complained of a feeling of a tight band round his head and that his self-control was gone. He felt demoralized, and begged that no further efforts should be made to help him to get sleep. After this a cup of hot tea during the night gave a little sleep, and as the irritation gradually subsided he passed better nights. Locally camphor in hard paraffin succeeded better than soda fomentations or lead and opium, but it is evident from this account that treatment did little, if anything, to relieve any of his symptoms. The throat gradually got better and the rash was not followed by desquamation. The day following the disappearance of the rash he had an attack of acute arthritis affecting the temporo-maxillary and wrist joints, and to a slight extent the ankles, with pains in the muscles of the forearms, back, and neck. This was greatly relieved by 10-gr. doses of salicine thrice a day. He was free from pain on the eighth day. On July 25th the rash reappeared and persisted for four days. The chart is not very complete, but there are a sufficient number of observations recorded to indicate the course of the illness.

It is alleged, first, that the previous exhibition of calcium salts will prevent the appearance of serum rashes, and, secondly, that they are less likely to recur if the second dose of serum is administered within a few days of the first. Now for many weeks prior to his haemorrhage my patient had been taking calcium to counteract a tendency to constipation, and after its onset he got large doses orally and also by enema; also during his haemorrhage he took 30 c.cm. and sometimes 40 c.cm. orally in the day for sixteen days. Again, after the intravenous injections were begun they were continued daily for six days. From this it is evident that neither the previous administration of calcium salts nor the quick repetition of the serum dose can be depended upon to obviate these unpleasant complications. It is also worthy of note that normal serum administered by the mouth may fail absolutely to arrest pulmonary haemorrhage and yet succeed at once if injected intravenously. If it is asked why, having stanching the bleeding with the first intravenous injection of serum, I persisted in them for five days, I can only plead the desire to make sure in a desperate strait and the benefit the patient seemed to derive from them otherwise. He is now rapidly recovering from his anaemia, and the little sputum he has does not show tubercle microscopically (August 25th). In spite of this unpleasant experience, I would not hesitate to inject normal serum again to arrest haemoptysis, but on the next occasion I shall not waste time giving it by the mouth. I hope others may be induced to try it and publish their results, for the value of a reliable styptic in bleeding from the lungs cannot be over-estimated.

A PERSONAL INVESTIGATION INTO THE DIETETIC THEORIES OF AMERICA.*

By ALEXANDER BRYCE, M.D. GLASG., D.P.H. CAMB.,
BIRMINGHAM.

AN endeavour to reconcile the divergent and apparently hostile dietetic theories which have reached us from America having proved futile in the privacy of my study, in the early part of this year I undertook an investigation on the spot. It was my earnest hope that I might be able to discover a *via media* which, although not capable of fully explaining the differences of opinion, would at least provide a satisfactory working rule in practical dietetics.

BATTLE CREEK SANITARIUM.

With this end in view, I decided to commence my research at the Battle Creek Sanitarium in Michigan, a large institution where vegetarianism, or at least flesh abstinence, is practised. My reason for selecting this establishment for breaking ground on the subject was not because I was a vegetarian, or in any way committed to its doctrines or practice, but because its superintendent, Dr. J. H. Kellogg, cordially invited me to make full use of the excellent research laboratories attached to the institution, whilst I was at the same time able to make observations on the patients and guests in the establishment. I was, therefore, entered as a patient under the care of Dr. C. E. Stewart, and instructed to sit for three days at the test-meal table in the dining room, where a skilled attendant assisted me to select my viands in accordance with prescription.

* A paper read before the Birmingham Branch of the British Medical Association.

In common with several others, I had an early rise next morning in order to consume the non-appetizing *Zwieback* used in the test meal for obtaining the stomach contents and a sample of the saliva. The urine was carefully collected for twenty-four hours and a sample of the faeces obtained. Once a week the weight, blood count, and blood pressure were recorded. Although I was unfortunate enough to be compelled to succumb on the second day of this severe ordeal, I was astonished to find that out of the 500 patients, most of whom had been living on the usual American diet of three meals a day, supplemented in many cases by large quantities of alcohol and excessive indulgence in tobacco, an incredibly small number appeared to have any objections to or be affected in a deleterious manner by the great change. My own sufferings revived the most vivid recollections of two previous attempts to become a vegetarian, and I mentally decided that if I made a fourth attempt I would at least do so in a deliberate and cautious manner.

With my preconceived notions of a sufficiency of protein, meaning thereby the 100 to 125 grams of Voit and Atwater, I found the greatest difficulty in selecting my food from the unaccustomed viands on the daily menu, for which I was unable to summon up the slightest appetite. I do not know whether the efforts of my table companions to make their respective items fit into the caloric values prescribed by their medical attendants was in any way contributory to the result, but it did not improve it. I ought to say that the menu was constructed on a novel principle, each article of food being served in what was called—after Professor Irving Fisher—a “portion” or part of a portion (one “portion” representing 100 calories), and having its constituent protein, fat, and carbohydrates tabulated in calories. Breakfast, about 8 a.m., was supposed to consist of about 800 calories; dinner, 1.30 p.m., 1,000 or thereby; and supper, at 6 p.m., the balance of 2,400 calories. In addition to being fleshless, the diet was of the variety termed “low protein,” and was constructed as nearly as possible of 10 per cent. protein, 30 per cent. fat, and 60 per cent. carbohydrate. It was likewise purin-free, and no beverage except milk, a variety of curdled milk called “yogurt,” apple juice, grape juice, water, and a sample of the scorched cereal preparations to resemble coffee, was allowed.

According to Dr. Kellogg, the essential feature of the diet was that it was antitoxic, by which he meant that it contained no substance nor any ingredient likely to be converted into a toxin in the alimentary canal, and so produce autointoxication. He subscribes to the doctrine that no protein is stored up in the system, and hence every particle beyond 60 or at the most 70 grams a day is broken down in the colon by the proteolytic anaerobic bacteria, forming indol, skatol, phenol, leucine, tyrosine, muscarin, cadaverin, etc.

I do not doubt that when this diet can be digested and assimilated, which is probably the general rule, the results of its adoption are excellent, at least temporarily. I was told that only a very small proportion of the patients adhered to it when they left the institution, but that the larger number went home determined to live more hygienic lives on a smaller supply of meat. As was to be expected, I heard of quite a number who had broken down under the system, and of these I had personal acquaintance with four. Probably with greater caution in the transference from one system to another, these might be prevented. I am bound to add that whilst the nurses and doctors appeared to have a fair amount of vigour, they did not look at all like the healthy type of person we are accustomed to in England, but it must be remembered that it was from amongst them that the men were selected who demonstrated their superiority in the endurance trials against the selected meat-eating Yale athletes.

BUREAU OF CHEMISTRY, WASHINGTON.

The pleasure of my visit to the Bureau of Chemistry in the Department of Agriculture at Washington, D.C., was marred by the fact that its president, Dr. Harvey Wiley, had just departed for London to attend the seventh International Congress of Applied Chemistry. This in no way interfered with the work which I was permitted to do in the laboratories, which are on the eve of being transferred to a capacious new home. Dr. Wiley has been kind enough to forward me a short

statement of his experience in dietetics. He believes diet is an important factor in the production and cure of disease, and the most preposterous dicta he has ever heard concerning diet have not come from teachers of dietetics and cooking, but from physicians themselves. In his opinion, in the progress of medical education the near future will see the professorship of dietetics in a medical school advanced to the same rank as that of medicine, and he even asserts that the practice of medicine in the future will be largely a practice of dietetics. He thinks the human animal selects his food naturally, and that the proportion of protein to other constituents which we find in naturally-selected dietaries is about right. He neither favours a very high nor a very low protein ration, but moderation in all things. He does not believe that the low protein theory is at the present time either established or disproved by scientific data, and he asks whether it may not be possible that excessive mastication—that is, converting the meal into a mere mechanical exercise—may not in the end threaten the human family with great dangers of insufficient nutrition.

BOSTON AND HARVARD.

My visit to Boston was less prompted by the idea of inspecting the medical school than by the certainty of an interview with Dr. Francis G. Benedict, who has been commissioned by the Carnegie Institute of Washington to build and equip a laboratory entirely devoted to the study of nutrition. How well he has succeeded is evidenced by the fact that already he has installed two of the finest calorimeters in the world, which are in daily use, and that he is looking forward to the time when, at no distant date, he may possess three more. His work for many years to come is to be confined to the study of the production of energy in man and the lower animals. It is from this point of view that he may be looked upon as the most able opponent of Chittenden's low protein theory. His views are much the same as those of Dr. Wiley, although he is essentially an advocate of a high protein ration. He is much inclined to doubt Chittenden's results, and wishes to see the tests repeated under his own personal supervision. He believes that it is quite possible to live on a low protein diet, but not that a sufficient supply of energy can be manufactured without a very much larger supply of food than is maintained by either Kellogg or Chittenden. He states that it is only necessary to know the daily energy output to determine the energy requirement, for the energy output is practically the energy requirement. He finds that a man of average size weighing 66 kg. and at rest within the calorimeter, has an energy requirement for twenty-four hours of not far from 2,270 calories. Naturally the average individual outside the calorimeter, pursuing his ordinary course of life but not engaged in any occupation, would actually require more than this, because with the greater liberty to move about, the movements of the body would call for the utilization of more energy. It is interesting to know that he subjected Mr. Horace Fletcher, who was the first man upon whom Professor Chittenden experimented, to a calorimetric test. From his study of Mr. Fletcher's diet, Professor Chittenden came to the conclusion that Mr. Fletcher was able to hold his own with 1,700 calories of energy. During this period he was undergoing an unusual amount of muscular exercise with the Yale University crew, and yet on a small quantity of food not only was nitrogen equilibrium maintained but his body weight also remained practically unchanged. During the three days of the residence in the respiration calorimeter his average output of energy was 1,896 calories, whereas the amount of energy actually derived from the food averaged only 1,357 calories. To make good this discrepancy, therefore, Mr. Fletcher was compelled to draw upon his body material for 541 calories, and the data of the experiment show that he actually lost body material sufficient to supply this amount of energy. Dr. Benedict, therefore, concludes that during the Yale experiment Fletcher's energy output could hardly have been less than 3,000 calories. The 1,300 calories representing the difference between the intake of energy as estimated in the food and the probable output during the excessive muscular exercise, could be accounted for by the combustion of 150 grams, or about $\frac{1}{3}$ lb. of body fat. In the course of the short

experiment of six or seven days there may easily have been a loss of 1 or 2 lb. of body fat, compensated by a gain of 1 or 2 lb. of water in the body, so that the body weight would remain unchanged. Fat and water constantly replace each other in the tissues. With an excess of carbohydrate in the diet the tendency of the body is to retain water in the tissues, whereas when fats largely predominate the tendency of the body is to lose water. In unpublished experiments upon other low protein advocates Dr. Benedict came to the conclusion that they took food of 40 per cent. more caloric value than they believed.

I found Professor Folin rather inclined to be conservative in the expression of his views. He believed that the average man can adapt himself to any form of diet, one with a low protein content for preference. He considers that all forms of protein are equally well absorbed, but that flesh contains something besides the protein, which gives it a more stimulating character than vegetable protein. He is satisfied that it is possible for auto-intoxication to arise in people who take an excess of carbohydrates or fats, and that there are people who can tolerate a larger quantity of proteins with a minimum of carbohydrates and fats rather than a smaller quantity of proteins with a maximum of carbohydrates and fats. But he considers that much work remains to be done on the subject. Professor Folin's observation that the same quantity of kreatinin was always present in the urine of people living on a flesh-free diet undoubtedly paved the way for the formulation of his brilliant theory of protein metabolism. Stated briefly, this is as follows: The food proteins are tissue builders solely by reason of their nitrogen content. The muscle tissues of a normal man—unlike those of carnivorous animals—do not increase when the protein of the diet is increased. Instead thereof, all the nitrogen of any excess of protein is eliminated at once, and hence cannot be required to build new tissues, which have a limit to their growth. In other words, when nitrogen equilibrium is established, the body does not store up the surplus nitrogen in the food, but excretes it as rapidly as possible. The reason is that there are two forms of protein metabolism—that carried on in the tissues, or endogenous, and that conducted among the circulating proteins in the blood, or exogenous. Only a small amount of protein—namely, that necessary for the endogenous metabolism—is needed. The greater part of the protein furnished by a standard diet like Voit's—that is, that part representing the exogenous metabolism—is not needed, at any rate so far as its nitrogen is concerned, but by a process of hydrolysis is split up into urea, which is rapidly excreted, and a non-nitrogenous or carbonaceous portion, which is doubtless utilized by the economy in the same manner as the other ternary bodies. These, we know, are by a process of oxidation decomposed with the evolution of heat, which can be converted into mechanical energy.

YALE.

I was pleased to discover that Professor Chittenden is as much admired for his personal qualities as for his capacity in research, and he spares no pains in assisting every eager worker with whom he comes in contact. I am specially indebted to him for many hours of interesting conversation on the subject of diet and metabolism. His own views on the question of diet may be crystallized into the statement that he believes in a low protein mixed diet for the following reasons: (1) Because no nitrogen can be stored in the tissues; (2) because excess of protein tends to disseminate toxins throughout the body; (3) because energy is dissipated in excreting the surplus protein; (4) because there is no necessity to indulge in muscular exertion to aid in working off surplus protein, and hence energy is saved; (5) because a combination of animal and vegetable proteins is essential for the requirements of the body.

With regard to his famous experiment which compelled him to adopt these views, he said that his reason for undertaking it was that he was not satisfied that the observation made by Voit and Atwater into the dietetic habits of the people had established the true physiological nutritive requirements of the body. His aim was to demonstrate the true nutritive requirements of the body as contrasted with dietetic habits, and he required that during the experiment the four following points be considered: (1) That nitrogen equilibrium be maintained;

(2) that physiological equilibrium—that is, the body weight—be maintained; (3) that physiological efficiency be maintained; (4) that the ability to resist disease be not decreased. He discussed with me in detail the various criticisms of his theory, especially with regard to the following three points: (1) The fact that the body weight was maintained by a retention of water in the tissues in place of fat which was destroyed; this, he said, might explain physiological equilibrium for a few weeks but certainly not for 225 days. (2) He combats the view that a diet rich in protein is likely to increase the resistance to disease. Dr. Reid Hunt, of Washington, fed two groups of dogs on a high and low protein diet respectively. The same poison was then administered to each group, and it was found that the low protein dogs could withstand a three times greater dose than the others, hence proving that they had a greater resistance to morbid influence. (3) With regard to the statement that the Japanese navy had found that a high protein diet was accompanied by a diminution in the number of cases of beri-beri, he contended that it did not necessarily follow that the increase of protein was the cause. He thought that it was much more likely that other elements were introduced into the food capable of accounting for the disappearance of the disease. Protein pure and simple is unlikely to be utilized as a food in the body. It is much more likely that it requires to become a salt of lime, potash, or soda before it can be available for dietetic purposes. He thinks the mineral salts introduced with the protein prevented beri-beri, much in the same way that lemon juice prevents the appearance of scurvy.

His able coadjutor Professor Mendel, who occupies the chair of Biological Chemistry, informed me that he considered that the great experiment had at least established the protein minimum requirements of the body. As he personally was rather a hearty eater, the only way he could adopt a low protein diet was by becoming a vegetarian, and this he did for the full 225 days. After the experiment he returned to a mixed diet with less protein than formerly, because he believes that this is the one best fitted to subserve the proper nutritive requirements of the body.

Dr. W. G. Anderson, who is Director of the Yale Gymnasium, informed me that on account of increasing fatigue and loss of endurance he dropped his high protein diet at the time of the great experiment and adopted a low protein one, with the result that he is now in the best of health and condition. His chest capacity had increased by 2 in., and his muscles, which I had the privilege of feeling, were as hard as iron bands.

Professor Irving Fisher was kind enough to inform me that on account of a serious breakdown in health he was advised to adopt a system of overfeeding. Although by this means he was about to rout the disease which threatened to overwhelm him, he experienced a great lack of energy, and had no capacity for endurance. Since, however, he had adopted the low protein mixed diet, his production of energy and capacity for endurance left nothing to be desired. He certainly looked the picture of health.

THE THREE CLASSES OF FOOD REFORMERS.

In reviewing the whole situation, one can hardly escape the conclusion that, after all the experimentation, we are not much further forward than we were. The doctrine of moderation in all things has been promulgated for many centuries, but it is not preached to-day with any more fervour than in the past. The three chief sections of dietetic reformers are: (1) Flesh abstainers, (2) purin-free feeders, (3) low-protein feeders. I am well aware, of course, that there are endless subdivisions of these classes on such minor points as salt-free food, yeast-free food, and so on, but these are non-essential points of difference of no great moment. Nor am I forgetting the system founded upon the theory of hyperpyraemia, but I think its author does not insist upon its adoption as a diet in health so much as a treatment in disease. When we endeavour to reconcile these various sects, we find the effort almost hopeless, as they all claim great advantages for their dietetic methods, but are at variance on the main principles. At first sight it might appear as if Classes 1 and 2 were similar, if not indeed identical, as they both agree in being fleshless and in the main purin-free, but they are at

daggers drawn on the question of the amount of protein, Class 1 insisting on 6 grains per lb. weight of the body, whereas Class 2 declares that without at least 9 grains per lb. weight of the body breakdown is sure to occur sooner or later. A minor point of difference in these two sections is that Class 1 derives its protein from legumes, nuts, and cereals, whereas Class 2 depends chiefly on cheese and other milk products. The purin-free devotee declares that there are excessive quantities of purins in legumes, and even nuts are not free from them, whereas the flesh abstainer stigmatizes cheese as a product of putrefaction, and if he ever uses it does so in its perfectly fresh state. It is quite conceivable that if legumes and nuts, or even cheese, were to disagree with any individual digestion, a much larger quantity of endogenous purin would be excreted, due to the greater breakdown of tissue cells.

The flesh abstainer, who in the great majority of instances has selected his dietary from humanitarian motives or religious scruples, is compelled to make up his caloric total by an increase of carbohydrates and fats, especially the former. To prevent the gastric discomfort which so frequently attends upon such diet he dextrinizes the cereals and specially prepares the nuts, and by this means doubtless provides the peptogens, of which he deprives himself when he eschews purins.

In a paper read before this Branch last year on the Limitations of a Purin-free Diet,¹ I gave the results of a fairly extensive experience in the application of that diet. It appeared to be tolerated for twelve months or thereabouts in the majority of cases, and then anaemia and dyspepsia supervened with disastrous consequences. The opinion I formed then was that the deprivation of the peptogens in the purins and the unaccustomed proteins in the cheese, etc., were chiefly responsible for the trouble. It is quite likely that the increased starchy content of the food had something to do with the matter, and possibly dextrinizing might be of great assistance. The flesh abstainer, however, declares that the chief reason is the excessive quantity of protein contained in the diet, and, as on this point he agrees with the third class of dietetic reformer, I should like to mention some of the advantages claimed for a low protein, fleshless diet, and for this purpose will make extracts from a paper read by Dr. J. H. Kellogg before the International Congress on Tuberculosis at Washington last year on "Diet as a means of increasing vital resistance in tuberculosis, with special reference to the protein ration."

THE ADVANTAGES OF A LOW PROTEIN DIET.

From thirty years' observation on thousands of patients and attendants in Battle Creek Sanitarium, he contends that the following obvious advantages are rapidly brought about: (1) Clearing the skin, the disappearance of skin eruptions, sallowness, etc., and rapid improvement in colour and texture of the skin; (2) improvement in the blood count and in the haemoglobin, 12 per cent. in the former, and 15 per cent. in the latter; (3) a notable fall in blood pressure, from an average of 181 mm. Hg to 158 in a fortnight's time. As no pressure-lowering drugs were administered, he attributed this fall to the suppression of pressure-raising toxins produced in the alimentary canal, and the better elimination of tissue wastes.

Professor Zuntz of Berlin informed him that protein requires a much greater expenditure of energy in its digestion and utilization than the other food principles. The energy required for the digestion of fats is only 2½ per cent. of the total energy represented, whereas that required for starch was 10 per cent., and that for protein was 16 per cent. The burden thrown upon the liver and kidneys by excreting the excessive quantities of urea and uric acid on a high protein meat diet is at least four times greater than that on a low protein, fleshless one, and there is a marked diminution of the alkalinity of the blood. This results in deficient oxidation of protein and accumulation of waste products in the blood and tissues. These are of a highly complex character, taxing the kidneys, liver, adrenals, thyroids, and other organs, whereas the metabolism of fats and carbohydrates simply produces CO₂ and H₂O, which are easily eliminated without harm.

He conducted many experiments and made many analyses of excreta showing that intestinal putrefaction is directly proportional to the amount of protein in the dietary, as much as twenty times the amount of indol in

the faeces and indican in the urine being produced by low protein fleshless feeders who were put on a high protein meat diet. At the same time they displayed symptoms due to this increase of protein, such as headache, loss of appetite, loss of energy, and general malaise. A striking table is quoted showing the amount of indol produced in equal quantities of various foodstuffs (25 grams) mixed with 10 grams of human faeces, and incubated for three days. The figures were an average of 8.54 mg. of indol for meats, 1.045 for milk products, 0.181 for vegetable foods, whilst cereals were 310 times less toxic on this method of examination than mutton, which, strange to say, was the most toxic flesh food.

Beisacher has shown that the removal of the thyroid gland of a dog is quickly followed by death if the animal is fed upon a meat diet, while life is prolonged indefinitely and the animal enjoys good health when fed upon a diet of bread and milk. Blum and Kishi hold that the function of the thyroid gland is to neutralize the poisons derived from the putrefaction of albumen in the intestine.

In the ingenious Eck fistula experiment an anastomosis is made between the portal vein and the vena cava, a ligature being applied to the portal vein close to the liver, thus cutting out the liver from the portal circuit. A dog thus prepared fed upon meat dies in three days; when fed upon bread and milk the animal lives in excellent health for an indefinite length of time. Pawlow has shown that the urotoxic coefficient of such a dog is trebled after tying the portal vein, showing that the liver has three times more work to do on a high protein flesh diet than on a low protein fleshless diet.

Hirschfeld has shown that with a diet of 70 grams of albumen a healthy kidney eliminates 10.1 grams of nitrogen, a diseased kidney 9.3 grams. When the albumen ration is increased to 130 grams the healthy kidney eliminates 14.5 grams, and the diseased kidney only 11.7 grams, and this disproportion increases the longer the high protein diet is maintained.

Flesh foods contain on an average 200,000,000 putrefactive bacteria in every gram, so that it is appalling to think of the number one swallows in the course of a day. It is comforting to think that Nature has provided the body with many defences against this terrible risk of poisoning: the most important, of course, being in the hydrochloric acid of the gastric juice, and the maintenance of the effective digestive capacity in the stomach and small intestine. We can see, therefore, how it is wise in old age, when the acidity of the gastric juice is diminished, to lower the flesh ration. The mucous membrane of the intestine next exercises a protective function, not only in its epithelial cells and leucocytes, but also in the outflow of mucus which hinders the absorption of the poisons by preventing their contact with the living tissues.

The liver and thyroid gland, as we have seen, and probably other antitoxic glands, are likewise on the lookout for any poisons which may escape the toils of the gastric juice and intestinal mucous membrane, so that the healthy man is fairly capable of dealing with the poisons contained in a flesh diet, a fact of which we have abundant evidence every day of our life.

Most of these facts are already familiar to those who have read Combes's treatise on "Auto-intoxication," and it is recognized that there are at least four efficient reasons why auto-intoxication does not exist in healthy people, even although all the local conditions may be present in the alimentary canal. Where, however, hypochlorhydria is present, or the colon is catarrhal, or the liver and the thyroid and other glands are defective in their activity, the toxins are admitted into the blood and exert their malign influence on the body.

CONCLUSIONS.

An attempt to reconcile the doctrines of these three sects will apparently meet with little success.

The low protein feeders admit flesh into their dietary, have not the slightest objection to purins in soups or xanthins in tea, coffee, etc., and lay no special stress upon the observance of other laws of health, such as the necessity for exercise, abstention from tobacco, etc.

The purin-free feeders expunge all purins and xanthins from their diet list, insist upon at least 50 per cent. more protein, and one would be disposed to infer from reading

the published treatise of its author that these are the only practices essential to perfect health.

The flesh abstainers agree with the low protein advocates in the smallness of their protein content and with the purin-free feeders in their objection to purins and xanthins, but, in addition to this, expunge every possible toxin from their diet list, and place the greatest emphasis on the performance of every known law of health. Their chief apostle, Dr. Kellogg, preaches the necessity of three evacuations of the bowel each day, and for this purpose consumes at each meal liberal quantities of agar-agar in compressed tablet form.

The one thing upon which they all agree is in the diminished amount of food, and so we come back to the fundamental doctrine of moderation in all things, which has not only been taught from time immemorial, but is actually practised by all sensible men at the present time. It is quite possible that the sedentary man may err in eating a little too much animal food, but this is practically forced upon him by his habit of taking too little exercise. But the average man will be very much surprised if he will sit down and carefully estimate the caloric value of his day's food. He will most likely find that it is very much below the 40 calories per kilo, amounting to over 2,500 calories per day, allowed by von Noorden, to say nothing of the 3,000, 4,000, and even 5,000 calories mentioned by some other authorities. I have frequently estimated the caloric value of my own diet, and have sometimes been depressed because I could not get it to exceed 1,800 calories. I have been much comforted, however, to discover in a little book by Max Einhorn on diet and nutrition that his own average was 1,650, or 32 heat units per kilo, and this was on a mixed diet, which, he informed me, he was profoundly convinced was the only rational dietary for a healthy man. Probably most men conform more closely to the low protein diet than they are willing to admit. The healthy man can live on any system of diet by attention to moderation and regularity, but the unhealthy man must look to the dietetic expert to guide him in the selection of the best system or kinds of food to suit his case.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, 1908, vol. ii, p. 1327.

THE TREATMENT OF CHLOROSIS.*

By CHARLES H. MELLAND, M.D. LOND., M.R.C.P.,
SENIOR HONORARY PHYSICIAN, THE ANCOATS HOSPITAL,
MANCHESTER.

CHLOROSIS is a very common ailment, and, generally speaking, one that is readily and fairly quickly cured. Each of us probably has his favourites among the twenty or so pharmacopoeial preparations of iron, and it only occasionally happens that one comes across cases that resist one or other of them. Nor are we usually neglectful of the auxiliary methods of treatment, the regulation of the bowels to prevent intestinal toxæmia, the prescription of fresh air, and, above all, of proper food, since its occurrence seems to be so frequently bound up with improper diet. We do not, perhaps, often carry out the line of treatment suggested by my friend Dr. Eustace Smith,¹ who relates the cure of a case of chlorosis by means of small doses of zinc sulphate, which, by frequently clearing out the stomach, and by preventing the fermentative changes which had been going on in the alimentary canal, removed what he took to be the underlying cause of the disease, though there is another way of looking at his case which I shall refer to later.

But it does occasionally happen that cases come or are sent to us, in whom all the ordinary measures have been employed and found wanting, and on whom all the new, so-called "organic" preparations of iron which the skill of German chemists has evolved, and the enthusiastic if somewhat commercial advocacy of German physicians has pressed upon the profession, have been tried with little or no success.

It is particularly in these cases that the routine treatment which I shall describe is likely to prove of value, though even in the less stubborn cases it is of service since it shortens a good deal the time required for recovery.

* A communication to the Association of Physicians of Great Britain and Ireland, Dublin, June, 1909.