A key to health and long life / by F.W.D. Mitchell.

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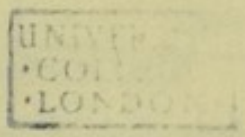
BY

F. W. D. MITCHELL, I.S.O.



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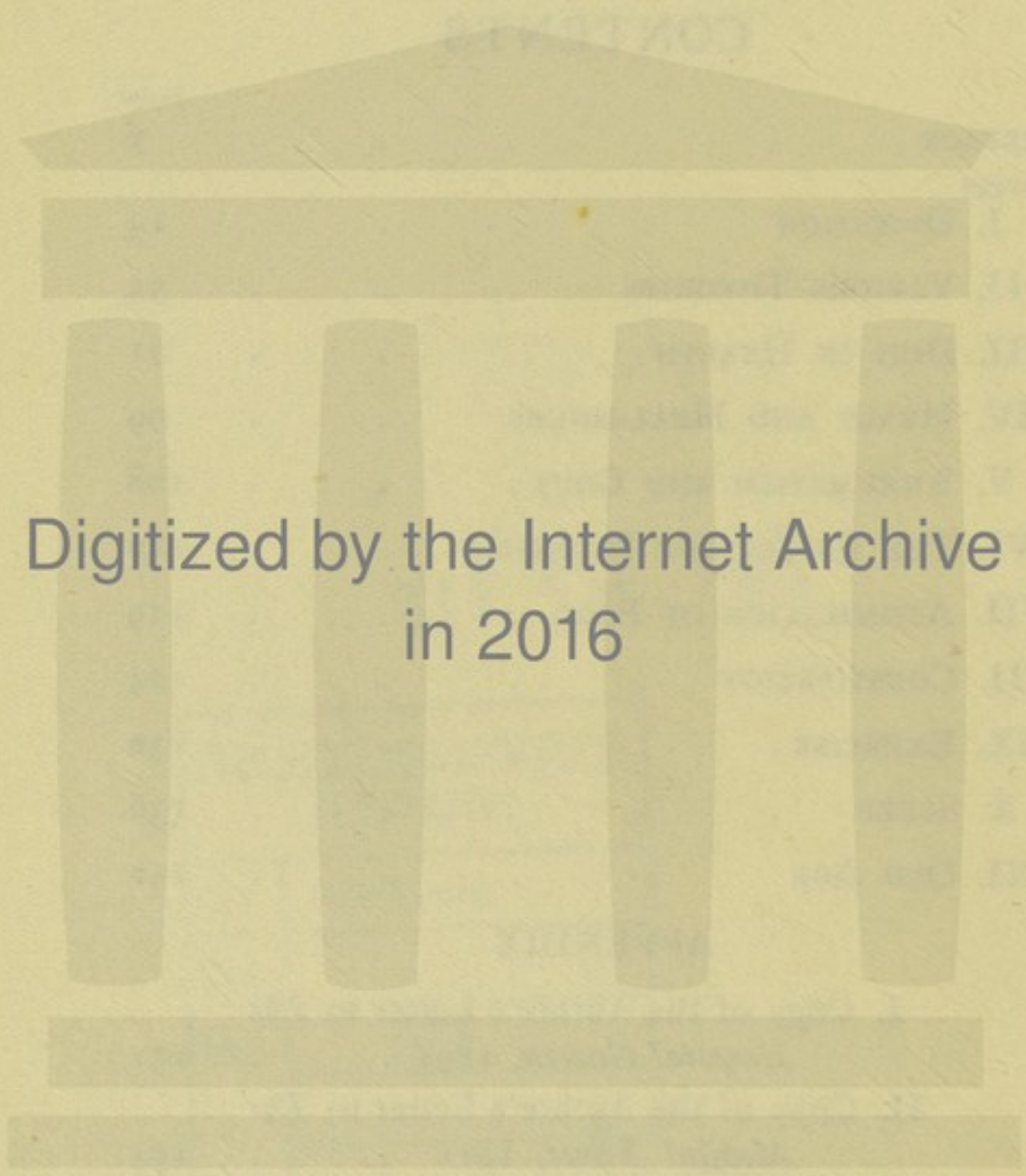

PREFACE

"If you were my fool, Nuncle, I would have you beaten for being old before your time."—KING LEAR.

"Make the third part of medicine regard the prolongation of life; this is a new part and deficient, though the most noble of all, for if it may be supplied medicine will not then be wholly versed in sordid cures, nor physicians be honoured only for necessity, but as dispensers of the greatest earthly happiness that could well be conferred on mortals."

FRANCIS BACON.

THE author of this little book is now in his seventieth year. Almost a quarter of a century has passed since he completed the five-year course prescribed by the Joint Colleges of Physicians and Surgeons in London, but, owing to the demands of other work, he could not devote sufficient time to enable him to pass the final examinations and obtain the medical qualification.

In these circumstances he feels that some apology is due from him for committing a trespass on the domain of the profession by writing on a medical subject. He therefore desires to state, in the first place, that the subject of digestion, or rather of the nature and consequences of bad digestion, on which he writes, has admittedly been to a great extent neglected in the training of students for the profession.

Dr George Keith, in "Fads of an Old Physician," says :

"The pity of it is that most medical men overlook the evils which come upon the healthy from

free living and that in this they are encouraged by the prevailing doctrines of the day, as taught in the Medical Schools."

Dr F. J. Wethered, in *The Practitioner*, said :

" To the Medical Student the cases of indigestion which present themselves for treatment in the Out-Patient Department are regarded with scant interest, as presenting no features likely to aid them in forthcoming ' Finals.' "

It will hardly be denied that the study and practice of medicine have hitherto been too exclusively concentrated upon the healing of disease and the relief of suffering, and that sufficient attention has not been given to the supremely important, though less pressing, subject of the prevention of disease and the prolongation of life by the regulation of the digestion. This view is strongly supported by the following passage in Sir Benjamin Ward Richardson's " Health and Life " :—

" The Physician has been the healer purely, not until the last days—almost our days—the preserver of health. It is the business of the Physician to cure the evils which the world has inherited or acquired. Why should he go into the questions of cause ? The question raised may be social. Is he to interfere with the daily life of his patients, turn their homes upside down, criticise their eating and drinking, find fault with their clothing, instruct them in their working and guide them in their amusements ? "

Dr Yorke-Davies, in his treatise on " Health and Condition," says :

" The day is dawning, I believe, when the subject of food with relation to health will form a part of our education. Sanitary science has of late made rapid strides, with results that are already an untold national blessing. It is not therefore too much to hope that the science of dietetics may have its day and if it does our posterity will be a stronger, healthier and longer-lived race."

In the second place, the author desires to draw attention to the remarkable fact that so many divergent, if not inconsistent, theories have been propounded by physicians and scientists in the attempt to explain the origin and history of those injurious substances which, it is admitted, are frequently, and even generally, present in the blood and are very fatal to health. Some attribute them to disorders of gastric digestion, some to derangement of the liver, some to nervous depression, some to particular articles of diet and some to certain microbes normally resident in the body. And then with regard to treatment there is a similar absence of unanimity : one suggests a diet of meat only, another no meat at all, another recommends a diet of vegetables and nuts, another condemns all starch foods, another abolishes breakfast, another says that a substantial breakfast is good for the digestive system, another says that all foods containing certain chemical substances should be avoided, another asserts that slow mastication will prevent all the mischief, another advises complete starvation for many

days at a time, while another states that the remedy lies in importing "friendly microbes" which are to be found in a certain preparation of sour milk. All these speculations and differences of opinion on fundamental questions must be most confusing and unsatisfactory to a lay inquirer who seeks simple, practical instruction in the means of preserving health. The only general recommendation in which all the medical authorities referred to may be said to agree is that the way to preserve health is to be moderate in all things.

Moderation is, however, only a general principle, not a precise rule; it is too vague and indefinite to constitute a reliable practical guide under all the circumstances of everyday life; it leaves room for endless misunderstandings and does little or nothing to instruct the ignorant. The rules suggested in this book are, on the contrary, clear and definite, and can be applied by any observant and careful person to his own case at any time.

No rigid system of dietary is here laid down for any class of persons, everyone being left quite free to find out by experiment what best suits his constitution, circumstances and tastes. At the same time a very simple test or guide is offered as a key to the practical difficulties, and the author has the strongest reason to believe that this key is the true solution, as it provides the means of ascertaining definitely at any time whether a meal has been properly and completely digested or whether it has resulted in dyspepsia, with the consequent formation of "mal-products" injurious to health.

In the third place, the author wishes to explain that the suggestions he puts forward have not been at all hastily arrived at, for he has tested and

practised the rules here laid down during a period of more than forty years and has proved their practical value and accuracy beyond all possibility of error.

Further, he has long been impressed by the fact that in no other important business or interest in life are so much carelessness and ignorance generally displayed as in connection with diet and digestion.

It is indeed strange that civilised men of the twentieth century, who are capable of accomplishing such marvellous feats as calculating the paths of the planets, severing continents, "putting a girdle round the earth" in little more than Shakespeare's "forty minutes," and flying at the rate of one hundred miles an hour, do not know whether they digest their breakfast or whether they eat twice as much food every day as they actually require.

Good digestion is generally supposed to be the common possession of all excepting the sick, but in reality it is far more often the exception than the rule, and few are aware that bad digestion is a much worse enemy to health than is time itself, inasmuch as it brings in its train a host of diseases and deprives most men of many years of health and activity.

It is virtually unknown to the mass of laymen that the distinction between healthy digestion and that failure of the stomach's functions which is termed dyspepsia is not merely a question of degree, one being a little better than the other, but that there is a clear physiological difference, the result in one case being healthy nutrition and physical strength, in the other physical weakness and the entrance of poisons into the system

which gradually undermine the constitution and seriously shorten the natural span of life.

Amongst the general causes of the prevalence of dyspepsia the number of occupations unfavourable to physical health must be given a prominent place. The complex industrial system of modern civilisation, in which some occupations are physically laborious, others sedentary, some are outdoor, others indoor, some demand physical work only, others mental work only—with endless gradations between all these extremes—creates such differences in the conditions to which the body is subject that no fixed rule or settled custom in regard to diet can be generally adopted. Quoting from the weekly journal, *Health* :

"In such circumstances heredity, which is Nature's means of gradually fitting a race of beings to meet changes in their surroundings, gets little chance of accommodating the constitution of a family to one mode of life. It might do so under the Hindoo system of caste, which compels the son to follow the same trade as his father, but with us a son frequently takes to an occupation differing radically in its physical requirements from that of his father. The great increase of town populations aggravates these irregularities and vicissitudes. Reason tells us, however, that there must be a very close relation between the income and expenditure of a healthy body and that it cannot be immaterial to health how much fuel is supplied to the machinery."

These considerations show how necessary it is that every individual should possess such a know-

ledge of general principles as will enable him to cope with some at least of the difficulties in which he may be placed.

For the greater part such industrial drawbacks as those here referred to are unavoidable, but there are national and class customs prejudicial to health which might be changed without any appreciable difficulty. It cannot be an accidental coincidence that in England the custom of taking a substantial breakfast at an early hour should be so general and that dyspepsia should be so very common, while it has been said that indigestion is unknown in France, where a very light breakfast is the universal rule. An easily digested meal, no matter how light it may be, is in every way preferable to a substantial one which overtaxes the powers of the stomach and is not digested. There can be no reasonable doubt that all classes of the English people are in this important matter of diet as extravagant as they are ignorant.

In order to lead up to and support the conclusions arrived at by the present writer, quotations bearing upon the subject of the poisonous substances derived from the digestive tract will be given from the writings of many eminent physicians.

The position taken up in this handbook, and by which it must stand or fall, is, briefly, as follows :—

1. By far the greater number of common diseases arise from degenerative changes within the body, not from infection or contagion from without.
2. These degenerative changes are the results of the presence in the blood of mal-products

of digestion called "lithates," "urates" or "uric acid compounds."

3. The blood can be kept free from these highly injurious substances by a little self-denial and by attention to a few simple precautions in regard to digestion, diet and exercise.
4. The only certain, convenient and reliable test of healthy digestion, applicable by anyone at any time, is the absence of visible deposits in the water, after cooling.

The supply to every cell in every tissue of the body of pure blood, free from the noxious substances mentioned above, keeps every nerve, muscle and artery in a healthy, efficient state until, in genuine old age, long deferred, the entire frame becomes worn out, not by disease, but under the inevitable decree of Nature. If, on the other hand, digestion is neglected and the blood is daily vitiated by these mal-products, every cell in the body is not only badly nourished, but actually poisoned; there is a general loss of vigour, and many painful diseases follow gradually on the advancing degeneration of all the organs, the worst sufferers being the arteries, heart and kidneys. Nor is the injury limited to this, for the weakened tissues become less able to withstand the effects of exposure to chills, of accidents and of the attacks of disease-germs coming from without.

The division of diseases into the two great classes referred to above—first those originating internally and caused by degeneration of tissue through mal-nutrition, and, secondly, those originating externally and arising from infection

or contagion—suggests that there are really two distinct branches of Preventive Medicine, the one aiming at the preservation of health and prolongation of life by means of healthy nutrition, moderate diet and due exercise, the other seeking to protect the body from the ingress of germs of infections diseases. Both are now, in a general way, included under the term hygiene.

The State has not hitherto fully recognised its duty in regard to hygiene and has taken no steps to give elementary instruction to the people in those simple, but at the same time vitally important, physiological laws, relating to diet, exercise and digestion, on which their health, wealth and happiness so directly depend. Dr Saleeby recommends the inclusion in national education of " personal hygiene and the formation of habits of health, as obviously and inevitably the first and most important item."

Apart altogether from the sorrow, pain and poverty which avoidable sickness and premature decay bring upon tens of thousands of families, the financial loss due to the same preventible causes must, from a national point of view, amount to a vast sum every year, and it is evident that any simple instructions which would do even a little to improve the general health of the community and extend the duration of life must be of very great value.

In close connection with the question of the economy to be effected by the prevention of much of the sickness and disease now prevalent, is the possibility of a large saving in the cost of food at present wasted and worse than wasted through the almost universal want of knowledge of dietetics

and hygiene. If a more rational system of diet were generally adopted and some instruction in the practical principles of digestion were in everyone's hand not only would a great improvement in public health be brought about, but that large portion of the nation's income now lost by the purchase of food which is either in excess of what is actually required or is in excess of what is likely to be digested at the particular time, would be saved. In *The Times* Food Supplement of the 8th June 1914 the following words are quoted from "The Toiler and His Food," by Sir William Cooper, C.I.E.

"He, or they, who can convince the masses of the people that their food is unwisely chosen and eaten in profound ignorance of all the laws governing alimentation, would confer on mankind gifts more material, durable and beneficent than have the brilliant scientists who gave the world steam and electricity and all sorts of strange mechanical devices."

Instruction should also be given in the cooking of plain dishes in which milk, cheese, eggs, peas, beans and lentils take the place of meat, which is an expensive luxury rather than a necessity. A table given in one of the following chapters shows that nearly as much work can be done by the expenditure of a few pence on cheap farinaceous foods as can be done by the same number of shillings spent on fresh beef.

This book is an endeavour to show that the old maxim, "Prevention is better than cure," is capable of far wider application in regard to health

and longevity than the public has any conception of. The thousands of wealthy people who annually spend large sums on visits to British and foreign spas for the purpose of "taking the waters," in the hope of clearing out the uric acid compounds from their blood, can hardly be aware that it is quite possible, by leading a more simple and healthy life, to prevent entirely the manufacture of these poisonous substances in their bodies. The fact that luxury, in its many forms, is the real fount and origin of all these troubles is gradually becoming more generally known, and yet, perhaps, not much progress towards a more simple life has been made since Dr Abernethy complained that "No man will attend to his digestion until death stares him in the face."

The author of this handbook is confident that the day will soon arrive when the simple test which he proposes will be universally recognised as the chief safeguard of health and that it will be deemed essential in any general scheme of instruction for the prevention of physical degeneration. He does not, however, ask any of his readers to act on his advice until careful experiment has satisfied them that the truth is in it.

F. W. D. MITCHELL.

SUSSEX LODGE, UCKFIELD,
16*th June* 1914.

A Key to Health and Long Life

CHAPTER I

DIGESTION

It is most probable that everyone who opens this book will be under the impression that he has a fairly accurate idea of what is meant by the word "indigestion," but it is equally probable that before he has read many of the pages he will have discovered that he knew nothing about the kind of indigestion with which this book chiefly deals.

Acute Indigestion

The explanation is that the only form of indigestion generally known to the lay public is that which announces itself by causing pain or decided discomfort after a meal, a trouble which is of far less common occurrence and of far less importance to the majority of the community than the kind of indigestion which causes no pain or discomfort at the time, which reserves its penalties for perhaps many years, and yet is most injurious to health, gradually undermines the constitution and very considerably shortens the natural term of life.

Dr Andrew Wilson, in " The Family Physician," says :

" The leading symptoms of all cases of indigestion may be taken to be represented by pain or discomfort associated with the taking of food and with digestion, in so far as the stomach is concerned. We may find other symptoms, represented by flatulence, acidity, constipation and the like."

Sir Henry Thompson, in " Diet in Relation to Age and Activity," speaks as follows :—

" The word indigestion denotes, not a disease, but an admonition. It is the language of the stomach and is usually an unknown tongue to those who are addressed. Few even listen to the cry, much less imagine that it bears a message of importance."

But even in this passage reference appears to be made to symptoms that are felt after eating and which more or less distinctly call attention to the stomach's troubles. Unfortunately, however, the stomach, as will presently be explained, is silent about the most common and most serious of its defaults.

Thomas Carlyle's experiences afford a remarkable instance of persistent neglect of often-repeated complaints of the stomach such as those referred to by Sir Henry Thompson. Carlyle's sufferings were, no doubt, very severe and were due to the mistaken notion that indigestion is an unavoidable weakness of the constitution, instead

of being a trouble that can be removed entirely by a more simple and well-arranged diet, with suitable outdoor exercise. He complained :

"The accursed hag dyspepsia had got me bitted and bridled and was ever striving to make my living day a thing of ghastly nightmares. I resisted what I could, never did yield or surrender to her, but she kept my heart right heavy, my battle being sore and hopeless."

And again :

"I dream horribly, the fruit of incurable biliousness. . . . Digestion totally ruined. Life is verily a weariness on these terms."

All this time he was probably adhering rigidly to a system of diet which, coupled with hard smoking, was quite unsuited to an elderly man engaged for many hours a day on literary work.

Books on indigestion give long lists of symptoms, such as the following, which are mentioned here only to explain more clearly the plan and purpose of the present handbook :—

Pain or spasms in the stomach.
Flatulence.
Difficulty in breathing.
Vertigo.
Vomiting.
Pyrosis.
Acidity or heartburn.
Regurgitation.
Constipation.
Diarrhœa.

Skin affections.
Nervous debility.
Mental depression.
Insomnia.

It might very naturally be remarked, after reading this list, that persons who suffer from such serious symptoms, except in the slightest and most transient manner, must know that they are decidedly unwell and it might well be assumed that they are in a doctor's care.

Healthy People

These sick persons are, however, but a small minority of the community and the present book is not addressed to them, but to the majority who are in good health, who have no troublesome symptoms to complain of and who think they require no advice in regard to their diet or manner of life. And yet very many of these healthy people will find, if they put their strength to a quite moderate and reasonable test, by some continued physical exertion, that they are quite out of condition and far from being thoroughly sound. They will get tired in a short time and perhaps exhausted long before a healthy person of their age should feel such signs of weakness.

Mr Eustace Miles has said, in "Avenues to Health," that he could count upon his fingers the really healthy men whom he has ever met, and Dr Yorke-Davies gives it as his opinion, in his book on "Health and Condition," that :

"A very common effect of taking food to excess, that does not nourish the nervous system, is want of condition, as evidenced by a general feeling

of malaise and fatigue after ordinary exertion. Indeed very few people are in what one may call condition. They may be in health and may do their work in a perfunctory manner, but the individual in good condition does it with zest and energy and life seems brighter and more pleasureable in every way."

Such people as those here referred to are unwittingly hastening the time when the infirmities of age will overtake them and will forbid all active exercise, while others of the same age as themselves may be in the enjoyment of health and strength. They may, however, be yet at the parting of the ways, and if they listen to good advice in time may escape years of sickness and add many years of health to their lives. The disabling effects of disordered digestion are not confined to people of middle age, for there are many between twenty and forty years of age who find themselves too weak for much active exercise and perhaps believe that their hearts are permanently weakened and that the fault lies in their constitutions. A strict regimen of early rising, careful dieting and regular outdoor exercise might in a few months restore many of these supposed invalids to fair if not full health and activity.

Those who habitually neglect exercise and yet seem in good health often feel tired and drowsy during the day, although they have had a good night's rest ; they sometimes feel hungry and weak two hours or so after breakfast, and may at times complain of aches in the back or in the legs or the head.

Those who have youth on their side usually feel

comparatively strong and well, even when put to the test of hard exercise, in spite of very frequent errors in diet and many unnoticed attacks of dyspepsia, but they are not so strong as they should be. If they kept their digestion in good order they would have far more strength and endurance than they now enjoy. Their present strength is due to their youth and unexhausted constitution and is no proof that their way of living is correct or that they are as well as they might be and ought to be. They resemble a spendthrift who is slowly but surely dissipating the fortune which he inherited and who may not for a long time feel the want of money, although he is every day bringing the moment nearer when his funds will be quite exhausted.

Dyspepsia or Functional Indigestion

The form of indigestion, more strictly called dyspepsia, dealt with in this book has not been given in medical works any name which clearly distinguishes it from the forms of indigestion which cause pain and discomfort, unless it be the term "functional," which explains nothing beyond the fact that no actual disease is present to account for the mischief. This kind of indigestion is not "acute," nor can it be correctly described as "chronic," as that word implies the continuance of some physical infirmity or weakness and here there is none to cause the dyspepsia that so frequently attacks healthy people. Nor is it "atonic," as that term is applied when there is a want of nervous tone in the system. There may be no abnormal condition of any organ, as this form of indigestion affects the healthy almost as

often as the sick. It may be termed "functional" in the sense that the stomach is at the particular moment unable to discharge its proper function when dealing with a certain supply of food owing to its powers being overtaxed and its proper action prevented by some accidental circumstance of a purely temporary nature, such as a larger quantity of food being taken than the stomach can digest; or the food is in an indigestible state; or an excess of liquid has been taken with it; or physical fatigue has caused general depression; or severe bodily or mental exertion just after the meal has deprived the stomach of much of its blood-supply; or perhaps great mental excitement has caused a general disturbance of function.

Functional indigestion or dyspepsia has the following characters:—

1. Its cause is independent of general health, as it may attack the strong or the weak, the healthy or the invalid.
2. It is not usually an exceptional occurrence, like painful indigestion, but is so extremely common that no one altogether escapes it. It may occur habitually and daily, or, in the case of the healthiest individuals, only on rare occasions.
3. It causes no trouble or pain at the time, but, on the contrary, may bring a sensation of relief and ease after a substantial meal, as the effort of digestion ceases when this form of indigestion takes place.
4. In the course of years it leads to many forms of serious disease in cases where it occurs very frequently. These diseases are due

to the degeneration of all the tissues and organs, the heart, arteries and kidneys being most affected, and it shortens life by many years.

The fact that functional indigestion or dyspepsia occurs so generally and does not cause at the time any noticeable inconvenience or pain, and that its ill effects are not usually distinctly apparent for many years, constitutes the great danger of this insidious malady. Although it is not regarded as a disease it is the parent of almost all the diseases that originate within the body. The peril lies in the impunity with which men seem to be able to bear its constant attacks and to defy or ignore the natural law that the amount of nutriment which any person requires and the amount which he can at any time digest are both strictly limited and yet the great majority are guided, in matters of diet, entirely by appetite and custom, and are quite indifferent to the existence of any such limits, as though no strict account were kept and no day of reckoning would ever come. Owing to the absence of any distinct warning, errors in diet and in the arrangement of meals, as well as the neglect of regular exercise, may be persisted in for the greater part of a lifetime, while the daily poisoning of the blood is laying up a store of suffering for the future and even now causing unsuspected weakness and degeneration throughout the system.

After any meal digestion may take either of the four following courses :—

1. It may proceed with perfect ease and in a normal, healthy manner to completion.

2. After a substantial meal a very slight feeling of fulness and effort may be noticeable, especially if a little exercise is taken, but with due rest digestion may be properly completed, as in the first case.
3. After some discomfort caused by the stomach being overtaxed by an excessive quantity of food or in some other way, as previously mentioned, the normal, healthy process may be interrupted, digestion breaks down and dyspepsia occurs.
4. Without any warning, perceptible discomfort or unpleasant sensation, the work of digestion may cease soon after the commencement of a meal and dyspepsia may occur, owing to the body being at the moment in no want of nutriment and to the nervous apparatus of the stomach being consequently unprepared for the digestion of a meal. This is what occurs when breakfast is taken too soon after rising from bed, or when a substantial meal is eaten while the whole system is depressed by great fatigue.

Symptoms and Tests of Dyspepsia

The symptoms which indicate a failure of digestion in the stomach and the occurrence of dyspepsia are as follows. Some of these symptoms are observable immediately after a meal, others within a few hours, and some still later :—

1. That pleasant sensation of fulness and even of weight and slight effort, with a disinclination for any exertion, which is quite natural and healthy after a substantial

meal, disappears entirely. This sense of effort or fulness becomes more noticeable after even a light meal if sharp exercise is taken too soon after it—assuming that digestion is proceeding. These latter sensations indicate that the stomach is doing its duty and is receiving the necessary supply of blood. If, by hard exercise or in any of the other ways already mentioned, the work of the stomach is interrupted, its efforts will cease and give place to a feeling of lightness, ease and freedom from effort, such as would be natural after a very light meal. When dyspepsia thus puts an end to digestion an unhealthy peace takes the place of healthy activity. It may hardly be necessary to add that a robust person who has been taking much active outdoor exercise is able to digest even a substantial meal without any appreciable sense of effort in the stomach, unless he takes exercise too soon afterwards.

2. A sudden feeling of flushing of the skin and sensation of heat during or immediately after a meal often indicates dyspepsia. Hence the old maxim : " Eat till you are cold and live till you are old." Sir Hermann Weber and Sir James Eyre confirm this view.
3. About two hours after the meal and perhaps during the remainder of the day thirst may be felt.
4. Two or three hours after the meal one may feel hungry, weak and even depressed, especially when taking hard or prolonged

exercise, if the meal was not digested. A substantial breakfast taken before some hard work often has this result. In some cases weakness and pain in the hip-joint may be felt by a person doing hard physical work and in other cases there may be a feeling of complete collapse. Sir Lauder Brunton remarks, with reference to this state of physical and nervous depression: "To relieve this condition they not infrequently think it necessary to take a glass of wine and a biscuit or a nip of brandy."

5. Sleep at night will be heavy and dreamy. During the day one will probably feel drowsy, tired and sleepy, and perhaps suffer from aches in the back, legs or head.
6. Moderate exercise, unless the weather be cold, will cause perspiration more readily and freely after dyspepsia than when the digestion has been good.
7. The bowels will probably be relaxed within twenty-four hours after the occurrence of dyspepsia, or perhaps within twelve hours.
8. The skin just below the eyes is darkened and depressed after dyspepsia, as it is after great fatigue. In cases of habitual and long-standing dyspepsia the skin here will be pale or slightly darkened, loose, wrinkled and depressed. At a later stage it may become either much sunken or much swollen. The full-face portrait of Milton in the National Gallery, London, affords a good illustration of a bad case of the latter kind. In the course of time the small terminal blood-vessels in the skin may become

weakened and relaxed, giving the complexion a permanently flushed or deep red appearance. This effect is increased by exposure to the weather.

9. The passing of water, which should take place within two or three hours after a meal, will be delayed considerably. The water will be more yellow and less in quantity after a meal which caused dyspepsia than it would be after healthy digestion. The time just referred to will depend very much on several circumstances, such as the quantity and nature of the food and the quantity and nature of the liquid taken with it. Cold weather and walking exercise, which assist digestion, will reduce the time ; rich food will cause delay because, as Dr Noel Paton states, fats delay digestion.
10. The water, after complete cooling, say in three or four hours at most after being passed, will show, if dyspepsia has occurred, a plainly visible deposit or cloudiness, instead of being quite clear or of a light, clear straw-colour. This deposit may take the form of a reddish-brown sediment on the bottom of the vessel, a suspended dusty cloud or an iridescent film or scum on the surface.

Notes on Symptoms of Dyspepsia

Each person must accept these directions and descriptions as merely suggestions and should use his judgment and experience in applying them to his own case. Symptom No. 10 is the decisive proof of the occurrence of dyspepsia after a meal taken

from four to six hours before the water has passed.

This interval may be even longer, as the waste-products of disordered digestion (the urates) are less soluble and pass through the kidneys more slowly than the waste-product (urea) of healthy digestion. It should, however, be mentioned, with regard to this symptom, that special deposits, due to serious disease, and having no direct connection with digestion, may appear, but there can be no danger of these being mistaken for the results of indigestion as the patient in such exceptional cases would be well aware that he suffers from disease and he is certain to be in the doctor's hands. After a little experience in applying these tests an observant person will be able to rely on No. 9 in the list, not troubling himself about the others. Although the time stated in this case is variable, being dependent on circumstances, the rule will be found a most reliable guide.

It should be understood that water passed within the first hour after a meal has usually nothing to do with the digestion of that meal. After a very simple and digestible meal the slightest sensation of fulness or effort in the stomach, perhaps nothing more than the consciousness of food being there, is sometimes mistaken for indigestion. A person who at other times often eats more solid or rich food than he can digest, and on such occasions feels no trouble after it, because dyspepsia has put a stop to digestion, thinks any sensation caused by healthy digestion is a symptom of indigestion. In such a case the digestion of some light refreshment may be proceeding quite naturally but is mistaken for

indigestion although the non-digestion of a heavier meal is mistaken for good digestion. This accounts for the complaint sometimes made that the most simple and digestible foods do not agree with a person's digestion ; thus milk, bread and milk, light farinaceous or pulse foods are often objected to by people who habitually eat rather freely of meat, cheese, eggs, pastry or new bread without any scruple, the reason being that dyspepsia relieves them of the effort of digesting these things. Rather intractable dyspepsia, due to weakness of the stomach and general want of tone in the system, will sometimes occur when a person is " run down " and should be treated under medical advice. Although Dr Herschell's treatment, given in his work on " Indigestion," under the heading of " Functional or Atonic Dyspepsia," is beyond the comprehension of the present writer, it may be quoted here. He says :

" The defective innervation of the digestive apparatus leads to imperfect digestion, and consequently diminished assimilation of food. The body is therefore imperfectly nourished. We have here to pursue the exact opposite course to that required in chronic catarrh. There we had to limit the food, here we have to build up and must consequently try and induce the patient to take as much nourishment as possible, whether it produces discomfort or not. Do not restrict the diet beyond avoiding things which are palpably indigestible. Rather increase the number of meals. Above all things avoid giving the patient food that is too digestible."

The Stomach's Needs

It is hardly necessary to say that solid food should be thoroughly and finely masticated in the mouth before being swallowed. The saliva cannot, however, be essential to digestion, as so many different kinds of food, liquid and semi-liquid, pass immediately into the stomach, with practically no admixture of saliva, and are easily digestible—namely, milk, soup, porridge, beef-tea, farinaceous dishes, beer, etc.

In order that the stomach may be enabled to perform its most indispensable tasks of kneading the food by muscular action and of mixing with it the gastric juices provided by the glands which cover its walls, a large supply of blood must circulate through the arteries around the stomach, and if this supply of blood is drawn away to other parts of the body, digestion will be delayed or put astray altogether, and it is a vitally important point that if the food leaves the stomach before it has been completely treated there the mischief cannot be repaired or compensated for in any of the later stages of the process (of so-called digestion) in which other organs take part in preparing the food for its entrance into the blood, to be then carried to all the tissues of the body. Obviously none of these organs is capable of doing the stomach's work.

The work of the stomach may be checked or stopped by overburdening it with an excessive quantity of food or in any of the other ways previously explained. Taking hard exercise too soon after a meal, taking a hot bath or sitting close to a large fire after a substantial meal interferes with digestion in the same way—that is, by draw-

ing away the blood from the stomach to the limbs. Any portion of the body which is working hard requires a good supply of blood, as may be proved by trying to drive a screw into a beam above one's head, a position in which the blood cannot flow freely to the arm, and weakness and fatigue in that limb are felt almost immediately.

Another point to be noted is that as the digestive fluid in the stomach is slightly acid it is injurious to take alkalies (soda, lithia, potash or magnesia) with food or while digestion is going on. To drink a mineral water which is strongly alkaline during a meal is a mistake, unless it be taken to correct the acidity of a rough wine. "Soda water" which is merely aerated water is harmless. A small dose of alkali taken half-an-hour or so before a meal is said to be beneficial, as it stimulates the secretion of acid by the stomach. An effervescing fluid is one in which the acidity is being neutralised by an alkali. If the acid is a little in excess the resulting fluid will be slightly acid and *vice versâ*.

The conditions most favourable to digestion are more fully stated under the head of "Breakfast," in the chapter on "Meals and Meal-hours."

A relaxing Day

When mild, warm weather suddenly succeeds cool, frosty and bracing weather, as often happens in the English climate, many people complain of feeling tired, and say: "This is a very relaxing day." Some may notice that their digestion and appetite on such occasions are not so good as they usually are, and yet they may not correctly trace cause and effect. When the air becomes warm the food

requirements of the body are at once reduced, less heat-giving food being needed, and if the diet is not quickly adjusted to the altered conditions by lessening the quantity of fat and animal food, dyspepsia is likely to occur, and this is the cause of the feeling of lassitude complained of. Owing to the dyspepsia less food is digested and consequently less nutriment has to be assimilated and thus Nature corrects the error in diet, but not without leaving some bad effects. To the nervous and digestive systems heat is enervating and cold is invigorating. In autumn, when chill October brings another sudden change to cool weather, " an autumn appetite " may be felt, and indicates that more food is required and more can be digested than in the previous warmer weather. This beneficial effect of more bracing air will be more or less counteracted if the quantity of food is increased too much under the influence of the better appetite.

Dyspeptic Collapse

The sudden depression or collapse sometimes caused by severe dyspepsia and followed or accompanied by great hunger, is referred to by several of the medical writers from whose works quotations have been taken. These attacks are known in the extreme west of Ireland as " the furgurttha " and are regarded as something quite mysterious. They are likely to occur when a man takes very fatiguing exercise after a good meal, perhaps two hours after a good breakfast. When the victim is walking over the moors or climbing the mountains he suddenly finds himself so weak that he is unable to proceed and may

have to lie down. Strange to say, whisky is not believed to be of any avail as a remedy, the only charm capable of removing the spell being a crust of bread or a biscuit.

Old Saws about Digestion

There are many old and familiar saws about eating and digestion and they all have much truth in them when rightly understood. One of these sayings, already quoted, is: "Eat till you are cold and you will live till you are old." The essence of this is that when digestion is proceeding satisfactorily and the stomach is receiving a good supply of blood, the surface of the body should be more or less cool; if it be flushed and hot this may indicate that the digestive effort is failing and dyspepsia is commencing. Sir James Eyre said: "Whenever the cheeks become rouged after dinner it is a sure sign of the feebleness of the digestive powers." Another saying is: "After dinner sit awhile, after supper walk a mile." Why this difference between the two meals? The explanation is that moderate exercise after a light meal, especially before retiring to rest, is beneficial both to digestion and assimilation as well as being conducive to sound sleep, but after the most substantial meal of the day there is a disinclination for exercise and complete rest is necessary for good digestion.

After Dinner

Those who find a difficulty in digesting even a moderate lunch or dinner would do well to try the plan of taking no liquid with the meal, drinking nothing until twenty minutes or half-an-hour

after it. Drinking some light hot liquid half-an-hour after dinner assists digestion. The fact that the first twenty minutes or half-hour after a meal is the most important and critical period in the process of gastric digestion may be gathered from several considerations: (1) this is the minimum of rest required after a good meal; (2) digestion is better if nothing is drunk until this period has expired; (3) it is wise to defer smoking until twenty minutes after a meal; (4) Dr Keith recommends drinking hot water half-an-hour after a meal; (5) the flush indicating weak digestion, mentioned by several writers, occurs during this time, if not earlier; (6) Dr Saleeby says: "Food which has been properly treated in the mouth undergoes a special kind of digestion for some twenty minutes or half-hour in the stomach."

Appetite and Habit

There are not many people whose appetite, or some happy instinct, always tells them when they have had enough. Those who are so fortunate as to possess and to obey this instinct are all small eaters and in appearance strong and healthy. As a rule the appetite imposes no reliable check, and the habit is to be guided too much by the palate. Dr Saleeby's maxim is: "That body cannot be regarded as ideally healthy the appetites of which are not trustworthy and beneficent."

There can be no doubt that a great many are misled by the increased appetite that follows dyspepsia, deeming it a sign of good health, and this delusion helps to make many people

confirmed dyspeptics. The case of Thomas Carlyle, who "suffered horribly" from dyspepsia for so many years of a long life, has already been referred to. Dr Fothergill mentions an old clergyman who said: "I have been a dyspeptic for fifty years; thank God for it!" All his brothers had died from gouty affections, and he believed that he would not have survived them if he had not been so dyspeptic. He resembled Carlyle in being persuaded that he was not personally to blame for being dyspeptic, and should have been told that if he must needs eat too much, or take insufficient exercise, dyspepsia was perhaps the least of the serious evils that might befall him.

Mr Eustace Miles, in "Avenues to Health," seems to look forward to the time when every man will be a law unto himself in regard to the preservation of health, for he says: "People will one day cease to trust Government or the doctors when they wish to be healthy,—they will be able to find out laws of health for themselves," and Dr Saleeby, in "Health, Strength and Happiness," takes a similar line of thought in the following passage:—

"If we did not make it part of our system to outrage, cozen, cheat, magnify and vitiate the appetite for food by the artifices of cookery, we should find in our appetite something to make the whole science of dietetics almost superfluous, and should rival the admirable and enviable state of such lower animals as have not been domesticated and corrupted by man, wherein the eater eats what he needs, when and as he needs it.

What an ideal and how incredibly remote from human practice and the hopes of the most optimistic hygienist!"

Is the Game worth the Candle?

It may now be as well, by way of recapitulation, to compare some of the advantages and disadvantages of the two modes of living—on one side there is the policy of "leaving digestion to Nature," which means neglecting it, and on the other side the policy of looking after it in a reasonable manner. First, let us take the man who, while he can do his daily work and suffer no pain, lets his digestion take care of itself and does not trouble himself about it. His plan certainly has its advantages; he does not "meet the devil half way" by anticipating trouble; in this matter he lives for the present and denies himself little for the sake of the future. If he be hard pressed in argument on this point he is ready to declare that he would rather live to be sixty as he likes than to be eighty as he would not like. He eats as much as he feels inclined at all meals without regard to any remote ill consequences. He enjoys a hearty breakfast as soon as he leaves his room in the morning, and although he probably does not digest it he benefits by having a keener appetite for lunch. Digesting only a small portion of his very liberal diet, he has less to assimilate, less to work off, none to cause any feeling of biliousness or congestion of the liver, and consequently he never feels himself under compulsion to take regular exercise, and he is inclined to take less and less, as the years go by. Thus he falls into a vicious circle which repeats its own history from day to

day: a good meal, mostly lost by dyspepsia, leaves a good appetite for another, without the trouble of earning it by exercise. Such a man congratulates himself on always having a good digestion—he can digest anything—nothing comes amiss—he is blessed with "a very quick digestion." In fact he treats his stomach as though it were something very like the *oubliette* of an old French feudal castle—a deep dungeon which is always ready to receive anything which may be cast into it, which keeps securely all that is committed to it and never allows any complaint to escape from it.

The disadvantage of all this want of care and method, in one of the most important affairs of life, is that the injury done to health is every day accumulating with relentless certainty, and the day is surely coming when, too late, a higher value will be set on even a few more years of life, out of the many that have been so heedlessly forfeited. The path of least resistance is not in such cases "the path of least expense."

Let us now turn to the case of the more sensible man, who is willing to sacrifice much present indulgence for the sake of a longer and healthier life, and so regulates his diet and exercise that he makes the best of his constitution and wears out rather than rusts out. He will at first find some difficulties and perplexities in his path, but will soon learn how to overcome them. Laurence Sterne said: "People who are always taking care of their health are like misers who are hoarding a treasure which they have never spirit enough to enjoy"—a statement that is open to the retort that he who wastes health wastes life and with it

everything this world can offer. Sterne died at the age of fifty-four.

Sir Hermann Weber's conclusion is:

"The manner of living required for the prolongation of life is irksome only at the beginning; it becomes easy by habit and leads to health of mind and body, to usefulness, to freedom from suffering and to happiness."

Amongst the difficulties likely to be encountered by one who endeavours to take reasonable care of his health are the following.—Exercise will have to be taken very methodically and steadily; some constipation may have to be contended with; symptoms of overfeeding must be watched for and treated; diet must be restricted to the kinds and quantities of food which are found to be most suitable, rich things being, to some extent at least, discarded in favour of more plain and simple fare.

Such small drawbacks as these are, however, only reasonable and necessary precautions which a prudent man will take as matters of course and without hesitation or question.

If such small difficulties as these are the price which is to be paid for the inestimable boons of health, freedom from pain and long life, they are but dust in the balance.

Degeneration

There is no want of medical testimony to the reality and the very serious nature of the degeneration, or hardening, of the arteries (arterio-sclerosis) and the similar degeneration of the heart and its valves caused in the course of years by the poisons in the blood proceeding somehow from the digestive

tract, but although the warning that "a man is as old as his arteries" has been so frequently repeated by medical writers, no plain and practical directions have been given to enable a layman to prevent this hardening process and thus preserve his heart and arteries from a most serious form of disease, excepting that he is advised, in general terms, to be very moderate in diet and to avoid severe strains. When the injury caused by degeneration becomes irreparable, when habits have become too settled to be easily reformed, and when the capacity for active exercise has been lost, it is too late to mend. Declining health then shows itself in reduced activity, in shortness of breathing, palpitation, chronic bronchitis, asthma, gout or rheumatism, and the patient attributes his increasing infirmities to the weakness of his constitution, to the hardships of his calling, to worry, to the climate or to the unavoidable decree of Providence. If he can afford it he spends a good deal of money on visits to hydropathic establishments at home or abroad, and may feel a little better for a time, but very soon is as bad as ever, because he is trying to correct the effects without removing the cause. If such a man had learned early in life, or even at middle age, the danger of habitual dyspepsia, and had gained some rational ideas about the regulation of diet and the necessity of exercise, he might have been still hale and hearty, instead of being a very old man at sixty years of age.

Medical Testimony

Galen, who lived in the second century, is quoted by Lessius as saying :

"Nobody will ever be seized with disease who takes sufficient care not to fall into indigestion."

Thomas Sydenham, who died in 1689, said :

"There are not a few diseases which can be cured by the use of proper diet alone."

Dr George Cheyne wrote, in 1725 :

"Nothing conduces more to health and long life than abstinence and plain food, with due labour."

Dr Prout said, in 1840 :

"With respect to an excess of wholesome food, an unusually heavy meal, especially of animal food or of bread is almost invariably followed by a deposition of lithic (uric) acid in some form or other. By a regulated diet the formation of a stone in the bladder may very probably be prevented. . . . Bodily inactivity, conjoined with a full and improper diet, ranks among the most fertile and powerful causes of such deposits."

Dr George Johnson's opinion was :

"Renal (kidney) degeneration is a consequence of the long-continued elimination of products of faulty digestion through the kidneys."

Dr E. A. Parkes observed :

"It is a certain fact that some of the evils of old age are owing to more food and liquid passing in than the eliminatory organs can get rid of. Hence arises indigestion, bowel troubles, gouty affections, some skin diseases and general discomfort of

feeling, all of which can be removed at once by lessening the diet."

Dr George Herschell, speaking of attacks of mental depression, says :

" There is very little doubt that these sensations are caused by the absorption into the system of those poisonous products of imperfect digestion."

Dr Saleeby, in " Health, Strength and Happiness," says :

" Most of our elderly men suffer from chronic food-poisoning with arterial hardening and they need someone to tell them so."

In another passage he says :

" Before long doctors will be compelled on all hands to denounce over-eating as probably the chief cause of the premature arterial degeneration, involving premature physical degeneration, which is one of the lamentable facts of our time. Our surplus food is in effect a mild poison, or the source of poisonous substances produced within the body. Circulating in the blood-vessels continuously these poisons naturally injure the delicate living cells which line their walls and arterial degeneration follows, with consequences that show themselves in every organ of the body."

Two more very interesting quotations from Dr Saleeby's book must be given :

" The criterion of age is the health of the arteries. The vast majority of deaths, even after fifty or sixty years, are rightly to be regarded as pre-

mature. Many of us ruin our arteries by chronic over-feeding."

Quoting from another writer, he adds :

"The whole secret of prolonging life consists in doing nothing to shorten it."

He states again :

"The new theory asserts that the food requirement is a mere fraction of what used to be believed, that the surplus can be stored up against a day of need only to a small extent and not at all in the case of the most important food, which is proteid ; and that the business of disposing of the surplus is a serious one, involving labour on the part of many vital organs and, in the long run, nothing less than chronic food-poisoning, for which we pay in the form of degeneration of the blood-vessels, kidneys and other organs—these degenerations being hitherto quite unexplained by pathology, which has commonly, but without an iota of evidence, put them down as senile. . . . Our bodies degenerate many decades before they should and, if we realise how utterly the current pathology fails to explain these degenerations, we may begin to suspect that something like an epoch is being established by the new students of dietetics."

Dr Henry Bennett, in "Nutrition in Health and Disease," gives the test of faulty digestion which has been adopted in this handbook :

"I have repeatedly alluded to the presence of morbid salts in the urine as a result and an evidence

of imperfect digestion. I believe their presence to be the most delicate and most easily recognised test that we can bring to bear in the diagnosis of defective digestion and I am also of opinion that its value, though recognised, has not been fully appreciated by the profession."

And he states further :

" For some hours after the ingestion of food by a dyspeptic patient the urine will remain clear, because the chyle has not reached the circulating fluid. Then, for a longer or shorter time it becomes turbid and throws down in cooling a deposit of pinkish or pale hue, owing to its being loaded with urate of ammonia."

Dr Milner Fothergill's opinion was :

" General pruritus or itching is found in jaundice or in lithæmia and is an outcome of blood-poisoning by the products of indigestion. Urticaria is so associated, as is eczema, some other skin affections and also boils and carbuncles. Diabetes is also accompanied by phlegmonous or carbuncular inflammations,—a suggestive relationship."

Sir Lauder Brunton, in " Disorders of Assimilation and Digestion," says :

" Food and poison are much more closely connected than we would at first imagine and it has been lately found that, in the process of digestion, food is actually converted into substances which, in large quantity, act as poisons. . . . It is evident that the normal products of digestion are poisons of no inconsiderable power." [The

poisonous substances appear to be referred to here as being products of normal healthy digestion, not as the results of a failure of digestion.]

Sir Lauder Brunton also says :

" In many cases of nervous depression we find a feeling of weakness and prostration coming on during digestion and becoming so very marked about the second hour after a meal and must ascribe it to actual poisoning by digestive products absorbed into the circulation. The languor and faintness of which many patients complained, and which occurred about eleven and four o'clock, was due to actual poisoning by the products of digestion of breakfast and lunch."

And further :

" The gouty man may suffer from the discomfort due to the circulating uric acid and fall asleep over his paper after breakfast or feel stupid and drowsy after lunch, when he ought to be attending to his business." [Dyspepsia, without any gout, would fully account for such symptoms.]

In another place he writes :

" Some of the poverty-stricken seamstresses in the east of London suffer from depression because they have insufficient food, but, in many who are well off and have little to do, the nervous depression is even greater and the vital flame sinks, not from lack of fuel, but from accumulation of ash. They think their weakness proceeds from want of food and they force themselves

to eat and especially to eat animal food, whereas what they want is abstinence and exercise."

He also mentions patients who complained that they " took all sorts of strengthening things and yet felt very weak," and he remarks that they should have said that they felt very weak because they took all these strengthening things.

Such was the experience of an eminent London physician in the twentieth century, and if we look back three hundred years we find that Lessius, a Flemish divine, who wrote a small book in Latin on "Health and Long Life," used almost identical words when he said :

" Numbers there are who are greatly deceived in this matter, who, although they feed liberally upon what is very nourishing, yet are perpetually complaining of a peculiar faintness and weakness of stomach, which they very injudiciously ascribe to the want of nourishment." He adds that such people " take care to provide breakfasts betimes from a vain apprehension of Nature's sinking for want of proper sustenance," and he advised them to set about rectifying their error " by continuing to eat and drink less till the cause of their disorder shall entirely cease."

Sir Henry Thompson says :

" At least more than one half of the chronic complaints which embitter the middle and latter part of life among the middle and upper classes of the population is due to avoidable errors in diet. . . . While such disease renders so much of life, for many, disappointing, unhappy and profitless, a

term of painful endurance for not a few, it shortens life considerably."

He also says :

"The over-supply of nutritious elements ingested must go somewhere more or less directly to produce disease in some form, probably at first interfering with the action of the liver and next appearing as gout or rheumatism or as the cause of fluxes or obstructions of various kinds."

Dr Saleeby had a similar idea in his mind when he said :

" No one who knows anything of any engine will question that something must happen to everything that is put into it and that if more is put into it than it can use some injury must result."

Sir Michael Foster adopts the same view :

" There can be little doubt that the ingestion of food—and perhaps especially of proteid food—in excess of what is, under the best conditions, sufficient for maintenance, can only be deleterious to the organism, clogging it with waste products which may at times be of a directly toxic nature."

Dr Yorke-Davies, in " Health and Condition," writes :

"The finest constitution and mental organization in the world will not last long if the laws of Nature are outraged on every hand. Byron died at thirty-six, a worn-out old man, though he had an exceptionally strong constitution as a young one

and swam the Hellespont,—a feat of endurance that gave Leander a reputation as an athlete which has lasted for two thousand years."

Dr Davies also says :

" Where the stomach does not thoroughly digest the food and the different organs are thereby not properly nourished, we get mental derangement and hypochondriasis that frequently culminate in insanity."

He also states :

" An attack of indigestion, when the food ceases for a few days to nourish the system, often leads to depression of spirits bordering on profound melancholia."

Sir Hermann Weber, in his work " On Means for the Prolongation of Life," says :

" Every physician who has occupied himself much with derangements of digestion and assimilation has met with many cases where the reduction of meals from four or five to two has effected a complete cure, without any medicine ; either only breakfast and dinner or lunch and dinner, according to circumstances."

He also says :

" When patients complained of fits of yawning, sleepiness and inability to do good literary work some hours after a heavy breakfast and lunch I induced them to substitute light breakfasts and lunches without, or with very little, flesh food,

with the almost constant result of the entire disappearance of the inconvenience formerly felt."

He states further that he knew persons who attained great ages and who lived almost entirely on vegetables and fruit in large quantity, with the addition of milk, cheese, butter and occasionally eggs, and adds :

" I have often succeeded in curing eczema, acne, roughness and scaliness of the skin and fœtor of breath by total abstinence during months and years from flesh and fish and the substitution of vegetables, especially green vegetables, milk and cheese with moderation and, occasionally, eggs. Often this diet led also to a great improvement of the complexion. . . . Superabundance of food leads in fact more frequently to starvation of tissues than what is often misnamed ' starvation diet,' which maintains them in a healthy condition."

In connection with this latter quotation it may sometimes be noticed that a thin, cadaverous appearance, with great muscular weakness, often results from habitual excess in eating and the constant dyspepsia which accompanies it. Lessius refers to two Italian proverbs : " He that eats little eats much," and " More fall by eating than by the sword."

It appears that Sir James Eyre, who wrote in 1852, was the author of the saying, since so often quoted : " We dig our graves with our teeth " ; and Dr Milner Fothergill declared that : " For one victim to zymotic disease a holocaust perish from failure in their digestive processes."

Professor Metchnikoff, a recent writer on "The Prolongation of Life," has a novel theory which will be referred to in a later chapter, but his opinion on the necessity of a reform in diet may be quoted here :

"The conceptions that the greatest good fortune consists in the complete evolution of the normal cycle of human life and that this good can be reached most easily by plain and sober habits, will convince men of the folly of much of the luxury that now shortens human existence."

Dr Haig's uric acid theory will also be dealt with later, but his admirable summing-up in favour of frugal living will form a fitting conclusion to the series of quotations from other authors given above. Dr Haig says :

"However far the eye can range over the past there is no iota of evidence that the laws of Nature have altered their working by the fraction of a hair's breadth. The path of self-indulgence has always led to decay and extinction while that of abstinence and self-control opens up the possibilities of a mighty evolution."

Shakespeare points the same moral:

"They are as sick that surfeit with too much, as they that starve with nothing: it is no mean happiness, therefore, to be seated in the mean; superfluity comes sooner by white hairs; but competency lives longer."—*Merchant of Venice.*

CHAPTER II

VARIOUS THEORIES ON DIET, DIGESTION AND URIC-ACID POISONING

A GREAT obstacle lying in the way of a layman who is seeking instruction and guidance from books on diet and digestion is that so many totally different theories have been advanced by eminent professional and scientific authorities on these subjects. So much diversity of opinion must create doubt and confusion in the reader's mind, and may even make him despair of ever finding what he is in search of—viz. a few simple non-technical rules for the preservation of health, readily applicable to his own individual case.

The following are some of the most noticeable of the theories and suggestions referred to :—

1. Dr Dewey, an American physician, author of "The True Science of Living," recommends his patients to take no breakfast at all, and this system has undoubtedly done wonders in hundreds of cases, restoring to health and strength people who had been weak and sickly for many years. Anyone who, after taking all reasonable precautions, cannot digest even a very light breakfast, should by all means take Dr Dewey's advice. The French custom of taking an early cup of coffee and breakfasting at eleven should, however, meet such cases. Dr Dewey's system must be quite unsuited

to those who have hard physical work to do all the morning, and this is the lot of the great majority of the community. Fatigue and such a long fast must endanger the digestion of the midday meal.

2. Mr Upton Sinclair, a well-known American literary man, recommends absolute fasting for days and even weeks at a time as a cure for rheumatism and a long list of other diseases caused by disordered digestion. This plan is open to the same objection as that made above to Dr Dewey's system, and it is to be feared that the starvation cure must remain a luxury for the few who have no physical work to do.
3. Mr Horace Fletcher, also an American, believes that extremely slow mastication is the best remedy for digestive troubles. He says that the appetite will be satisfied before there is any danger of eating to excess, and it is perhaps true that, if only meat, bread, vegetables and other solids are eaten, this may be the case, but slow mastication would not prevent excess if the food were rich or fluid. It cannot be expected that this suggestion will meet the great difficulty and become the universal remedy.
4. *The Salisbury Treatment.*—This is a diet of meat only, and has not been found generally successful.
5. *Dr Haig's Theory.*—Dr Haig recommends a diet of vegetables, milk, cheese, eggs and nuts, without any meat. He forbids all flesh, fowls, pulses, mushrooms, pea-nuts, asparagus, tea, coffee and cocoa, as these

substances are said to contain uric acid in the form of purin or zanthin. Dr Haig's uric acid theory claims special attention, and will be separately considered at the end of this chapter.

6. *Pure Vegetarians.*—Some very strict vegetarians not only abstain from animal food of all kinds, but object on humane principles to any food obtained by taking life. Some refuse even to wear leather shoes. Nuts, as a source of nitrogen, form an important part of this purely vegetarian diet.

6. Dr Sealy's theory is that much nerve-force is used up by the digestion and assimilation of large quantities of flesh food, and that the nerve-force saved by lighter meals becomes available for other functions.

8. Dr Lorand, author of "Old Age Deferred," says that old age is a chronic disease due to degeneration of the ductless glands.

9. Professor Metchnikoff is the author of the most remarkable of recent theories. He says:

"The accumulation of waste matter retained in the large intestine for considerable periods becomes a nidus for microbes which produce fermentation and putrefaction harmful to the organism. It is certain that the intestinal flora contains some microbes which damage health, either by multiplying in the organism or by poisoning it with their secretions. . . . As the large intestine not only is the part of the digestive tube most richly charged with microbes, but is re-

latively more capacious in mammals than in any other vertebrates, it is a just inference that the duration of life of mammals has been notably shortened as the result of chronic poisoning from an abundant intestinal flora."

He also states :

" As the part of the flora that does most damage consists of microbes which cause putrefaction of the contents of the intestine and harmful fermentations, particularly butyric fermentation, it is against these that our efforts must be directed."

And further :

" All these qualities make the Bulgarian bacillus much the most useful of the microbes which can be acclimatised in the digestive tube for the purpose of arresting putrefactions and pernicious fermentations, such as butyric fermentation. . . . There are many useful microbes, among which the lactic bacilli have an honourable place. . . . As the microbes need sugar to produce lactic acid it is necessary to take with them a certain quantity of sweet food, jam, sweetmeats and especially beetroot. . . . From the general point of view of this book [" The Prolongation of Life "], the course recommended consists of the absorption either of soured milk prepared by a group of lactic bacteria or of pure cultures of the Bulgarian bacillus, but in each case taking

at the same time a certain quantity of milk-sugar or saccharose."

One more quotation from the Professor may be found interesting :

"It is plain that any factor to which long duration of life has been attributed disappears when many cases are examined. Naturally sound constitution and simple and sober life are favourable to longevity, but apart from these there is something unknown, which tends to long life. . . . According to Flourens man takes twenty years to grow and ought to live five times twenty, that is to say, one hundred years. The duration of life in mammals is relatively shorter than in birds, and in the so-called cold-blooded vertebrates. The key to the problem is to be found in the organs of digestion."

It is not too much to say that in the quotations here given from the Professor's treatise there is a series of gigantic assumptions. First, the comparative size of the large intestine in mammals, or the occasional occurrence of fermentation in it, cannot by any possibility justify the inference that the life of mammals is generally shortened by the presence of this larger intestine—it would not be large if it were not the better for being large. Then the assumption that in addition to sound constitution and healthy habits of life there is a mysterious something which tends to prolong life is quite unwarranted ; in fact, according to the Professor's own list of cases, longevity has occurred

here and there in all ages and all countries, and it cannot be assumed, just to fit his theory, that bacilli inimical to longevity were absent or had been driven out in each of those particular cases where a great age was attained. Then again there have been a great many cases in which the theoretical limit of one hundred years has been far exceeded, in spite of all microbes. Again, the inference that "the key to the problem is to be found in the organs of digestion" cannot be correct, unless it be assumed that these organs are not generally in a normal and healthy condition, and are incapable of discharging their proper functions, or, in short, that they are failures. As it cannot however be that the fault lies in the construction of these organs, it must be due to our ill-treatment of them. If Nature's physiological laws are broken, as they are when the stomach is prevented from discharging its duty, the case becomes abnormal in the strictest sense and circumstances injurious to health and longevity have been created. The advice that sweetmeats should be eaten to supply the microbes with sugar is more suggestive of bee-keeping than of measures taken to prevent fermentation. Dr George Herschell says that sweets added to a mixed diet "create plenty of germs ready to set up fermentation on the slightest opportunity." Sir Hermann Weber is of the same opinion. He states: "Large quantities of sugar, when taken together with a full amount of animal or mixed foods, prevents thorough metabolism of the proteids, and may lead to gout, uric acid concretions, diabetes and indirectly also to arteriosclerosis." Dr Herbert Alderson states: "To the dyspeptic all jams, preserves, and marmalade

are absolutely forbidden. . . . Chocolates and all kinds of sweets are not to be taken."

Dr Haig's Theory

Dr Haig's uric acid theory, as explained in his books, "Diet and Food," and "Uric Acid as a Factor in Disease," is very interesting and calls for close examination, as it is supported by much ingenious argument. Briefly, this theory is that certain foods (flesh, pulses, eggs, pea-nuts, cashew-nuts, asparagus, mushrooms, tea, coffee and cocoa) contain uric acid in the form of zanthin, and when these foods are eaten, the uric acid enters the system and causes degeneration of vital organs and many consequent diseases. The uric acid impedes the circulation of the blood in the capillaries, or minute terminations of the blood-vessels, and thus prevents the complete combustion or metabolism of the food. It will at once be observed that this theory ignores or opposes the doctrine that gastric dyspepsia is the primary cause of uric acid poisoning and of the degeneration it produces. Dr Haig often touches lightly upon the subject of dyspepsia, but everywhere ascribes the mal-products present in the blood to the eating of food containing uric acid, and in fact his case against uric acid would be complete without the occurrence of any gastric dyspepsia, as he blames the food, not the miscarriage of digestion. He says :

"The pulses, peas, beans, lentils and pea-nuts, contain even more zanthin than many kinds of animal flesh and are therefore to be regarded as poisonous."

From an economic point of view this is a most unfortunate conclusion, for while it must be admitted that fresh beef and mutton are an expensive means of obtaining nitrogenous food, the exclusion of the pulses, which are both cheap in price and rich in nitrogen, renders Dr Haig's system unsuitable for the mass of mankind in temperate or cold climates, where a considerable proportion of cheap nitrogenous food is a necessity. As population increases in the civilised world so the necessity of tillage must increase, grazing land must become scarcer and meat must become dearer. A few passages from Dr Haig's books will show that the remarks made above are not unfair. He says :

" People who, soon after eating a hearty meal, start for some exercise, but within half-an-hour are in a condition bordering on collapse and have an intense feeling of emptiness. . . . What has happened ? Merely this, that the exercise was too much for gastric digestion and caused its suspension, so that, though the stomach is full, there is no absorption of albumen into the circulation, no rising urea and no force available. A little rest puts matters right, the stomach's circulation is restored, digestion begins again."

Let it be observed that Dr Haig does not here attribute the feeling of collapse to poisons entering the blood, as the authorities quoted in a previous chapter would do, but ascribes it to the want of fresh supplies of nutriment. If no food had been eaten just before taking the exercise would any collapse have occurred ? It is, in fact, a typical case of dyspeptic poisoning, and rest will not " put

matters right," inasmuch as such an attack leaves a man " out of condition " for the remainder of the day. Again, Dr Haig states :

" The effect of meat-eating will be a certain amount of dullness, heaviness and disinclination for mental or bodily exertion in the morning hours, often associated with more or less irritability and mental depression."

Here the familiar consequences of gastric dyspepsia, which is only too likely to occur when meat has been eaten " in the morning hours," are attributed to the nature of a food, which, if properly digested, is universally found to be both strengthening and stimulating. Dr Haig also speaks of " a urine which tends to throw out a little red sand from time to time, owing to relatively high acidity "—an ordinary symptom of dyspepsia. He says also :

" It is a remarkable fact that those who take meat require to be fed more frequently than those who live largely on cereals, and this is due to the fact that meat is a stimulant, quickly digested, absorbed and worked off."

It will not be denied that when meat is not digested a person must very soon require more food, but when meat is digested it is the most sustaining of all foods, or equal to the best. " Quickness of digestion " is a term often applied in error when a failure of digestion occurs ; the effort of digestion ceases and there is almost at once an appetite for more food.

Another interesting passage is :

" I should now be inclined to consider that the rheumatism met with among vegetarian natives of India is not so much due to the excess of cereals, with deficiency of fresh fruits and vegetables, and exposure to cold at night, but rather to direct and considerable introduction of uric acid or zanthin in the pulse foods."

Gastric dyspepsia is again the simple solution of the mystery. Dr Haig refers to a statement made by Dr Alanus " that a vegetarian diet causes atheromatous degeneration of the arteries," and remarks :

" The teaching of pathology shows, I believe, that atheroma of the vessels is always associated with pressure and strain, and of late years I have come to regard uric acid as at least the chief cause of such vascular pressure and strain."

But is not the atheromatous change in the arteries caused by urates in the blood, arising from disordered digestion ? When the walls of the vessels have become hardened and rigid they are unable to withstand any exceptional increase of blood-pressure such as that produced so often by muscular strain. Dr Saleeby says : " No man can burst a healthy blood-vessel from within, the bursting is a mere accident dependent upon the fact that the vessel is diseased." See also his description of the causes of arterial degeneration quoted in Chapter I., page 44.

One more quotation from Dr Haig's book :

" A similar investigation in Australia and New Zealand would, I believe, trace to the excessive use of flesh and tea an equally long array of serious or deadly diseases and an almost equal number of mental and moral defects. In this country also I should attribute to the effects of flesh and tea the all-pervading anæmia seen in London."

Here again the blame is laid on the chemical constituents of the food instead of upon the dyspepsia which is notoriously common wherever the diet consists chiefly of meat and tea, especially when this is coupled with excessive smoking.

Dr Valentine Knaggs, a well-known authority on rheumatism, says :

" Dr Haig insists upon a rigid exclusion of all foods that contain zanthin, and yet this is the type of compound which is found to a greater or less degree in practically all natural food-stuffs."

He continues :

" If badly arranged, or if the articles selected are eaten to excess, this uric-acid-free diet is capable of producing some of the worst types of rheumatism and gout."

And again :

" Uric acid is not necessarily a thing which we eat, but may be equally a normal product of our own bodily activities."

The Origin of the Urate Poison

A very remarkable feature of many of the opinions of eminent medical authorities quoted in the preceding pages of this handbook is that the writers do not attach primary importance to the work of the stomach in regard to the vitiated state of the blood attributed by them all to disorders of digestion—many of them do not trace the poison to the stomach as its original source. The term " digestion " has, perhaps improperly, been applied to the whole of the long process by which the food is converted into its ultimate form of chyle, when it is ready to pass into the blood-stream and feed the tissues. At any rate this wide application of the word has helped to lead to the inference that " the stomach takes only a subordinate part in the digestive act " and that the poisons above mentioned are due to the action of the liver, or, as Professor Metchnikoff will have it, to bacilli in the intestines, or, as Dr Haig insists, to injurious substances in the food. It should not be forgotten that the crisis in the ordinary history of digestion takes place in the stomach ; it is there that the success or failure of the process, in all but very rare cases, is determined. There are thousands of healthy people who suffer from frequent failures of the stomach's functions (primary digestion) to one person in bad health who suffers from a failure of digestion owing to disease of the liver or pancreas (secondary digestion) ; and the healthy people usually suffer many years from this gastric dyspepsia before it leads to any definite disease. These reasons are sufficient to show that as regards the responsibility for digestive poisons that are almost always present, the

stomach is first and the rest nowhere. The stomach is peculiar in being the only organ engaged in digestion, excepting the mouth, over which we have any control, or of whose operations we are at all conscious. If we overtax the powers of the stomach or swallow any nauseous or irritating substance we are at once made aware that there is trouble in that region. Thus Nature enables us to look after the most critical step in the first stage of digestion, while she takes sole charge of those later stages in which we have no power to interfere.

And yet Dr Fothergill states :

" Uric acid is a normal constituent of urine and must be regarded as the product of perverted metabolism in the liver. . . . The stomach plays a comparatively subordinate part in the digestive act."

And again :

" These deposits in the urine are, then, significant of disordered function in the liver."

And yet again :

" The urine is either high coloured and dense or laden with lithates according as the liver is capable of converting the nitrogenised waste into urea or only splitting up the peptones into uric acid and urates."

His omission of the stomach's leading part in the business is made still more clear by the following :

" When albuminoid food is taken in excess of the tissue needs, the surplusage or luxus consumption

is split up in the liver and it is in this function of the liver we find the disturbance which leads to the excessive production of lithic acid or lithates. . . . The congestion of the liver interferes with its functional activity and the lithates appear in the water—a proof of the derangement of the function of the liver."

But is not the natural sequence of events that this congestion, indicating that there is no demand in the system for more food, reacts upon the stomach and checks its digestive powers, with the result that, if more food is taken, dyspepsia occurs and a deposition of urates then takes place? The dyspepsia relieves the congestion of the liver by reducing the supply of digested nutriment and this relief is apparent even in the greater freshness of the complexion after an abundant deposit of urates.

In thus transferring the responsibility for "the morbid salts in the urine" from the stomach, where they originate, to the liver, where perhaps they take final shape, Dr Fothergill is supported by Sir Lauder Brunton (see pp. 106-107 of "Disorders of Assimilation"), who, when speaking of the peptones formed by the digestion of albuminous food, says:

"Their passage into the general circulation from functional inactivity of the liver may be regarded with much probability as one of the causes of depression and melancholy. Such is probably the case with those people who suffer from nervous depression, weakness and melancholy chiefly

during digestion . . . and especially about two or three hours after a meal."

Dr Murchison (quoted by Dr Fothergill) speaks of

" that derangement of the liver which produces lithaemia. . . . When this is the case the patient is often heavy and drowsy after a full meal."

And he continues :

" In most of these cases there are no obvious symptoms of gastric dyspepsia ; the appetite may be good, too good in fact ; the bowels may be regular and there may be no pain, flatulence or other discomfort after meals, but there will be found an increased tendency to the deposit of lithates in the urine."

What words, one may ask, could better describe a typical case of functional gastric dyspepsia than the latter portion of this extract ?

Sir William Roberts says :

" Bernard ranked pepsin (part of the gastric juice) low as a peptonising agent. He looked on gastric digestion as a hasty preparatory process introductory to the more perfect intestinal digestion."

And Sir William adds : " This seems to me a truthful view."

Against this array of evidence in favour of the primary importance of the work of the liver or intestines there may be set the very positive statements of Dr Henry Bennett, Dr Prout and Dr Keith quoted in a previous chapter, and Sir

B. W. Richardson's experience given in his letter. The plain question which goes to the root of the matter is : Would these salts be thrown down, in the case of a person free from any organic disease, if the stomach had not failed to complete its work in the normal, usual and healthy manner ?

Another set of facts which doubtless have had some effect in drawing away attention from the stomach, as the primary source of morbid deposits in the urine, are referred to by Sir William Roberts :

" Organic disease of the lungs, heart, liver, spleen or other part, attended with emaciation and waste of the tissues, is usually accompanied with abundant deep-coloured urate deposit."

But how far these deposits are due to general weakness and disturbance affecting the stomach and interfering with its functions, as happens in the case of fever, does not appear to have been ascertained. Although the primary source of the poisoning of the blood by food-derivatives may be disputed by some modern writers, it is interesting to observe that Lessius, in his treatise on " Health and Long Life," written about three hundred years ago, shows that at that period these troubles were definitely referred to the stomach and had been so even as far back as the time of Aristotle, 330 B.C.

Lessius says :

" What we call ' crudity ' is the imperfect digestion of food. . . . A sober course of diet doth ward off these crudities and thereby totally eradicates and destroys the very ground-work of diseases. . . . That chyle or juice which is made of the food so

taken is said to be crude which introduces into the habit (*i.e.* the system) a black train of dangerous, nay, fatal, consequences. It corrupts and vitiates the whole temper of the body and last of all stuffs the blood-vessels with such a mass of viscous, morbific matter that the individual must of necessity suffer diseases, pains and miseries. When the chyle is crude or malignantly concocted (*i.e.* digested) by the stomach and rather corrupted than digested—for so Aristotle calls it, *molynsis*, not *pepsis* (a corruption, not a digestion), there cannot be produced pure and uncorrupted blood in the liver, but on the contrary, only what is very foul and putrefied; for, as physicians assert, the second digestion cannot amend the first."

The meaning of *molynsis* is given by Liddell and Scott as "defilement, pollution—a sort of half-digestion of meat in the stomach."

Lessius continues:

"Crudity of the chyle is the cause that the veins throughout the whole body abound with a mixture of impure and foul blood wherein are engendered and secreted many bad qualities or evil humours which by little and little do putrefy and at long run, upon the slightest occasions, become inflammatory and vent themselves in very deplorable and grievous symptoms, whereby multitudes are unhappily swept away and perish, even in the verdure of their years. . . . By means of diet it comes to pass that the digestion is rendered perfect or complete and so good blood is produced. From good chyle springs good blood and from good blood sound and wholesome nutriment. . . . Physicians affirm

that crudities are the first original or chief cause of all those diseases wherewith mankind are ordinarily molested. . . . Almost every disease under which mankind ordinarily labour receives its rise from repletion, that is from men taking more food than either Nature wants or the digestive powers can dispense with."

Is much more known now? The clear insight and practical knowledge manifested in these quotations would render them quite suitable to be adopted as texts by such modern scientists as Dr Haig and Professor Metchnikoff.

CHAPTER III

DIET IN HEALTH

THE problem of health is not how to select the foods we should eat, but to learn by what means or rules we can ensure that we shall digest what we eat. Various races in different parts of the world, and different individuals in each country, can and do maintain themselves in perfect health on totally different kinds of food, proving that in this matter it is manner that makes the man—the healthy man. Although the consideration of the principal problem of health is the main purpose of this book, a few pages devoted to dietary questions and the characters of the various kinds of food may be useful to some readers.

Prejudices

There is nothing concerning which most people are so sensitive and conservative as they are about their diet, and if it be even suggested that prevailing customs are not exactly as they should be, one is almost certain to hear a repetition of the time-worn argument that " One man's food is another man's poison," or, in other words, " One rule cannot suit everybody." These sayings contain only a half-truth and are therefore misleading.

The fact is that although the powers of digestion and the tastes of individuals vary greatly (as do

their habits of life) the same general laws apply to all, and Sir Benjamin Richardson said :

" The true scientific position of the question is that to form the healthy man anywhere and everywhere the same qualities of food are required for him anywhere and everywhere."

Natural Limitations

As stated elsewhere in this handbook, no one can escape from the law that there is a definite limit to the amount of food he requires and also a definite limit to the amount he can digest. The quantity of nourishment required to replace ordinary wear and tear and to maintain the heat of the body must vary, in the case of each person, with his age and weight, with the amount of physical work done and with the season of the year. The problem is, therefore, a very difficult and complex one, and yet Sir Henry Thompson states, very emphatically, that, after making some allowance for the small quantity of food that can be stored up in the body in the form of fat, any excess of nutriment cannot be disposed of without injury to the system, and Dr Saleeby's view is equally strict.

Medical writers are not, however, all agreed upon the merits of a very frugal diet. Dr Woods-Hutchinson, for instance, says that children should be allowed

" all the butter, all the cream and all the roasted almonds or pecans or English walnuts, in reason, that they want. Let their bread be simply an excuse for butter and their porridge for cream and

sugar. . . . Three square meals a day for a healthy boy are just the mere foundation of his day's eating. Most animals in a state of nature eat whenever they can get food and until they can hold no more. If anyone feels hungry between meals let him eat by all means. It is a sure sign that he either ate too little at his last meal or has worked too much."

Dr Yorke-Davies's opinion is :

"To keep the digestive organs in a continued state of good health a substantial meal should be taken for breakfast about eight or nine in the morning."

Dr Dudgeon gives similar advice :

"Breakfast may be a tolerably substantial meal. A plateful of oatmeal porridge and milk, followed by an egg, a bit of bacon, some fish or a kidney, with bread and butter, washed down with a cup of tea, coffee or cocoa, will suffice till luncheon time."

Dr Buckley also recommends a substantial breakfast.

The great majority of professional authorities are, however, strongly in favour of strict moderation in diet, and the only fault to be found with their teaching is that it is extremely difficult to put it into practice, unless each person could be told what constitutes moderation in his own particular case and under all circumstances, which is a practical impossibility. The only safety lies in a rule which will guard against errors of digestion by enabling any person to detect and avoid excess,

and thus to keep his supply of food within the limits required by his digestive powers under all the changing conditions of daily life. The advice that he must always aim at moderation will not do this.

Analysis of Food

It will greatly assist anyone in the rational management of his dietary to have some clear idea of the nutritive value of each of the various kinds of food, so that he may know how much nutriment he is really consuming and may be better able to grasp the fact that a considerable bulk of light food—bread, farinaceous dishes, vegetables or fruits—counts as little compared with even a small bulk of rich animal foods such as meat, eggs or cheese, which contain large proportions of the two most condensed kinds of food—animal fat and albumen, or proteid. Only a very limited quantity of these foods can be utilised in the system at any one time, and an excess will probably cause dyspepsia or biliousness. Keeping this general principle in mind, the various foods may be divided into the following classes, arranged according to strength or nutritive value :—

Classification of Foods

1. Animal fats. In beef, mutton, pork, cheese, milk, butter and cod-liver oil. Milk contains 86 per cent. of water by weight.
2. Albuminous or proteid animal food. The lean of beef, mutton, pork, poultry, etc.; and portion of cheese and eggs. Cheese contains equal quantities of fat and albumen.

3. Fish. Contains as much albumen as meat, but little fat.
4. Albuminous vegetable foods—the pulses or legumes—viz. ripe peas, ripe beans, lentils and haricot beans. These contain a large proportion of albumen and much starch. Nuts may be included in this class; they contain albumen and oil.
5. Farinaceous foods. Wheat-flour, oatmeal, Indian corn (maize), rice, arrowroot, sago, etc. These contain much starch and little albumen.
6. Roots and green vegetables. Potatoes, onions, parsnips, carrots, turnips, green peas, fresh beans, cabbages, etc. Potatoes consist chiefly of starch. The other roots contain a form of sugar, with a minute quantity of albumen and no appreciable quantity of fat.
7. Dried fruits, sun-dried or preserved in sugar. Dates, figs, raisins, plums, etc. Contain much sugar and some albumen, with much less water than fresh fruits.
8. Fresh fruits. Apples, pears, plums, bananas, oranges, grapes, etc. Contain a small quantity of sugar and less starch, with a large proportion of water.

[TABLE—

Analysis of Foods

TABLE giving the proportions of the principal constituents in ONE POUND of each kind of food, omitting minerals, acids and waste.

Name of Food	Water	Albumen or Proteid	Starch	Sugar	Fat or Oil
	Ounces	Ounces	Ounces	Ounces	Ounces
Beef, ribs .	10½	2	..	..	3⅕
Beef, lean .	12	2⅗	..	..	1½
Veal . .	10	1½	..	..	2½
Mutton, leg .	11⅓	2⅓	..	..	2¼
,, lean chop	12	1⅔	..	..	1⅓
Bacon, cured	3½	1¼	..	..	10¼
Chicken . .	11	2¾	..	..	1
Turkey . .	10⅖	3	..	..	2½
Goose . .	10	2⅓	..	..	4
Salmon . .	12¼	2	..	..	¾
Mackerel .	11¾	2¼	..	..	1
Sole . .	13	1¾	..	..	..
Herring . .	12½	1½	..	..	1½
Egg, with shell	12⅖	2	..	..	1½
,, no shell .	11½	2¼	..	..	1¾
,, white only	13	2	..	..	⅓
,, yolk only	8	2⅖	..	..	5
Milk (⅘ pint) .	14	½	..	⅘	⅗
,, skim .	14	⅔	..	⅘	1/16
,, preserved	4	2⅓	..	7	2
Buttermilk .	14½	⅗	..	⅗	1/18
Butter . .	2½	1/16	..	..	13
Cream . .	8⅘	1	..	⅖	6
Cheese . .	5½	4½	..	½	4½
Flour, wheaten	2¼	2	11	..	2/7
Bread, white .	6⅖	1⅓	7¾	..	⅕
,, brown .	7	1½	7	..	⅕

Name of Food	Water	Albumen or Proteid	Starch	Sugar	Fat of Oil
	Ounces	Ounces	Ounces	Ounces	Ounces
Biscuits	1⅓	2½	11¾	..	¼
Macaroni	2 1/10	1½	12	..	1/20
Oatmeal	2⅖	2	10	..	⅘
Rice	2	1	12½	..	..
Maize	2	1⅗	11	..	⅘
Arrowroot	2½	⅛	13	..	..
Peas, dry	2⅓	3⅗	8½	..	⅖
Lentils ,,	2	4	9¼	..	⅖
Beans ,,	3⅕	3¾	8¼	..	¼
,, haricot	2	3⅗	8½	..	1⅓
Potatoes	12	¼	2¾	..	..
J. Artichokes	12¾	¼	..	2¼*	1/14
Onions	14	¼	..	1*	..
Turnips	14½	⅙	..	½*	
Carrots	14	1/14	..	¾*	..
Parsnips	13	⅙	½	¾*	⅛
Cabbage	12½	⅕	..	⅘*	..
Apples	13	1/18	..	1⅗*	..
Grapes	12¾	1/10	..	2½*	..
Tomatoes	15	..	½	..	..
Bananas	11½	¾	..	3*	..
Dates, dry, with seeds	3⅔	1⅑	..	11⅔	..
Figs, dry	2¾	1	..	10½	..
Prunes, dry	4	⅖	..	10½	..
Almonds, shelled	⅘	3⅓	2⅔	..	8⅘
Walnuts, ,,	½	2⅔	2⅓	..	10
Cocoa nibs	¾	2¼	..	..	8

* Includes pectose, which is convertible into sugar.

Note.—The above approximate analyses are derived from tables prepared by Mr A. H. Church, Dr Andrew Wilson, and Dr Chalmers Watson. The figures for ounces may be turned into the corresponding percentages by multiplying by

$6\frac{1}{4}$, as $16 \times 6\frac{1}{4} = 100$. The salts or "mineral ash," not included in the above Table, consist of small quantities of lime, potash, sulphur, phosphorus, etc.

With reference to these analyses it should be observed that water forms the largest part of the weight of most articles of food—viz. about three-fourths of the weight of fresh meat, poultry, fish, fresh vegetables and fruits. Nearly half the weight of bread consists of water; flour is one-seventh part and biscuits only one-twelfth part water. Dried peas and beans (the pulse foods) contain only one-seventh of their weight in the form of water.

It is very important that we should be able to judge of the food-value of any article in relation to its cost, and to make this possible the analysis should take account of every part of the substance, as usually sold retail—it should show of what ingredients the whole weight consists—that is to say, the average amount of waste in the form of water, bone, shell, husk, etc., generally bought retail by the consumer, should be all accounted for. Meat, for instance, may be analysed with or without bone, cooked or uncooked, and cooking may greatly reduce the amount of water. Nuts may be with or without shells, bread may be new or stale, and in the latter case much of the moisture will have evaporated. Unfortunately this rule has not always been strictly adhered to and partly for this reason the Table given above is only approximately correct.

Production of Energy

With the view of showing which are the cheapest foods for the production of force or energy,

Mr A. H. Church, in his book on "Food," gives in the following list the quantity of each kind of food sufficient to enable a man to raise his own weight (140 lb.) to a height of 10,000 feet. [It has been estimated that a fair day's work for an average man is equivalent to raising 300 tons to a height of one foot, which is the same as raising 67 lb. to a height of 10,000 feet.] Mr Church's Table is based on the prices in 1882, and where necessary these have now been altered to represent the fair average prices of 1913-1914.

Name of Food	Weight required	Price per Pound	Cost
	Pounds	s. d.	s. d.
Oatmeal	1¼	2	2½
Ground rice	1⅓	2	2¾
Bread	2⅓	1½	3½
Cane sugar	1½	2½	3¾
Beef-fat	½	8	4
Cod-liver oil	½	9½	4¼
Pea-meal	1⅓	3¼	4½
Grape sugar	1½	3½	5½
Cheshire cheese	1⅙	10	11½
Butter	¾	1 4	1 0
Milk	8	4 quart	1 0
Cocoa nibs	¾	1 5	1 0¾
Eggs	2½	10 / 1 4 dozen	1 10
Mackerel	3⅛	8	2 1
Lean beef	3½	1	3 6

Daily Requirements

Dr Chalmers Watson, in "Food and Feeding," 1910, says that Professor Atwater and others fixed the following diet for a healthy man of average

weight, doing a moderate amount of healthy work :—

Albumen (Proteid)	4½ ounces
Starch . .	18 ,,
Fat . .	1⅘ ,,

Half as much as this to be added for severe muscular work, or, if no exercise is taken, half the quantity of albumen will suffice.

This diet contains 310 grains of nitrogen and 4650 grains of carbon. Albumen contains one-sixth of its weight in nitrogen and one-half of its weight in carbon. Starch and sugar contain no nitrogen and two-fifths of their weight in carbon. Oils and fats contain three-fourths of their weight in carbon (Church).

In ordinary foods the above diet could be made up as follows :—

Bread .	1 lb.	Professor Atwater's Scale
Meat .	½ lb.	
Fat .	¼ lb.	
Potatoes	1 lb.	
Milk .	½ pint	
Two eggs	¼ lb.	
Cheese .	2 ounces	

Dr Dutton's minimum scale is: bread, 1¼ lb.; meat, ¾ lb.; fat, ¼ lb.

Dr Watson adds that Dr Chittenden's researches show that from a-half to one-third of the albumen in Professor Atwater's dietary, given above, is sufficient, and says that :

" There is no question that the ideal diet consists

in the smallest amount of albumen (proteid) food that, together with non-nitrogenous food (starch, sugar and fat), will keep the body in a state of vigour. Dr Chittenden's explanation of the advantage of a low proteid diet is that if proteids are taken in excess the kidneys are overworked, giving rise to various diseased states."

The explanation should have been that the excess overtaxes the stomach and it is only when that happens that the kidneys suffer.

A few equivalent values of different kinds of food may be useful, although they are only approximate :

1 lb. fat	is equal	to about	$2\frac{1}{2}$ lb. starch
,,	,,	,,	$2\frac{1}{2}$ lb. sugar
1 lb. bread	,,	,,	8 oz. lean meat
,,	,,	,,	3 oz. cheese
1 lb. eggs	,,	,,	$1\frac{1}{2}$ lb. lean meat
One egg	,,	,,	$8\frac{1}{2}$ ounces of milk
1 lb. meat	,,	,,	$3\frac{3}{4}$ lb. milk
1 lb. cheese	,,	,,	3 lb. cooked beef

In connection with these figures it may be noted that Dr Noel Paton says :

" It would seem that carbohydrates (sugar and starch) play some special part in the metabolism (combustion) of proteins and have the power of sparing or conserving the nitrogen which is not possessed by fats."

He also says :

" Liebig taught that proteins (albumens) are the

great source of the energy of muscular work, but Voit, Hirschfeld, Munk and others have definitely shown that fats and carbohydrates, equally with proteins, are a source of the energy for muscular work, indeed, over 80 per cent. of the energy of the ordinary diet of the British labourer is yielded by starch and fat. It would seem as if the presence of carbohydrates is necessary in the combustion of fats in the body, just as a wick is necessary for the burning of a candle."

The net result of all these researches is that only a small quantity of nitrogen is absolutely necessary and this conclusion is consistent with the well-known fact that so many races are able to endure very severe labour on a diet consisting chiefly of rice or corn. As Lessius states :

" There are many nations who seldom eat any flesh at all, but live chiefly on fruits and rice and by this same course of diet prolong their lives and preserve their health very wonderfully. Such are the inhabitants of Japan, the Chinese, the Africans and the Turks."

The amount of work which can be done on a diet of any particular food has been measured by " calories," or heat-units, on the principle that the heat required to raise the temperature of one pound of water one degree Fahrenheit could be used to raise 772 pounds weight to a height of one foot. The amount of work that can be done by the consumption of one pound of each of the four chemical forms of food is estimated to be :

1 lb. albumen raises 453 tons one foot
,, starch ,, 485 ,, ,,
,, sugar ,, 406 ,, ,,
,, cod-liver oil ,, 1130 ,, ,,

In calories the diet suggested by Dr Watson, mentioned above, works out thus :

Albumen .	4½ ounces	equals	512 calories
Starch . .	18 ,,	,,	2050 ,,
Fat . .	1⅘ ,,	,,	465 ,,
		Total	3027

Albumen, starch and sugar are thus shown to be of about equal value, giving about 114 calories per ounce, while fat gives 265 calories per ounce.

The great prominence given to albumen by Liebig disappears under this test and the results arrived at by the other scientists referred to above are confirmed in a general manner.

Particular Foods

Milk. A few individual foods may now be specially referred to. Milk is the only article which is by itself a complete food. We are dependent on milk in infancy, in serious disease and in old age. Dr Saleeby says :

" As part of the diet of the adult milk may well have a place. Milk, despised of the strong man when his need is least, will save him in illness, when his need is greatest."

Dr George Cheyne mentioned, in 1725,

" the milk doctor of Croydon, who by living on

milk, cured himself of an otherwise incurable distemper, the epilepsy, and lived in perfect health fifteen years after, till an accident cut him off."

Another instance, a case of a different kind, is recorded by Sir Lauder Brunton, who says :

" The results of an exclusive milk diet in chronic diarrhœa are sometimes quite astounding. A patient who had been suffering from it for ten years, and had tried all sorts of medicine in vain, had just come back from Carlsbad worse than he went, and had nearly given up hope of a cure. Milk alone cured him as if by a charm."

The same eminent physician recommends sour buttermilk in wasting diseases, and also mentions the " whey cure " as being successful in certain cases. Sour milk has from time immemorial been the chief food of the wandering Arabs and of many African tribes. Fresh milk is too rich for some stomachs, and when that is the case it may be made more digestible in several ways, one or other of which should suit any individual. It may be diluted with water or aerated water ; it may be allowed to become sour or may be turned sour by rennet or lemon-juice, sugar being then added to make it palatable ; lime-water may be added to it, or fresh fruit may be eaten with it. It should not be boiled. It now appears to be decided that there is little danger of contracting tuberculosis from cow's milk, Professor Koch's view, that the germ of human tuberculosis is not the same as that found in cow's milk, having proved correct. A perfect

imitation of cow's milk has recently been made from the soya bean and other materials, the object being to obtain a milk-food free from all infectious germs. In addition to other uses this article may replace the preserved milk carried by ships when making long voyages. The price is said to be very moderate.

Bread. As a staple food, bread comes next to milk, but requires the addition of milk or fat to make a complete food. Mr A. H. Church, in his book on "Food," says that four pounds of bread will enable a man to do a full day's work, but will not keep him permanently in health. Bread and milk, with fruit or fresh vegetables, form a healthy diet, to which cheese should be added if hard work has to be done.

Bread used to be styled "the staff of life" and should still form the chief part of the diet of everyone. A diet containing a good deal of bread, other farinaceous foods and vegetables has one advantage which renders it very suitable for persons who, owing to advancing years or a sedentary occupation, cannot assimilate much rich animal food; this advantage is that the lighter diet satisfies the appetite and yet does not overload the system or tax the digestion with nutriment that is not necessary and may give rise to serious trouble. It has the effect of delaying digestion. Brown bread is much superior to very white bread for several reasons. It contains more albumen, in the form of gluten, and more lime; its rougher portion, the husk, is also an advantage, as it assists the action of the intestines. As little or no vegetable is usually eaten at breakfast, brown bread is particularly suitable at that meal, for the sake of

this husk or cellulose. It should not, however, entirely displace white bread, unless the happy medium between coarse " whole-meal " and pure white can be obtained. As brown bread contains more husk and gluten and more water in a given weight than does white bread, the percentage of starch is less than in white bread. Soda-bread is not so digestible as yeast-bread or aerated bread, and should be avoided, at least at breakfast.

Oatmeal. Oatmeal is more nourishing, at the price, than any other food, and is superior to wheat-flour. It has, however, if digested, such a strong diuretic effect on some people that they can only take it occasionally. Porridge may prevent the digestion of breakfast if taken too hot and loses none of its flavour by cooling. Oatmeal may, however, be regarded more as a winter than a summer food.

Cornflour or maize, etc. Cornflour is inferior to bread and oatmeal, but with the addition of milk it forms most palatable foods. Cornflour porridge saved the lives of thousands of poor people during the Irish famine of 1846. The Table of Analyses shows that the farinaceous foods, wheat, oatmeal, maize, sago, arrowroot, etc., consist almost entirely of starch, and starch is converted into sugar in the process of digestion ; it is therefore practically equivalent to sugar, but has the advantage that it is not likely to create acidity in the stomach.

Fruits and vegetables. The special value of fresh fruits and vegetables is that, although they do not contain much nourishment in proportion to their weight, their mineral salts and vegetable acids keep the blood in a healthy state. It is well known that if a ship remains a long time at sea

and the crew get no fresh fruits or vegetables, they are liable to attacks of scurvy and general debility. Lime-juice is often issued in such circumstances to prevent these ill effects.

Onions. Amongst fresh vegetables onions should take a high place, although the results of analysis do not show any marked superiority over other roots. One pound of cabbage has a value of 115 calories, and the same weight of onions 190 calories. Their keeping qualities give them an increased value. Sir Samuel Baker, in "The Nile Tributaries of Abyssinia," says: "The latter delicious bulbs are the blessing of Upper Egypt. I have lived for days upon nothing but raw onions and sun-dried rusks. Nothing is as good a substitute for meat as an onion."

Artichokes. The "Jerusalem" or girasol artichoke appears from the analysis to be superior to the onion. As Mr Church points out, there is no starch in the artichoke and on this account it does not become floury when boiled, as the potato does.

Mushrooms. Mature or ripe mushrooms contain a substance (muscarin) which may completely paralyse digestion.

The pulse foods. The pulses—peas, beans, lentils and haricot beans—are most important from an economic point of view, as the necessary nitrogenous or albuminous food can be obtained in these foods far more cheaply than in beef, mutton or pork and even more cheaply than in cheese, eggs or milk, as appears from Mr Church's Table copied above. With regard to digestibility, the pulses have the advantage that they contain no fat, which so often tries the digestive powers

and leads to much waste. There is also much less water and waste material in a given weight of pulse than there is in the same weight of fresh meat, which also usually contains bone, sinew and fat.

Dr Haig, who excludes the pulse foods from what he considers a wholesome diet, makes an observation which touches the economic side of the question when he says: "Ultimately the problem of cheap living controls the existence of the nation." As the pulses are the cheapest of the albuminous foods and albumen is an essential element in the food of nations living in the temperate regions, the pulse foods are likely to become more and more indispensable in the dietaries of the future.

Animal fats. The most concentrated form of food is animal fat—beef-fat and cod-liver oil especially. A given weight of such food will enable a man to do far more work and to resist the cold better than the same weight of any other kind of food would do. That fats are nearly three times as strengthening as sugar, starch or albumen is shown by the calories test, as already stated. On the other hand, it is difficult to digest or assimilate more than a small quantity of animal fat daily, except in extremely cold climates. The most digestible forms of fat are cream, butter, cod-liver oil and the fat of fried bacon. A diet of olive oil and potatoes has been tried by some vegetarians. Butter, according to an old saying, is, "gold in the morning, silver at noon and lead at night," the meaning being that rich food should be taken sufficiently early in the day to allow of it being assimilated before night.

Cheese. Cheese is one of the best forms of albuminous food and is recommended in preference to meat by some authorities.

The food-contents of cheese are the same as those of milk, except that the milk-sugar is lost in the whey when that is pressed out of the cheese. The composition of these two foods can be easily compared by taking the analysis of one pound of cheese and placing it beside the percentage analysis of milk :

	In One Pound of Cheese	Percentages in Milk
Water	5½ ounces	86 per cent.
Casein (albumen)	4½ ,,	4 ,,
Milk-fat	4½ ,,	3¾ ,,
Milk-sugar	¼ ,,	5 ,,
Phosphates and other salts	½ ,,	¾ ,,

Cheese is sometimes said to be indigestible and at other times is given the credit of making other things digest more easily. The explanation may be that in both cases the quantity of strong nourishing food contained in cheese is frequently overlooked. The two ounces of albumen required for one day on the minimum diet approved by Professor Atwater can be supplied by half-a-pound of cheese, and when other animal or albuminous food is eaten as part of a substantial meal, it is quite possible that the addition of cheese may create an excess that is difficult to be digested or assimilated. It may also be that in some cases, where cheese is supposed to assist the digestion of

a meal, it causes dyspepsia. The sense of effort in the stomach, which is quite a natural feeling while digestion is proceeding, may then cease and the sense of relief from effort may be mistaken for a sign of better digestion.

Sugar. There are three kinds of sugar :

1. Milk sugar (or lactose).
2. Cane sugar (beet sugar).
3. Grape sugar (or glucose).

Milk and cane sugars have to be converted into grape sugar by digestion before they become fit to enter the blood as food for the tissues. Dr Fothergill says that cane sugar " requires very little digestion, it soon finds its way to the blood and, next to alcohol, is the easiest digested food we have." Grape sugar passes at once into the circulation when taken into the stomach. It is contained largely in honey, raisins, dried figs, dates, grapes, bananas, etc.

In connection with Dr Woods Hutchinson's advice, that children should be allowed " plenty of sugar and sweet things," etc., etc., it should be noted that many other authorities are strongly opposed to a liberal allowance of sweets. Sir James Eyre said : " Sugar in abundance is an abomination to the stomachs of young people." Dr Chalmers Watson holds that " excess of sugar, jam, sweets and chocolates " is one of the causes of chronic rheumatism. Sir Hermann Weber's opinion is : " Large quantities of sugar when taken together with a full amount of animal or mixed food . . . may lead to gout, uric acid concretions, diabetes and indirectly also to arterio-sclerosis." A very common notion is that young people should

be allowed to eat as much as they can, even of the richest food, "because they are growing," but the great rule still applies—if young or old do not properly digest all their meals they cannot flourish as well as they might do and they may be sowing the seeds of disease. Dr Valentine Knaggs states, in "Rheumatism and Allied Ailments," that "when children are fed on wrong lines and freely stuffed with milk, sweets, puddings, etc., they are taking into their little bodies food-material that they cannot properly oxidise."

Model dietaries. It will be observed that in this book no special dietary is recommended for anyone. On the contrary, the principle adhered to is that everyone should be free to follow his own tastes and inclinations, and should eat, drink or avoid whatever he pleases. This liberty can be safely enjoyed only because health is protected by the rules which have been given to enable anyone to detect the occurrence of dyspepsia and thus to regulate his diet in such a manner that he will learn to eat only as much as he can digest.

Tea and coffee, etc. It is stated that tea and especially coffee delay digestion, but Sir William Roberts maintains that this is a distinct advantage as it allows time for the more gradual absorption of the products of digestion—the work may be delayed, but in the end it may be more thoroughly done—and the experience of most of the world seems to be in favour of a little coffee after dinner. Dr Haig holds strong views on this subject, his opinion being that "tea and coffee are worse than alcohol and tobacco," and Dr Kellogg uses language nearly as strong, but Sir William

Roberts defends tea "of medium strength" and says:

"A good deal has been said of the injurious effects on gastric digestion of the tannin contained in tea. I question whether the statements made with reference to this matter are worthy of attention. Meat-fibre does not, as a matter of fact, harden in tea; on the contrary, it swells nearly as freely in acidulated tea of medium strength as in simple acidulated water."

Sir Henry Thompson recommends that tea should be taken with plenty of milk. The tests of dyspepsia already given are the best guide for the avoidance of any ill effects from taking tea or coffee in excess. Of course care should be taken that sleep is not interfered with by taking tea or coffee at too late an hour in the evening. Strong coffee is rather constipating. "Maté," or "Paraguayan tea," made from the leaf of a species of holly, is said to be very nutritious. It appears to be very uniform in quality and, although not so refreshing as good tea, it is a more agreeable beverage than much of the inferior tea so largely consumed in England. Cocoa, unlike tea and coffee, is not a mere stimulant; it is a substantial food like milk and soup.

Alcohol and tobacco. A few words should perhaps be added on the subjects of alcohol and tobacco. Practically all authorities agree in condemning the habitual consumption of spirits, and there is little doubt that they should only be used medicinally. A person who digests all his food finds perfect health a sufficient stimulant and will only on very rare occasions either desire any other stimulant or be

the better for taking it. Light wines and ale must be included in the list of foods, and in small quantity they assist digestion, but add to the task of assimilating the meal, and for that purpose may render additional exercise necessary.

There are many objections, for those who are not engaged daily in hard physical work, to the habit of drinking beer: (1) it is likely to cause some congestion of the liver, (2) it is a frequent cause of gout, (3) its immediate effects are bad for "condition" in prolonged exertion or athletic training, (4) it causes corpulency and often produces a very unhealthy fatness. Dr Garrod states that the use of fermented liquors is the most powerful of all the predisposing causes of gout, and Sir Henry Thompson says that at one period of his life he tried a single glass of good wine every day at dinner, but was compelled to give it up. To drink little or not at all seems to be the best advice in regard to alcohol, and still more certainly is a similar rule applicable to smoking.

Variety is an important principle in diet, and every kind of food that suits the palate and the digestion should be taken from time to time, when in season or conveniently obtainable. Dr Prout's opinion was:

"Error of quantity in diet is of infinitely more importance than the error of quality (*i.e.* the kind of food). Any stomach may digest a little of anything, but no stomach can digest a great deal of anything."

He might have added, "especially when the same thing is repeated too often in the daily

diet." A diet restricted to a very few articles has, amongst other objections, the serious disadvantage that the stomach may after a time find a difficulty in digesting any kind of food outside the limited range that it has become accustomed to.

What is indigestible? There is a good deal of misconception on the question of the kinds of food that are difficult of digestion or quite indigestible. Some articles of food are quickly and easily digested in two hours, while others, which are quite digestible, require three or four hours; others again are considered to be indigestible because, being of a rich nature, they give trouble by being very slowly assimilated. Such are suet puddings and rich pastry, which are so dense and heavy that, unless they are very finely divided in the mouth, they cannot easily be penetrated by the digestive fluids, and there is the further difficulty of digesting and assimilating the animal fats they contain. There is still another class of foods rendered difficult of digestion by their toughness or coarseness of fibre, such as salt beef, salt pork, lobster and smoked fish. Others again contain substances which are absolutely indigestible and yet are harmless in moderate quantity, such as the seeds and skins of fruit, the skins of nuts, the husks of wheat and other grains and the woody fibres of some vegetables. Starch foods, such as flour and potatoes, are quite indigestible unless the hard covering of each starch-granule is burst by cooking. Raw cucumber and raw onions are not easily attacked by the gastric juices.

The chief danger in connection with vegetables

and fresh fruits is that children may eat them too hastily, without sufficient mastication, and that masses of such coarse materials may afterwards cause trouble in the stomach or in the bowels.

Brain-work

Those who devote much time to hard mental labour are, with regard to diet and exercise, very much in the same position as persons whose occupations are sedentary, inasmuch as a restricted diet and plenty of outdoor exercise are indispensable in both cases. Literary labour is apt to cause a hot head and cold feet—symptoms of congestion of both brain and liver—and the remedies are active physical exercise and abstinence from rich food.

Sir Hermann Weber observes :

" It is often said that persons doing a large amount of brain-work require a large amount of food and stimulants, but careful observation does not prove this to be the case. I have known many hard brain-workers who did their work best when they ate and drank very little."

He also says :

" Many people by taking a cup of milk or of weak tea with milk, and with a piece of bread or a biscuit, can do their mental work or take early walks with great advantage."

That is, instead of taking breakfast. He adds that General Moltke preserved his health " by

great moderation in all things, by regular outdoor exercise in all weathers—never a whole day at home."

Sir Henry Thompson's opinion is :

"Brain-workers can really enjoy a fair degree of health and comfort by living on light food which does not require much force to digest and much muscular activity to assimilate."

Dr Keith, in "Fads of an Old Physician," remarks that Sir Isaac Newton, Napoleon and the Duke of Wellington took scarcely any food while they were engaged in great problems. Dr Saleeby's observations on the need of sleep for the brain-worker are quoted in another chapter under the heading, "Sleep."

The latest theory on national diet as influencing the mind (see *The Times* of 20th April 1914), is that an oatmeal diet was the making of the Scots, by favouring the development of their intellectual faculties, and that in recent times indulgence in beef has been their undoing by turning them from intellectual to commercial pursuits ; and yet the author of this theory holds that beef was the making of the English and should continue to be their typical food. If this view is correct it must be more difficult to bear prosperity on the north of the Tweed than it is on the south of that river.

A Long Day's Work

The diet most suitable to a long day's hard work or severe exertion, walking, cycling, golfing or

steady manual labour, when little time can be spared for rest, should consist of food which is very nourishing, easily digested and of small bulk. Vegetables do not fulfil these requirements. Meat sandwiches, eggs or cheese, with bread and butter, are the most suitable and convenient foods. A little fruit may be added with advantage. Weston, the world's champion walker, who could walk seventy-two miles in a day when seventy-two years old, used to suck lemons while on the road, and Dr Haig claims that lemon-juice assists in clearing out the uric acid from the system. For light refreshment between meals nothing can equal milk or milk and soda-water (*i.e.* aerated water), with or without a few whole-meal biscuits. If time permits, a simple afternoon tea is both strengthening and refreshing. Raisins or dates with milk and bread have been recommended, and some find cocoa or coffee, with plenty of milk, very sustaining. Beer generally has a bad effect on "condition" if taken during a long day's severe exertion, but everyone must follow his own taste and learn by experience on what diet he can work best. It is a great mistake to eat a heavy meal in the evening when very hard work has caused exceptional fatigue, for in such circumstances the whole system, including the stomach, requires rest more than anything else. The breach of this rule will increase that tendency to dyspepsia on the following day, or even two days, which frequently ensues after excessive fatigue.

In Sir Hermann Weber's "Prolongation of Life," he states:

"The increased removal of waste products is

one of the most beneficial influences of such a weekly long walk."

The meaning of this passage is not at all clear, as an increased removal of waste products would indicate dyspepsia, resulting from fatigue.

CHAPTER IV

MEALS AND MEAL-HOURS

Breakfast

FEW careful observers would hesitate to say that the modern English breakfast—a substantial meal taken at an early hour—does more to cause disease and shorten life than does any other luxury or indulgence, not excepting the neglect of regular outdoor exercise, which is so common amongst the well-to-do. The injury done is so universal that it is even doubtful whether drunkenness or any other vice does more harm to the health of the community.

It may, indeed, be said, without exaggeration, that the question of protecting health from the effects of disordered digestion resolves itself into the precautions that should be taken to ensure the proper digestion of breakfast, and it is not at all surprising that Dr Dewey's system of abolishing breakfast altogether has had such a large number of followers or that so many of them have by this simple means completely recovered health after suffering for years from weakness, depression, pain and increasing infirmity caused by eating a breakfast that they did not digest. The view taken in this handbook is that total abstinence from breakfast is an extreme course, which exceeds the bounds of necessary caution and is impossible of application in the case of persons who have much hard physical work to do. The suggestion here made is that by taking

a few simple precautions anyone can digest as much breakfast as he really requires.

The old and still popular maxim that it is well to begin the day with a good breakfast is a fallacy founded on a very common, but most erroneous, assumption—viz. that those who feel no pain or inconvenience after a meal may rest assured that they do not suffer from indigestion ; immediate, conscious suffering is made the pivot of the whole question, while in fact, as explained in a previous chapter, the form of indigestion most to be feared is one which gives no such warning of its presence. For many years, perhaps, it is the constitution alone which suffers, and we feel no very noticeable ill effects until our constitutions begin to break down under the continuous strain.

If a solid meal, especially one accompanied by hot drinks of any kind, is taken soon after rising from bed the risk of the occurrence of dyspepsia is very great. When the body, after being, in most cases, well supplied with food on the previous evening, has remained at rest and warm for many hours, the system does not at once call for a fresh supply and, except in the case of the very young, an hour or two must elapse before its energies become fully aroused. The digestive powers seem to be closely in touch with the demands of the body in regard to supplies of food, and it is only by the stimulation of the renewed activities of the opening day, by the effects of cool air and of the lapse of a certain amount of time, that the stomach becomes able to digest a morning meal. At any rate it is clear that the stomach is not prepared at once to recommence work at high pressure.

The symptoms and evidences of dyspepsia have been rather fully detailed in an earlier chapter, and it must here suffice to state that if the first meal of the day be not completely digested, one's physical strength and endurance during the day will be very considerably diminished, the tone of the whole system will be reduced much below the standard of perfect health and one more blow will have been given to the constitution.

What, then, are the precautions that should be taken to ensure the digestion of breakfast? Everyone must have observed that a long walk or any sharp exercise in cool air, at any time of the day, greatly improves both the appetite and the digestion, and this fact reveals the conditions which prepare the way for the digestion of breakfast. These conditions are as follows:

(1) *Time.* The longer the interval, within reasonable limits, between the hour of rising and the first meal (or between any two meals) the better will the stomach be able to digest and the body to assimilate a supply of food. To be out of bed an hour or an hour and a half before breakfast is advisable.

(2) *Cold temperature.* A cold bath or sponge-bath, cold enough to be thoroughly refreshing, or even dipping the head in cold water, is very necessary. Dr Dewey appears to be the only medical writer who undervalues the cold bath, but, as he takes no breakfast, one great purpose of the morning bath is gone. He says that a cold bath is "a protracted chill that chills mind and soul at the same time—a debilitating process" (see "The True Science of Living," pp. 266-268). A glass of cold water just before breakfast will help greatly to brace up the digestive system, and

those who will not drink water should take some other cold liquid, such as milk and soda, cold tea, claret and water or lemon-juice and water. This is quite a necessity, unless the meal is postponed for a longer time after rising, and should be made an invariable rule. Breathing cool air all night in a well-ventilated room has a distinctly good effect in creating a demand for food—just as winter air promotes digestion better than summer air does.

(3) *Exercise.* Moderate, gentle exercise helps to create a demand for food, but care should be taken to avoid anything approaching fatigue before a meal, and sitting down to breakfast feeling overheated by exercise is almost fatal to digestion. Hard work when the stomach has long been empty, as is the case before breakfast, prevents good digestion. It is a common experience that sea-bathing before breakfast makes one drowsy and tired all day, and the reason is that too much muscular work has been done and too much body-heat lost in the cold water, leaving a degree of physical depression which is fatal to digestion. A glass of milk, with or without a slice of bread and butter, or some other light food, taken before starting for the bathe will prevent these ill effects. A working man who has to walk a considerable distance or do much work before breakfast should keep this rule in mind. A little exercise with a "chest-expander," or with dumb-bells, or by working the arms rapidly without dumb-bells, is very useful.

A glass of cold water immediately before breakfast is of the greatest benefit. Dr Herbert Alderson, in his handbook on "Indigestion,"

recommends a tumbler of water, hot or cold, the very first thing in the morning, and advises the addition of "one egg-spoonful of bicarbonate of soda, with or without a little less carbonate of magnesia and a pinch of common salt." He says that this should never be neglected, as it cleanses, refreshes, and stimulates the stomach. In most cases it will be found that a slightly acid liquid, cold tea or lemon-juice and water, will assist digestion better than the salts here recommended. Hot water may suit some people, but the reasonableness of taking hot liquids when the body is already too warm is not apparent. Sir Henry Thompson advises "an air bath" to cool the body before dressing. At breakfast very hot tea, coffee or cocoa should be avoided, at any rate during the earlier part of the meal. They should be allowed to cool at least a little, or, better still, they should be taken quite cold, especially in hot weather. Porridge is often said to be "too heating," and in fact it injures digestion, not because it is oatmeal, but because it is too hot and may cause that warm, flushed feeling which Sir H. Weber and others say indicates weakness of digestion when it comes on during a meal. Cool porridge has more flavour and is much more safe than hot porridge. Next to hot liquids the most common cause of the non-digestion of breakfast is an excess of rich food—meat, eggs, bacon or butter. It is not that these things are not required at all, but that they may not be tolerated by the stomach at such an early hour, except in very limited quantity.

The power of digestion being so dependent, at any hour of the day, on the demand for food to

supply the immediate needs of the system, the strength of digestion at the breakfast-hour is greatly influenced by the nature of the meal taken in the previous evening—the more one eats in the evening the less one requires next morning. If, therefore, the evening meal was a light and early one, and especially if outdoor exercise was taken after it, there will be more need of food in the morning than there would be in the opposite circumstances—assuming, of course, that the evening meal was digested.

If it be anticipated that, in the day just beginning, little or no exercise can be taken, as when a long journey by train is in prospect, the lightest possible breakfast will suffice, even a glass of milk or a cup of tea or coffee and a biscuit. When breakfast can conveniently be postponed for an hour or so, Sir James Eyre's plan might be tried. His suggestion was: "On rising take first a cup of milk, coffee or cocoa and then promenade for an hour." Or a little porridge with cold milk might be taken before the promenade, instead of the tea, etc.

It is more than probable that a glass of ale and a crust of bread for breakfast would be more wholesome and sustaining, even for an active man, than the modern meal of eggs, bacon, butter and hot coffee. It has been stated that in Florence many families adhere to the old custom of taking only a cup of coffee and a crust of bread in the morning, and after that two light meals in the day, believing that "much eating prevents much thinking."

Speaking of the feeling of weakness and depression which is often felt before noon when a sub-

stantial breakfast has caused dyspepsia, Sir Lauder Brunton observes : " To relieve this condition they not unfrequently think it necessary to take a glass of wine or a biscuit or a nip of brandy." Morning dyspepsia certainly creates a desire for some stimulant at or before midday, and it would not be an exaggeration to include a taste for drink amongst the frequent consequences of habitual neglect of digestion.

Dr Leared, in his book on " Imperfect Digestion," says : " The diet of persons associated together is apt to be the same, and sufficient individuality in matters of eating and drinking is seldom observed." Family usage does, no doubt, often keep individuals in a groove that is not good for them, but the routine in such cases is very easily broken by those who desire to reduce their diet. The French have a saying that dessert is a course to be played with, not eaten, and by taking merely some fruit, dry toast or other light food, breakfast can very comfortably be reduced to harmless proportions by those who find that they require very little at that meal. An apple or other fresh fruit before breakfast assists digestion.

A fair trial by the ordeal of active exercise will soon convince anyone that he will be far more " fit " all day, and in distinctly better condition, after a light, well-digested meal than he will be after a solid one which he cannot properly digest. A very light breakfast may be regarded as a sound foundation which can safely be built upon, a few hours later, with more food, as occasion may require. The early morning is the " dead point " of the machinery of digestion and will have been got over after a few hours.

The Midday Meal

The chief meal of the day should, if possible, be taken at midday, when the demand for food has been fully aroused during the time which has elapsed since rising from bed and by the active occupations of that interval. A second reason is that after a midday meal there remains ample time for the digestion and assimilation of the food before night—when the whole body, including the digestive, muscular, and nervous apparatus should be completely at rest. Even the heart and lungs are then going at low pressure. Sir James Eyre, when discussing the most suitable hour for dinner, spoke of "the great privilege of being able to dine at two o'clock, or not later than three o'clock, tea at six or seven, and a very slight repast afterwards, suppers being abolished."

Sir Henry Thompson says: "Few meals are more undesirable for man than a heavy supper."

Dr George Cheyne's opinion was:

"From hence is evident the absurdity of heavy, various, and luxurious suppers, or of going to rest till many hours after such a meal. Our sleep is sound, sweet and refreshing according as the alimentary organs are easy, quiet and clean."

If breakfast and the evening meal are reduced the midday meal should be liberal, in proportion to the amount of physical work done and to the age of the individual. Those whose occupations or business engagements do not permit them to take a substantial meal at midday must postpone their principal meal to the evening, when the day's work is done, but, as there will then be less time for the

completion of digestion before retiring to rest, it will be found advisable to take rather less rich food. Each person must discover his own peculiar strength or weakness in regard to the nature of his evening meal, remembering that the more he takes at that time the less he will require at breakfast next morning and that a calm night's rest is a first consideration. Whenever possible, a half-hour's walk should be taken between the evening meal and bed-time; this will be found a most beneficial and healthy practice, assisting digestion and conducing to sound sleep; in fact, nothing is more calculated to keep one fresh and to stave off the encroachments of age. In default of outdoor exercise, some form of dumb-bell exercise is useful.

Number of Meals

Afternoon tea is a pleasant and sociable institution, but should not be a meal. Sir James Eyre said that: "Persons who are advised to take little and often carry out the idea faithfully and eat all day long." Dr Herbert Alderson also advises his readers to restrict this meal as much as possible. Three meals a day should be quite enough, except for the very young and for invalids. The Greeks were content with two meals, and Dr Dewey maintains that that system is the only safe one. Sir Hermann Weber says he also had to put some of his patients on two meals a day. Europeans working in the tropics often find that one meal a day keeps them in good health and, as suggested above, those whose engagements permit might do well to aim at gradually concentrating their consumption of food more and more on the midday meal, by reducing the morning and evening meals.

CHAPTER V

RHEUMATISM AND GOUT

ATTACKS of muscular rheumatism, from exposure to damp and chills, are very common, and in most cases are quite temporary ailments. A very severe general chill may, however, leave the sufferer a cripple for life, but how far these more serious effects would follow from the same accidents in the case of a person in perfectly sound health and condition, free from uric acid poisoning, has yet to be proved.

The uric acid compounds, which enter the blood as the result of disordered digestion and are such a universal scourge, appear to predispose the system to rheumatism, if they do not directly cause it, and prevention is in this, as in all other cases, far easier than cure. It is better policy to take a little trouble to prevent the entrance of the uric acid poisons than to be careless about digestion and exercise and then endeavour, year after year, to wash these poisons out of the system by taking iodide of potash or salicylate of soda, or by drinking sulphur waters and taking baths at Bath, Aix-les-Bains or some other health-resort at home or abroad.

The cause of rheumatism is another problem on which there is much difference of opinion, but it is becoming more and more generally believed that the disease is directly connected with errors in diet, although microbes of mysterious origin are said by some to take an active part in the causation.

Three principal forms of rheumatism are generally distinguished: rheumatic fever, rheumatoid arthritis and chronic rheumatism, the first being always "acute rheumatism," the second acute or chronic. The second is altogether in the joints and the third chiefly in the joints.

Many medical writers leave their readers in doubt on the important question whether the "specific microbe" of rheumatism is produced in the body or invades it from without. If the former be the fact the disease should not be described as "infectious." One authority states: "It is now universally assumed that in acute and sub-acute rheumatism we are dealing with a specific fever of microbic origin. . . . The origin of an acute rheumatic infection is most probably the tonsils or throat, whence the organisms migrate into the blood." Another speaks of "arthritis dependent in many cases on toxic infection from without." Another says: "The invasion may occur from the mouth, nose, pharynx or air-tube." Another states: "There is good reason for believing that it is of bacterial origin, the source of infection being the gastro-intestinal tract or the genito-urinary tract." Another asserts that chronic rheumatism (fibrosis) "is not a microbic infection. . . . It is due to a number of preceding acute diseases." Another is of opinion that chronic rheumatism "may appear in the wake of acute rheumatism or may follow influenza, sore throat, severe muscular effort or exposure to damp and extremes of temperature. . . . It is absolutely distinct in nature and origin from acute rheumatism. In the majority of instances the affection is distinctly

related to gastro-intestinal derangements." The same writer attributes rheumatoid arthritis to "intestinal flora initiating abnormal fermentative and putrefactive processes in the alimentary canal," which is tantamount to ascribing both diseases to the same cause. Dr James Galloway narrows the question still more, for he says: "The chief common factor involved in the series of rheumatic diseases is the poisoning of the tissues of the body by the absorption of certain noxious materials, often of bacterial origin."

Several authorities, however, trace rheumatism directly to errors of diet.

Dr Dewey attributes rheumatic fever to disordered digestion, and gives his patients nothing but water while the fever lasts.

Dr George Keith attributes rheumatic fever to the excessive consumption of meat. He states:

"I have never in all my experience met with it in young or old except when the diet had been full and had consisted largely of beef and mutton. In Buenos Ayres rheumatic fever is exceedingly common among the young and leads to most of the heart disease, which is also very common. The amount of meat, especially of beef, consumed there by old and young is enormous."

Dr Valentine Knaggs says distinctly: "If we look carefully into the history of rheumatic fever cases we shall invariably find that waste storage has been going on for some time. . . . Rheumatism, in short, is nothing less than the deposition of bodily impurities in the parts affected by it." He also says that

"A restricted diet is the only possible alternative, for it is from the wrong foods, the excessive quantity of food or the badly digested and imperfectly assimilated nutriment, and out of nothing else, that these impurities originate which give rise to chronic rheumatism, gout, asthma, sciatica, neuritis, paralytic affections and other disorders."

Dr Haig attributes rheumatism to uric acid derived directly from animal food and other articles of diet, independently of errors in gastric digestion.

The question one would like to ask, in connection with some of the theories about the causation of rheumatism, is: Would rheumatism still attack us if the effects of chills and damp and of the poisons due to dyspepsia were both eliminated? It has not been proved that microbes cause rheumatism or rheumatic fever independently of disordered digestion, and if disordered digestion produces microbes which cause either of these diseases, then the disordered digestion is the real source and cause against which preventive measures must be directed. Would these diseases develop, from causes over which we have no control, in men who have thoroughly sound constitutions and who lead perfectly healthy lives in the most healthy surroundings? Or does the fault lie in our own mismanagement of diet and our ignorance or defiance of hygienic laws?

Neuralgia has been described as "the cry of ill-fed nerves," and there is a strong presumption that rheumatism and neuralgia have a common

origin in malnutrition due to the blood being impoverished by disordered digestion.

The frequency of attacks of rheumatism and neuralgia in hot weather is very remarkable, but is readily accounted for if dyspepsia is the cause of both of these affections. Less rich or animal food is required in hot weather than in cold and, as it is not the usual practice to reduce the diet at once when the weather becomes warm, dyspepsia is likely to be much more prevalent in summer than in winter. Profuse sour perspiration seems to be another link between dyspepsia and rheumatism.

When rheumatism begins to attack the hip-joint attention should at once be paid to the digestion, with the view of preventing dyspepsia. It will generally be found that breakfast is the meal which causes most of the trouble. It may seem absurd to say that rheumatism may be cured by abolishing or greatly reducing breakfast, but it has been done in a great number of cases, when the disease has not proceeded too far for preventive measures. Regular, moderate exercise several times a day, careful dieting, a cold bath or a moderately cold one in the morning, and a glass of cold water before breakfast will, with care and watchfulness, ensure good digestion, and keep the blood in a pure state. A person who is confined to his bed should, of course, be content with an extremely light breakfast.

An Australian paper says :

" Everybody who has had experience of rough-riding must have known what it is to find his thigh

muscles give way and to suffer torture when suddenly called upon to grip the saddle hard with his knees. Apart from the pain a feeling of helplessness approaching paralysis sets in and for days every form of movement which brings the thigh-muscles into play is peculiarly painful. It is a mistake to treat this class of injury as being purely a muscular strain. The seat of the trouble lies deeper and is only a disguise for little-suspected rheumatism."

The crippling weakness and pain in the hip-joint which sometimes attack a man who has been working very hard while his digestion has been out of order, must be closely akin to the trouble experienced by the horsemen mentioned in this extract.

It might naturally be expected that when rheumatism attacked the town-dwellers in Buenos Ayres mentioned by Dr Keith, and the mounted stockmen spoken of in the Australian paper quoted above, it would not take the same form in both cases. The features common to the two cases are a warm climate and an excessive meat diet, but the habits of life are totally different. The Australian stockmen spend much of their time on horseback and in the healthiest surroundings; their diet, however, consists largely of meat and badly cooked flour and its ill effects are often aggravated by excessive tea-drinking and smoking. That dyspepsia was the cause of the trouble in both cases is not an unreasonable hypothesis.

Rheumatism has a great tendency to return

again and again to the same joint and to attack a joint which has at any time been injured by a chill or a sprain.

Gout

Gout has, from time out of mind, been ascribed to too much good food and too little hard work, conditions which at once suggest indigestion. Dr Prout said : " Those who live chiefly on matters purely farinaceous are little liable to lithic acid deposits," and Dr Chalmers Watson says that gout is unknown in Japan, where a strict vegetarian diet is common.

Sir Robert Christison said that during an experience of thirty years at the Edinburgh Royal Infirmary he met with only two cases of gout, and these patients were both butlers from England. The freedom of the Scots from gout must not, however, be attributed to their drinking whisky, but to the fact that they drink little wine or beer. Malt liquors are said to be one of the most frequent causes of gout. Dr Haig states that in gout the uric acid is retained in the fibrous tissues round the joints.

Sir Lauder Brunton says : " It is usually supposed that there is a greater tendency in some persons to the formation of uric acid than in others and that this tendency is associated with a gouty or rheumatic diathesis." Dr Prout said : " I was induced to make some experiments which appeared to confirm the supposition that healthy urine contains no uncombined lithic acid," but Dr Haig's opinion is that there is always a very small proportion of this acid in a free state in the blood. Sir Michael Foster says that " uric acid

is the result of a metabolism slightly diverging from that leading to urea."

The fact seems to be that, when proteid food is properly and completely digested in the stomach, urea (a compound of uric acid) is the normal and harmless waste-product of that kind of food, and this urea passes out through the kidneys without causing any injury to the system and leaving little or no uric acid behind it. When, however, the digestion is faulty, and dyspepsia occurs, abnormal and injurious waste-products make their appearance, in the form of other compounds of uric acid, called lithates or urates. It seems that in some cases these mal-products are retained in the system a longer time than in other cases and that gout instead of rheumatism may then occur, as the result of differences in individual constitution. The richness of the diet must have much effect in these questions, just as the urinary deposits which cause stone in the bladder vary very much in their composition, and when dyspepsia occurs owing to the non-digestion of a meal at which an excess of meat was eaten, the resulting mal-products must be more injurious than those which follow a meal consisting only of bread and butter that was not digested. For the same reason, the degree of dyspeptic collapse must depend very much on the nature of the meal.

CHAPTER VI

THE EFFECTS OF DYSPEPSIA

It may be interesting to enumerate briefly some of the various forms of disease, or symptoms of weakness and malnutrition, which are caused by the poisonous products of disordered digestion carried by the blood to all parts of the body.

It is not suggested that the following list is at all complete, and in view of the fact that every single cell in the body must suffer from the effects of malnutrition, it is most probable that many other diseases which should be included have been omitted.

A fairly comprehensive list of the symptoms of what may, for the sake of distinction, be termed acute indigestion, has already been given in the chapter on Digestion.

Some of the effects of disordered digestion are:

Shortness of breathing after slight exertion.

Muscular weakness or collapse.

Perspiration is more free.

Hunger and thirst felt soon after a good meal.

Depression of spirits.

Drowsiness by day and heavy comatose sleep at night.

Pain and weakness in hip-joint after prolonged exertion.

Deposits in urine visible after cooling.

Depression and discoloration of skin under the eyes.

Toothache.

Headache.
Neuralgia.
Colds in the head.
Boils.
Bronchitis.
Asthma.
Melancholia.
Insanity.
Neurasthenia.
Neuritis.
Sciatica.
Gout.
Rheumatism.
Aneurysm.
Degeneration of the heart.
Degeneration of the arteries.
Degeneration of the kidneys.
Stone in the bladder.
Stone in the kidneys.
Carbuncle.
Consumption.
Apoplexy.
Epilepsy.
Hip-disease.
Meningitis.
Bright's disease.
Varicose veins.
Adenoids.
Chorea

The extracts already given from Lessius, in the chapter on Digestion, show how much was known three centuries ago about the consequences of "free living" and disordered digestion, but the quotations referred to would not be complete

without the following remarkably up-to-date list of maladies which Lessius says may be "driven away by a regular life":—

Catarrh, coughs, asthma, headaches, pains, fevers, dimness of sight, vertigo, melancholy, madness and apoplexies, epilepsies, gout, sciatica, rheumatism.

Consumption

With reference to Dr Armstrong's opinion that dyspepsia is a frequent cause of consumption, it should not be forgotten that this disease is one that is peculiarly dependent on nutrition, and it is a generally accepted principle that the danger of contracting any infectious disease depends on two factors, one being the amount of the dose of poison which gains entrance to the system, while the other is the ability of the individual cells in the body to resist and overcome the germs of disease by which they are attacked, and this, of course, varies with the healthy or unhealthy condition of the whole body.

Dr V. Knaggs asserts that the real cause of consumption is the creation of a soil in the human body favourable to the development of the particular germ of tuberculosis.

That indigestion is the beginning of almost all our ailments—slight, serious or fatal—is becoming more certain every day.

CHAPTER VII

ASSIMILATION OF FOOD

AFTER digestion in the stomach has been completed the food passes through some further stages in which other organs do their part in preparing it for its entrance into the blood in the form of chyle, when it is fit to serve as nutriment for all the tissues of the body. As stated in a former chapter, we are unconscious of these later processes and have no control over them. We may therefore, in a handbook intended only as a guide in practical matters, pass on to consider the stage at which nourishment derived from the food enters the blood and is carried by it to all parts of the system. It is at this point that the question of supply and demand arises. If a long time has elapsed since the previous meal, or if a great deal of physical work has been since performed, much wear and tear have to be made good, and there is an urgent need of a fresh supply of nutriment, which will be quickly assimilated—that is to say, absorbed or taken up—by the tissues when it is brought to them by the blood-current. If, on the other hand, there is no more to be provided for than the wear and tear of a quiet life—merely the expenditure necessary for the maintenance of the heat of the body, the action of the heart and lungs and the small muscular and nervous exertion required for gentle movements—there will be much less demand for food and there may be some delay in assimilating anything beyond a very light meal.

If larger supplies arrive, the excess of fuel over the quantity called for by the body must wait and accumulate until it can be used. While thus waiting the excess is to some extent an inconvenience and may cause sensations more or less uncomfortable. It is quite true that a very strong constitution, especially in the first half of a lifetime, may digest a good deal more food than the quantity immediately required, but, if hard exercise be not taken, this surplus can only be stored at the expense of a feeling of biliousness, or perhaps headache, depression, constipation, restlessness at night, giddiness, yellowness of the eyes, sallowness of the skin, spots floating before the eyes, boils, chronic nasal catarrh etc.

An habitual offender may possibly suffer from fatty degeneration and obesity. The symptoms here mentioned, excluding the last two, indicate congestion of the liver, which is the storehouse for supplies that the blood is not able to dispose of at once. The remedies for this congestion, or, in other words, the means of working off the extra supplies which clog the liver, are :

1. Physical work.
2. Time. A sufficient time should elapse before any more food is taken.
3. Cold temperature. This helps to exhaust the store of fuel.
4. Aperient medicine, which hastens the progress of the remains of the food through the intestines and reduces the amount of nutriment that might be absorbed during its passage.

5. If more food is taken, while there is already an excessive supply in the system, dyspepsia is likely to meet the difficulty by stopping the digestion of the fresh supplies.

With regard to No. 5 in this list, the repletion of the system reacts on the digestive apparatus when any considerable quantity of unnecessary food is thrust upon it. There being no demand for this extra food, it is not digested, at any rate a great portion of it is not completely treated in the stomach and is worse than wasted. When dyspepsia continues from meal to meal, as it sometimes does, the nutriment stored up in the blood and liver is soon exhausted and the congestion is rapidly relieved. It may be noticed that in such circumstances the complexion, which had been rather sallow, becomes fresh and clear.

It is important to bear in mind, however, that the relief of congestion by the occurrence of dyspepsia is not the normal and healthy means of attaining that end, hard exercise and abstinence being the natural and safe processes. The easy and self-indulgent course of neglecting exercise and continuing to eat as much food as usual is taken at the expense of the injurious effects that follow dyspepsia.

Many a man has what is called a bad or sluggish liver, and does not know that the symptoms of which he complains indicate that his constitution and digestion are naturally strong and that to put himself right all that is necessary is that he should take more exercise and eat less animal food. The difficulty of assimilating rich food, animal fats,

cheese, meat, eggs, etc., has been referred to in a previous chapter. The quantity of bread, fruit and vegetable substances may be increased without much risk of overloading the liver, as there is comparatively little nutriment in them requiring assimilation. Plenty of exercise in the fresh air is the best means of promoting assimilation, and a walk a little while after each meal has the best effect.

It is well known that the power of assimilating food, particularly rich food, is weak when there is any constitutional tendency to consumption, and outdoor exercise after each meal is, for those who are able to take it, the best of all medicines.

It is a law of Nature that the assimilation of food should require hard work—in proportion to the quantity of nourishment contained in the food—and at the same time this obligation brings with it the privilege of being able to bear hard work and to accomplish the objects one has in life. The labour necessary to assimilate food, in the case of a person whose occupation in life does not entail much physical exertion, may at times be felt as a hardship, but it should always be remembered that health is a thing to be earned, it is not a gift renewed in full every morning, and success cannot be attained in any pursuit without taking trouble. In this case the prizes are the best that this world can offer—health, efficiency, freedom from pain and long life.

The physical labour required to assimilate properly a fairly liberal diet can only be evaded by incurring the evils of dyspepsia or by reducing the diet to such an extent that very little exercise is

necessary, but this plan of leaving a narrow margin is not a safe one, except for an invalid. Hippocrates must have considered this question as he said : " A slender and exact diet is more dangerous than one a little more liberal."

CHAPTER VIII

CONSTIPATION

It has been stated in a previous chapter that one of the results of dyspepsia is a relaxed condition of the bowels and that habitual dyspepsia has thus the advantage that it usually renders aperient medicines unnecessary. When, however, measures are taken to regulate the digestion and to prevent the occurrence of dyspepsia there will be a tendency to more or less constipation, not because good digestion naturally and normally has this bad effect, but because in modern civilised life neither our ordinary diet nor our daily exercise are quite suitable to the physical requirements of our nature. In short, to keep in perfect health, most of us should eat more fruit and vegetables, take less animal food and lead much more active lives. If all did so, there is little doubt we should hear much less about appendicitis and other maladies consequent on too luxurious a style of living.

Dr George Cheyne has given his opinion as follows :—

"Those who eat but one moderate flesh meal a day will have regularly once a day a discharge of the remains of their food and generally speaking those that go oftener have exceeded somehow. Purging stools show intemperate feeding ; too full a meal has the effect of a purge."

It often occurs that strong, healthy people are

more troubled with constipation than those who have weaker constitutions.

Remedies. The simple remedies for constipation are, first, less animal food (meat, cheese and eggs), and perhaps less of certain fine white starchy foods, such as rice and very white bread ; secondly, more plain vegetables, fruits and brown bread ; thirdly, more regular outdoor exercise. The modern preference for the whitest wheaten flour and highly refined starchy and farinaceous foods increases the tendency to constipation, as there is in such diet not enough waste fibre to assist the action of the intestines. Another result of this popularity of white flour has been the very large consumption of patent pills and laxative salts.

In connection with the subject of digestion there is perhaps no more mischievous error than the belief that a regular daily action of the bowels is a proof of good digestion. It is far more likely to be the result of a very bad digestion. So strong is this erroneous impression that cases have occurred where persons have been advised to cease taking a cold bath in the morning, " because it is bad for the liver " and leads to constipation. A warm bath was substituted for the cold one in those cases and the desired effect on the bowels was produced—there was no more complaint about constipation.

This advice was given in complete ignorance of the fact that the cold bath braced up the system and enabled the patient to digest his breakfast, whereas the warm bath had an enervating effect ruinous to digestion. Smoking has also been recommended for the same purpose and with the same result—breakfast is not digested and

day after day dyspepsia relaxes the bowels and earns the reputation of being improved digestion. The price paid for the comparatively unimportant object in view was the derangement of a function on which the purity of the blood depends, and if this mistaken course were to be followed for years the consequences to the constitution must become very serious.

Sir Hermann Weber's opinion is :

"A diet consisting in great part of flesh food, eggs, cheese and farinaceous matter, is in many persons attended with constipation, while the diminution of these substances and the substitution of fruit and green vegetables leads to regularity of the bowels. The reason is that of flesh food, cheese and eggs the greatest part is absorbed in the upper portion of the intestines and only a small quantity remains for the formation of the bulky mass which stimulates the action of the bowels, while green vegetables and fruit have a large proportion of vegetable cellulose or fibre which is not soluble and is therefore not absorbed as food, but passes on as waste and causes regular and natural evacuation."

Animal food has, however, a direct effect in causing constipation by creating more or less congestion of the liver if the amount eaten is at all in excess of the requirements of the system. It has been suggested that mankind would be relieved of a good deal of trouble if the necessary food could be condensed into tabloids which would be of very small bulk, require no mastication, save the time spent at meals and leave no

waste material, but it is very certain that our internal mechanism is totally unsuited to such a diet.

Aperients. The common prejudice against occasional doses of aperient medicine is a very great mistake, for much harm may be done by neglecting constipation, and at times a risk of serious consequences may be run by not taking medicine when it is required. Professor Metchnikoff appears to base his microbic theory on the iujurious effects which he attributes to the sluggish action of the intestines. He says :

" The accumulation of waste matter retained in the large intestine for considerable periods becomes a nidus for microbes which produce fermentation and putrefaction harmful to the organism."

Herodotus says of the ancient Egyptians :

" For three days successively in every month they use purges, vomits and clysters ; this they do out of attention to their health, being persuaded that the diseases of the body are occasioned by the different elements received as food. After the Africans there is no people in health and constitution to be compared with the Egyptians."

Probably the wisdom of the Egyptians was shown in this custom.

It is quite impossible to adjust exactly and scientifically, even for a day, the quantity and quality of the diet to the wants of the body, there being so many difficulties in the problem. The amount of work done or exercise taken varies each day, as

does the temperature of the air, and a perfect adjustment of the food must compensate for all wear and tear, keep all the organs in healthy condition and yet allow no excess that would clog any part of the system. Only a rough and ready adjustment can be made in practice and the net result of our attempts will most probably be that some excess of food will be taken and cause some congestion of the liver. It is also possible that the food may not contain a sufficient proportion of husk or cellulose to promote the action of the bowels. Keeping these considerations in mind, and assuming that all the meals taken are properly digested, there will generally remain, as the balance of probabilities, a tendency to some degree of constipation, and if the same conditions continue for several days it is fairly certain that a dose of laxative or aperient medicine would do more good than harm.

It is safe to assert that, in such circumstances, if dyspepsia did not intervene and relax the bowels, those who object most strongly to taking any medicine would have to admit their error or adopt the only other remedy—viz. to take no food for a day or two. The most rational view on this question seems to be that laxatives and aperient medicines are to be regarded as merely a variation or adjustment of the ordinary diet for a special or temporary purpose. Our food contains such a wide range of substances, each having its own peculiar effects on the blood and on the intestines, that a selection to suit the circumstances of any occasion appears to be quite reasonable and even necessary. Our ordinary diet includes such articles as arrowroot and rice on one side and rhubarb

and fruit on the other, and the list of well-known medicines gives the fullest scope for choice and adaptation to all possible circumstances. Should not the wise man, therefore, avail himself of these natural aids to rectify irregularities that are certain to occur ? From one spring of clear water he may be drawing an aperient, sulphur, from another he takes a tonic in the form of iron. Most of the medicines in ordinary use are vegetable ; a few, such as sulphur, soda, potash and magnesia, are mineral, and all are free from any risk. Mercury is at times very useful, but is not free from objection. The natural mineral waters are in many cases found to be most beneficial, but of all aperients the one that can best be adapted to the treatment of a sluggish liver is a well-made pill.

The objection most frequently raised to taking aperient medicine is that it causes constipation afterwards, but this, though quite true if strong doses are taken, does not apply to mild doses, especially when taken after a meal. A pill has then the additional advantage that it assists digestion. It is also to be noted that aloes, which are the basis of most good pills, leave no binding effect, but rather tend to cure habitual constipation. Aloes have, in fact, a tonic influence, and this is not the only tonic element commonly added to a pill. The ingredients of the dose must, of course, be adjusted to individual cases, under medical advice. Dr Fothergill recommends aloes, rhubarb, ipecacuanha and podophyllin as most useful when there is any congestion of the liver. Two half-doses of a good pill, taken after meals, at intervals of four, eight or twelve hours will often be found better than a stronger dose taken

at night, a mild laxative effect, slightly stimulating the liver, being far better than a purge, which is sure to cause some subsequent constipation. Those who have an obstinate objection to aperient medicine are not unlikely to suffer from hæmorrhoids of the bowel (piles), owing to chronic congestion of the liver and of certain blood-vessels.

Special occasions may often arise when a moderate dose is beneficial, as when anything happens to prevent sufficient outdoor exercise, or when there is reason to fear that some food eaten was too rich and may not be easily digested or assimilated. In spring, or whenever there is a sudden change to warm weather, less rich food should be taken, and at the same time a little medicine may be useful.

What the physicians of a past generation termed "humours" will sometimes accumulate, and persons who have what is called "the bilious temperament" then find that a dose of medicine improves the digestion, benefits nutrition, relieves the congestion of the liver, clears the brain, removes headache, increases physical activity and restores the cheerfulness of the mind. Hard exercise is of course even more beneficial in all these respects.

Although some patent pills may be composed of quite harmless materials, it is not safe to take frequently a strong medicine not ordered by a medical man and the constituents of which are not known. Very powerful drugs may be made up in very small compass and the cumulative effect of repeated doses may be decidedly injurious.

It is hoped that enough has now been said to show that the question of taking aperient medicine is so closely linked with the question of digestion that the principles which should guide a person who usually digests all his meals must be quite an unknown language to a person who does not know good digestion from bad.

CHAPTER IX

EXERCISE

THE muscular and nervous depression, sometimes amounting to complete collapse, as in the cases referred to by Dr Haig, caused by taking hard exercise while suffering from dyspepsia, cannot occur without affecting the heart, and it is safe to conclude that every attack of dyspepsia temporarily weakens the heart and, therefore, to some extent, unfits a person for severe exertion. The strain of great muscular effort should be prepared for by a long apprenticeship of steady exercise or training.

No one who is not in good condition can safely undertake any severe or prolonged physical exertion, and it is impossible to be in good condition while the digestion is in a disordered state. Good condition means that sound general health which is only to be attained by regular exercise and good digestion.

Dr Yorke-Davies says, in his treatise on " Health and Condition " :

" A very common effect of taking food to excess, that does not nourish the nervous system, is want of condition, as evidenced by a general feeling of malaise and fatigue after ordinary exertion."

Dr Keith's opinion is :

" It is well known that a large amount of mental as well as bodily work may be done on a moderate diet made up wholly of vegetable food and milk

and that this may be kept up for an indefinite period with no risk to the system. It is also known that a professional or anyone else, if he lives too long on a training diet made up very much of flesh, often comes to an untimely end, unless he be pulled up in time by an acute disease."

Dr Haig speaks of "people who soon after eating a hearty meal start for some exercise, but within half-an-hour are in a condition bordering on collapse and have an intense feeling of emptiness. . . . The exercise was too much for gastric digestion and caused its suspension."

This is not at all an uncommon experience, and it shows how directly dependent the physical strength and stamina are upon the stomach's functions and that, as Napoleon expressed it, "An army goes upon its belly."

The essential requirements for physical training are the same as those for maintaining good health —viz. a simple, well-ordered diet, good digestion and steady exercise in the fresh air several times a day. Exercise for an hour three times a day is much better than one spell of three hours, and if exercise be neglected all the week the injury done to health cannot be remedied by excessive exertion at a gymnasium on Saturday afternoon, with the added risk of a serious strain.

Those whose lot condemns them to a sedentary life should sacrifice a considerable portion of their leisure time, after or before their daily work, to physical exercise, if they sufficiently appreciate the value of health. If three hours a day is a moderate allowance for exercise, a man who works

seven hours in an office should devote another three hours to exercise, and this would only place him on a par with a man whose manual labour provides him with ample bodily exercise in the course of his duty and leaves him free to spend the remainder of the day in complete physical rest, if he desires to do so. As a comparatively small portion of the exercise required by the sedentary man could, as a rule, be taken in the form of amusement, he is at a disadvantage when compared with the hand-worker, unless his hours are considerably shorter.

Walking is the best of all forms of exercise, and is free from the danger of excessive muscular strain. Golf chiefly consists of walking, and one of its advantages is that it supplies an inducement to walk a great deal. It also exercises the shoulders and arms. On the mental side there is a great difference between walking and golf, a man playing golf can think of nothing else, while a man who takes a solitary walk thinks of everything under the sun.

There are not many famous athletes who preserve their health so well as Weston, the champion walker, who is in better health at the age of seventy-two than most men are at thirty.

The fact that a good digestion is almost of necessity associated with active habits is not sufficiently realised. One who digests all his meals cannot eat more than is sufficient for his bodily needs without suffering from biliousness, sleeplessness or some other discomfort—he is perforce an active man—whereas the dyspeptic, who becomes hungry soon after a good breakfast, is deprived of this natural safeguard against

excessive appetite. He may take twice as much strong nutriment as he requires and yet not be capable of much work; the vitiated state of his blood not only disinclines him for physical exertion, but in no small degree unfits him for it.

The Spartan life—frugal and laborious—is the only one which keeps a man in perfect health and efficiency, and must, therefore, be the life for which he was intended by Nature.

If, amongst the well-to-do classes, more attention were paid to the preservation of health, more time would be devoted to regular outdoor exercise and a more simple style of living would be found to be both necessary and agreeable. Luxury, being less in favour, would have fewer victims, and wealth would be relieved of some of its temptations. Old Lessius, writing three centuries ago, said: "That man must have a constitution of brass who is not worn out by luxury."

CHAPTER X

SLEEP

Some medical authorities have expressed the opinion that much sleep is injurious to the health of adults.

Sir John Sinclair said :

" Nothing is more pernicious than too much sleep. It brings on a sluggishness and dullness of all the animal functions and materially tends to weaken the body. It blunts and destroys the senses and renders both the body and the mind unfit for action."

Sir Hermann Weber seems to hold a somewhat similar opinion :

" We have good reason to assume that neglect of the mental faculties, idleness and excessive amount of sleep, lead to premature decay of the brain functions and to shortening of life."

Sir James Eyre, however, held that

" Every man ought to have seven hours' sleep in the twenty-four, or as much of this allowance as possible."

Dr Saleeby has a remarkably suggestive passage on this subject. He states :

" The brain-worker also needs much sleep, but the contrast between the difficulty with which he obtains it and the case of the hand-labourer

suffices to show that man is better adapted for physical than for mental labour."

The inference from these words seems to be that if a man devotes himself too exclusively to intellectual pursuits and neglects physical work he will suffer for it. Man may, to some extent, be in a state of transition towards more intellectual occupations, but he can never afford to neglect physical exercise.

Before one fully accepts the view so strongly expressed by Sir John Sinclair it might be well to ask whether the drowsiness, sluggishness and premature decay, said to result from too much sleep, are not to a very large extent accounted for by dyspepsia, and if so it would be a mistake to attribute them to excessive sleep, which is itself one of the effects of dyspepsia. To bring such serious charges against an extra hour or so of sleep, while overlooking the part taken by disordered digestion, seems to be an unwarranted attack on "Nature's sweet restorer." A very dyspeptic person generally sleeps "like a log"; he is aroused with difficulty in the morning, and nevertheless is often ready to take a nap during the day, while a man who is in sound health is usually ready and even anxious to be out of bed early and feels more inclined for work than for more sleep.

Professor Metchnikoff adopts a peculiar theory. He quotes the following from Claparède :—

"To bring about sleep the nerve centres must be influenced by waste matter and this influence can readily be regarded as a kind of intoxication."

The Professor adds :

" It is very probable that sleep is due to poisoning by the products of organic activity."

Dr Saleeby, speaking of the effects of physical fatigue upon the brain, says :

" Professor Mosso of Turin, the greatest living student of the subject, has conclusively proved that the poisonous by-products of muscular exercise, circulating in the blood, temporarily depress the brain."

This theory, which makes sleep so dependent on muscular exercise, is inconsistent with the fact that everyone, whether young or old, sedentary or active, lazy or energetic, takes, and seems naturally to require, a very fair average amount of sleep. Hard physical work does, no doubt, make one additionally sleepy, but it is quite as certain that a day spent without exercise, on a too liberal diet, may have a similar effect when it causes dyspepsia, as it is very likely to do, and the blood is then loaded with poisonous waste products far more injurious than those which result from muscular fatigue. The poisonous effects of dyspepsia cannot be regarded as normal, while the effects of muscular fatigue are quite normal; the former are not proper to and incidental to a perfectly healthy life, while the latter are so. It might also be maintained, in opposition to the above-mentioned theory, that the excretion of muscular waste products, through the lungs, skin and kidneys, goes on all through the twenty-four

hours, not during sleep only, and sleep is not therefore necessary for this purpose.

In his book on "Health, Strength and Happiness," Dr Saleeby draws a distinction between light sleep, in which the mind is so clear and busy that the dreams are coherent and comparatively reasonable, and deep sleep, in which the dreams are incoherent, less reasonable and more interrupted. He says: "The more coherent your dreams, the more of your brain was awake." His conclusion is: "Six hours of dreamless sleep will probably suffice for an adult, if he can obtain them." Perhaps these six hours would be more than equivalent to seven hours of the less peaceful sleep that ordinary mortals enjoy. The dreamless, childlike sleep of perfect health and unruffled nerves forms, it would appear, one of three degrees or kinds of sleep, the second being the light, rather disturbed sleep which comes when there is some irritation of the nervous system, an overwrought brain, some mental excitement, slight physical pain or a congested state of the blood and liver, due to the want of exercise; while the third kind of sleep is the heavy slumber of the very dyspeptic or of the man who is physically exhausted by hard work.

Much mental work in the evening is unfavourable to sound sleep, and Canon Beadon, who lived to the age of one hundred, made it a rule never to do literary work after seven P.M.

Sir James Eyre's advice was: "Never go to rest with cold feet," a maxim followed by the hunter and the bushman, who lie with their feet towards the fire when camping out. Sir Henry Thompson states that for thirty years he has

placed his feet in a hot bath before going to bed.

Setting aside the question of dyspepsia, as affecting sleep, the work of digestion and assimilation has a great influence upon the character of the night's rest. If a meal be taken shortly before retiring, sleep will probably be heavy and oppressed by dreams, whereas, if no food has been taken within several hours, but a very ample diet has been indulged in during the day and has not been fully assimilated or worked off by exercise, the blood may still be burdened with surplus nutriment, which will irritate the brain and disturb sleep, causing more or less restlessness and fidgetiness. Dr Keith states: "The great necessity is perfect digestion, so that when one goes to bed there is no sour, undigested mass in the stomach." Sir Henry Thompson is not so strict on this point. He says that after dining at seven or seven-thirty, "a very light refreshment may be advantageously taken the very last thing before entering bed, at about eleven or so, as it favours sleep. All animals feed before resting for the night." Dr Saleeby, however, seems to agree with Dr Keith, for he says: "Though in the lower animals, and in man when he approaches to the lower animal, sleep and digestion often coincide, it is best that the digestive glands, the stomach and the bowel should do little or no work during sleep."

It may be a fair conclusion to draw from the various opinions quoted that, excluding the cases of old people and invalids living on a very restricted diet, no one will go far wrong who retires to rest not sooner than three hours after his last meal;

who limits, as experience may teach him, the amount of rich food that he takes at that meal; who gets, if possible, a little outdoor exercise before going to bed and who remains in bed about eight hours.

Of the two great causes of sleeplessness one is physical—the blood is encumbered by nutriment which has not been assimilated by exercise; the other cause is mental, as "Friar Laurence" explains:

> "Care keeps his watch in every old man's eye,
> And where care lodges sleep will never lie,
> But where unbruised youth with unstuffed brain
> Doth couch his limbs there golden sleep doth reign."

One or other of the following simple remedies for wakefulness may be found useful: a glass of water or milk, or milk and soda, a biscuit, an apple or a banana, taken during the night.

CHAPTER XI

OLD AGE

THE most significant symptom of the approach of old age is the decline of the digestive powers, and it is of the utmost importance to anyone who is past middle life that this change should be detected at an early stage, and that suitable reductions in the diet should be made without delay, and again and again as age increases. If such reductions be not made, dyspepsia will probably become habitual, as it is Nature's readiest means of disposing, with as little harm as possible, and yet with much harm, of the excess of food that burdens the system. The premature breaking up of the constitution and the more rapid advance of the infirmities of age are the penalties that follow the neglect of Nature's tacit command to restrict the diet. Sir Henry Thompson is reported to have told a patient: "Eat less as you get older and when you get to the age of ninety you will only require a crust of bread to keep you alive."

It is an old story that Dr Abernethy told one of his wealthy patients "to live on sixpence a day and earn it." An additional reason for reducing the quantity of food after middle age is suggested by Dr Keith when he says, referring to cancer:

"I have long known that high living, that is the use of wine and other stimulants and of strong animal food, aggravated in an extraordinary

manner all the symptoms arising from this terrible disease."

Dr George Cheyne said :

" Nothing conduces more to health and long life than abstinence and plain food, with due labour."

Dr E. A. Parkes's view was :

" It is a certain fact that some of the evils of old age are owing to more food and liquid passing in than the eliminatory organs can get rid of. Hence arise indigestion, bowel troubles, gouty affections, some skin diseases and general discomfort of feeling, all of which can be removed at once by lessening the diet."

Sir Hermann Weber says :

" It is especially in advanced age and in persons suffering from gout, rheumatism, arterio-sclerosis (hardening of the arteries), and disease of the liver and kidneys that meat ought to be taken very sparingly. I have often succeeded in curing eczema, acne, roughness and scaliness of the skin and fœtor of breath by total abstinence during months and years from flesh and fish and the substitution of vegetables (especially green vegetables), milk and cheese with moderation, and occasionally eggs. Often this diet led also to great improvement of the complexion."

Constitution

It is the custom amongst people who consistently oppose every suggestion in the direction of a more

carefully regulated diet, and who apparently believe that the habits they have inherited in regard to diet are incapable of any improvement, to discredit every fact which proves the success of an abstemious or methodical dietary, by attributing the results, in every case, to the strong constitution of the individual. It is only the test of personal experience, which they will not apply, that could convince them of their error. Although some constitutions are so incomparably stronger than others, there are several agencies constantly in operation which reduce, in a most effectual manner, the strong to the level of the weak and thus illustrate in a very striking way the doctrine of compensation.

The chief of these agencies is the inclination, which so often besets the strong man, to presume on his strength and to neglect all conservative precautions so long as he feels no distinct signs of the failure of his powers. He is even disposed to boast of his indifference to the caution shown by weaker but wiser men. Another potent levelling agency is the general ignorance of the laws of health, especially in regard to digestion, and of the quantity of food that is necessary to maintain it. A third agency is appetite and indulgence—the wayward man brooks no restraint while he can pursue his own inclinations, and strong men frequently go to excess in eating, smoking and drinking, not calling a halt until they have gone a long way on the road which brings down their constitutions to the level of those of weaker men.

It is an old adage that "the creaking wheel lasts longest," because the man whose constitution is not extremely strong finds out in good time

that he cannot afford to do exactly as he pleases ; he learns that he must use self-denial in diet and in the taking of exercise—in short, that method pays in matters of health as it does in all the other affairs of life.

The general result of these levelling agencies is that there are not many who live far beyond the average span, although it might naturally be expected that a large proportion of those who are born with perfect constitutions, and who are enabled, by possessing ample means, to take the best care of themselves, would reach quite a patriarchal age.

Dr Keith's experience is :

" I have known very many strong healthy men and women who naturally would be expected to live to a long age, but most of them, from presuming on their strong constitutions and living too freely, have died while still in their prime."

He says again :

" I had it from the manager of our foremost life-insurance office that his Company lost more on the healthiest lives, to which no objection whatever could be made, than on those which, though accepted at the ordinary rate as sufficiently good, were not altogether of a first-class character."

Sir Hermann Weber writes in very similar terms :

" A strong digestive system often gives rise to the temptation of overfeeding, while a weak digestion compels moderation and this leads frequently to a longer life and happier old age."

He states further :

" Many persons with very delicate digestion, from an early age onwards, who could take but very small quantities of food—only a half or a third part of what the rest of their family and the majority of people took—and only special kinds of food, such as milk, farinaceous food and a few kinds of fruit and vegetables and eggs, were usually free from gout, rheumatism, neuralgia and other complaints and lived much longer and enjoyed a much healthier old age than the more vigorous companions of their youth who could and did eat large quantities of food with enjoyment and with seeming impunity."

Although useful lessons may often be learnt from our errors, and although a sound constitution has, especially in youth, great recuperative powers, yet the fact remains that the ground lost by taking the wrong course in matters of hygiene, at any time of life, can never be entirely regained, nor even partially regained, if strict account be taken of the progress which might have been made if the right course had all along been pursued, and there can be no doubt that a good constitution that has never been impaired by serious ill treatment is far superior to one which, though equally good in youth, has suffered any severe or long-continued ill usage.

A Reliable Guide

It must be sufficiently obvious that no one can regulate his diet and keep his digestive system in reasonably good order under all ordinary circumstances without the aid of some simple practical

rule by which he will be able to ascertain whether any failure of digestion has occurred, and will thus be able to change or restrict his diet so as to bring it within the quantity that his system can utilise in a healthy manner. Such a rule has been given, under the heading of " Symptoms of Dyspepsia," in the chapter on Digestion.

Activity of Mind and Body

With regard to elderly persons taking exercise, Sir Hermann Weber says :

" Many more people wear out too soon from over-rest than from over-exercise. Old persons accustomed to much exercise may go on taking it as long and as much as agrees with them and need not think of the number of their years. Short walks at all events ought to be maintained, if possible, once, twice or three times a day."

Sir James Eyre was of the same opinion :

" Everyone, whether affected with indigestion or not, should walk, in as pure air as he can find, till he begins to experience a sense of fatigue, every day. For one dyspeptic in the country there are twenty in London."

Dr Dudgeon follows suit :

" Amongst the greatest enemies of a healthy and pleasant old age are indolence and laziness."

Dr Saleeby's opinion on the value of mental activity in promoting longevity has been quoted in a preceding chapter. He also states :

" Various independent schools of contemporary workers, approaching the matter from wholly

different standpoints, are making it more certain every day that nine-tenths of what we call old age, senile change, premature senility, tissue-degeneration, and so forth, are due, not to time, but to toxins (poisons) that have nothing whatever to do with old age as such, but are the results of chronic poisoning."

His maxim is : " One of the secrets of youth is to keep working."

Sir Hermann Weber confirms Dr Saleeby's view and says :

" It may be wholly denied that, after the period of adolescence, years are any criterion of age."

Professor Metchnikoff accepts an argument of Flourens, that the ordinary length of man's life should be one hundred years, that being five times the period required for his growth—viz. twenty years, and says :

" We must all use our endeavours to allow men to complete the normal course of life and to make it possible for old men to play their parts as advisors and judges, endowed with their long experience."

There are, however, not a few cases on record of men attaining the age of one hundred and forty, and some have reached one hundred and seventy years. Such instances as these prove that the human frame will last at least twice the proverbial term of seventy years if favourable circumstances

all combine to give it a fair chance. These very old people have, it appears, generally been hale and hearty up to a short time before their end.

An Old Venetian

Luigi Cornaro, a Venetian who reached the age of one hundred years, and in 1548 wrote a short treatise on "The Benefits of a Sober Life," had for many years reduced his food to twelve ounces of bread, soup, yolk of eggs and meat, all included, and could not increase the quantity to fourteen ounces without serious injury to his health. A few quotations from his book may be appropriately inserted in this chapter. It has often been said that a man should be his own physician at forty. Cornaro said :

"Every man by long observation and various experiments may attain to the perfect knowledge of the qualities of his own nature. . . ." "It is sobriety alone which preserves our bodies in a steady course of health and vigour, which clears the brain, brightens reason and gives a full, free and perfect use of all the faculties. . . ." "Galen himself says that all other excesses, immoderate heat and cold, sharp winds, excessive labour and the like made no lasting impression on his constitution because in his diet he was ever moderate. The indisposition thereby occasioned was but slight and certain to pass off within a day or two at farthest. . . ." "Let us learn therefore to eat no more than may prudently adminster to the recruit and maintenance of the body ; whatever exceeds this measure is of fatal consequence and lays a foundation for infirmities and death."

Speaking of a healthy old age, he says :

" Those stupid and dull souls who object that a man's life, when once he shall have almost reached seventy, is not worth the having, are mightily mistaken. I am at this present eighty-three and yet the pleasures and recreations I take are such as that most men generally account me happy. I am continually in health and so nimble, brisk and active that I can get on horseback with all the ease imaginable off any riding ground. I often ascend steep and high hills without lassitude. Besides, I am ever cheerful and merry and well pleased."

With regard to the last days of a man who has led a frugal life, Cornaro says :

" He cheerfully resigns his soul into the hands of God. His end will be calm, he shall depart in peace, as a lamp goes out for want of oil."

APPENDIX I

COPY OF THE AUTHOR'S LETTER TO THE EDITOR OF *The Hospital Gazette*, PUBLISHED ON 7TH MARCH 1891

THE CHIEF CAUSE OF DISEASE

To the Editor of The Hospital Gazette.

SIR,—Will you kindly permit me, though only a student, to ask through your columns for information as to the truth of a theory on which I have acted for many years and, from observation *in propriâ personâ*, have found to be a most valuable practical guide for the preservation of general health? The theory amounts, in fact, to a definition of dyspepsia, as distinguished from indigestion, and it does not appear to me that this is done in the manuals of medicine.

I think that while indigestion is only a delay and difficulty in the process of digestion in the stomach—that process being ultimately completed—the term dyspepsia may be confined to those cases in which there is a collapse or cessation of the stomach's work, part of the soluble food passing on unprepared for the subsequent processes of digestion in the succeeding portions of the alimentary canal. In the first case there may be many disagreeable sensations: distention, flatulence, palpitation, oppression or even pain, but the work is being done and there will be no lithates, while in the other case injurious and less

soluble compounds result from the stomach's failure. After a good meal there may be no discomfort (or after commencing it may cease more or less suddenly), and the patient is generally completely deceived by this absence of uncomfortable sensations just after a meal, flattering himself that this, which is dyspepsia, is good digestion, and that the difficult digestion, which is the only digestion known to him, is a much worse condition.

It is unnecessary for me to say anything about the causes which may stop the healthy process of digestion and precipitate dyspepsia; the question is;—How, apart from these rather indefinite sensations, can the difference between these two conditions—indigestion and dyspepsia—be practically demonstrated? Here comes in the theory above referred to:—If the urine on cooling at ordinary temperatures, say in an hour and a half after being passed, shows any visible deposit, either an iridescent scum on the surface, a light cloud suspended in it, or a reddish sediment on the bottom of the vessel, then dyspepsia has occurred;—the stomach's work was not done and mal-products from the absorbable food pass into the blood, weakening and poisoning the system.

This dyspepsia must, however, be regarded as Nature's plan for getting rid, with the least possible injury to the system, of an excess of food, and though the results, if dyspepsia occurs only occasionally, leave but little bad effect, yet when dyspepsia becomes habitual or constant, its effects on the general health must be disastrous. It is evident that, if this theory be correct, there must be something essential in the nature of the work done in the stomach, inasmuch as the mischief

following a collapse of digestion there is not rectified during the later stages of digestion.

I am aware that the constant occurrence of urinary deposits has been stated by medical authorities to be "unhealthy," but they have also stated that these deposits are "normal" and it has nowhere, I believe, been laid down as a principle that they afford a direct and unfailing proof of a breakdown of digestion and of the entrance of poisons into the system.

Of course special deposits due to actual disease are to be excluded. At any rate, if this theory be true, it is manifestly of the greatest practical importance as a guide for the prevention of disease and should be universally known as such. Further, if it be true that these deposits are distinctly unhealthy—only requiring frequency to produce disease—how is it that the analyses of urine placed before us in medical works are not based on a recognition of this clear and definite distinction—between urine which does and urine which does not show a visible deposit on cooling? I am, sir, yours, etc.,

F. W. D. MITCHELL.

January 30th, 1891.

APPENDIX II

COPY OF THE AUTHOR'S LETTER TO THE EDITOR OF *The Medical Times*, PUBLISHED ON 28TH JANUARY 1911

THE CHIEF CAUSE OF DISEASE

To the Editor of The Medical Times.

SIR,—On the 7th March 1891 the Editor of *The Hospital Gazette* (since amalgamated with *The Medical Times*) was good enough to publish a letter from me under the above heading. The purpose of that letter was to draw attention to what seemed to me to be a supremely important, and yet generally ignored physiological law, viz. :— that any deposit in the urine, visible to the naked eye after complete cooling, is an unfailing indication that a meal taken some hours previously has not been properly digested and that the nitrogenous waste, instead of taking the normal and healthy form of the perfectly soluble product urea, has taken the form of other poisonous uric-acid products, variously called " urates " or " lithates." I then believed and still believe, after acting more than forty years on this theory, that health, strength and longevity are impossible if a failure of digestion, resulting in such visible deposits, is of constant or daily occurrence and I have read many medical treatises (Prout, Milner Fothergill, Lauder Brunton, Dudgeon and Saleeby), which recognise the serious injury done to the whole system by

mal-products arising in the process of digestion. Lessius wrote about them in 1620, or earlier, and I know that Sir Benjamin Ward Richardson considered them important in his practice, but, so far as I am aware, the simple urine test, available to all and absolutely reliable, has not been given its proper place as the first law in preventive medicine.

I have just read, with some amazement, Professor Metchnikoff's book "The Prolongation of Life," in which effects, injurious to health and long life, are attributed to certain microbes detected in the alimentary tract, and the recommendation is made that other microbes should be introduced into the system to wage war on these injurious denizens of the intestines. Not a word is said about the injury done daily to the majority of men by avoidable failures of digestion, or of the urinary deposits which afford unfailing evidence of this serious functional derangement. I understand that a certain kind of sour milk is now being largely sold as an antidote for the germs discovered by the Professor.

May I ask whether it would not be quite time to enter on such a campaign after men have first been taught to guard against the injuries done to their health by errors in hygiene entirely within their own control and easily capable of detection ?

The mischief is certainly not of a kind that can be remedied by adding microbes to the diet before any attempt has been made to regulate diet, exercise and digestion on common-sense principles. Should it not be obvious to the Professor that, if the mal-products referred to by so many eminent authorities are constantly entering the blood, every

cell in every tissue must be badly nourished? Neuralgia has been described as "the cry of badly fed nerves." The whole constitution is steadily undermined and the way is prepared for all forms of disease by this chronic poisoning. Premature old age is the necessary consequence, if life is not cut short before that stage has been reached.

It is certainly a misfortune that the failure of digestion, which has in the end such disastrous results, in so many cases, does not cause any immediate pain or inconvenience that might serve as a warning to the sufferer. On the contrary, when the stomach is relieved of its task there is a sensation of lightness and ease after a substantial meal, and no notice is usually taken of the cessation of a process which is essential to good health. Heart, arteries and kidneys may deteriorate, but the patient, who is slowly committing suicide, has no suspicion that he is himself in fault and when at last failing health forces itself upon his attention, he will then throw the blame on his constitution, on the climate or on the act of Providence.

I think I have said enough to indicate clearly the gulf which separates complete, healthy digestion from that dyspepsia which is always followed by deposits in the urine, visible within three or four hours after it has been passed,—either an iridescent film on the surface, a murky cloud suspended, a general yellowish muddiness, or a reddish sediment on the bottom of the vessel. I may, however, mention a few symptoms which will assist any observant person in detecting a breakdown of the digestive functions.

These are: (1) Hunger (a "sinking feeling") an hour or two after a good meal; (2) thirst;

(3) drowsiness by day and heavy sound sleep at night; (4) relaxed bowels,—a man who digests all his meals will usually be rather constipated and should treat that symptom by diet and exercise; (5) the face will usually be more or less flushed; (6) the sweat-glands will act more freely, assisting the kidneys, on which the duty of excreting the waste-products chiefly falls; (7) the skin below the eyes will be dark and hollow, or in cases of long standing, it may be puffed out and deeply lined; (8) muscular weakness,—prolonged exercise will prove to an observant person that when digestion fails he is in very bad condition and that a light meal digested gives far more strength than a heavy meal which overtaxes his digestive powers; (9) the passing of water may be delayed until perhaps six or seven hours after a meal, instead of two or three hours, the quantity will be less and the colour more yellow. The two latter tests, (8) and (9), are almost sufficient of themselves to detect a failure of digestion, without the urine test.

In my own particular case I have recently become aware of another of the sequelæ of disordered digestion, viz.:—rheumatic arthritis. I had a severe attack in the hip and knee and have reason to attribute it solely to the neglect, during the preceding four or five months, of those rules as to diet and exercise which had preserved me so many years from any such attack. I am, sir, yours, etc.,

F. W. D. MITCHELL.

17th January 1911.

APPENDIX III

Copy of Sir Benjamin Ward Richardson's Letter to the Author, dated 23rd January 1892

25 Manchester Square,
London, W.
Jany. 23rd, 1892.

My dear Sir,—I have read your letter with the greatest attention and I think it is most sensible in its arguments.

For many years past I have, in practice, followed what you state is necessary, have carefully watched the condition of the urine in dyspepsia and have treated by the observations named.

I have not specially published on the matter, however, because I thought there was no novelty in the practice. Your note seems to correct this idea and I will recast my experience with the view of considering if it would be possible to construct a paper on the subject for a future Asclepiad. I am, dear sir, very truly yours,

(*Signed*) B. W. Richardson.

P.S.—I regret that so good an observer as you obviously are should not have completed your medical career and entered practice. But perhaps

it is best as it is, the profession of Physic is a hard one and ungratefully acknowledged and, as the poets say,

> "There is a destiny that shapes our ends
> Rough-hew them as we will."

F. W. D. MITCHELL, ESQRE.

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