On personal care of health / [Edmund A. Parkes].

MANUALS

OF

HEALTH

PERSONAL CARE OF HEALTH

E. A. PARKES, M.D., F.R.S.

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P. "Personal Care of Health"

A Manual of Health.

Presented by ——

ON PERSONAL CARE OF HEALTH.

BY

E. A. PARKES, M.D., F.R.S.

PROFESSOR OF MILITARY HYGIENE IN THE ARMY MEDICAL SCHOOL, NETLEY.

"Reason's whole pleasure, all the joys of sense,
Lie in three words, health, peace, and competence
But Health consists with temperance alone,
And Peace, O Virtue, peace is all thy own."

POPE'S *Essay on Man.*

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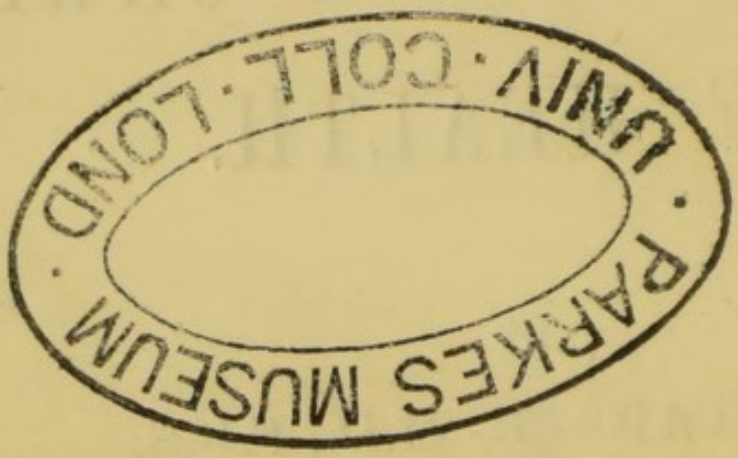
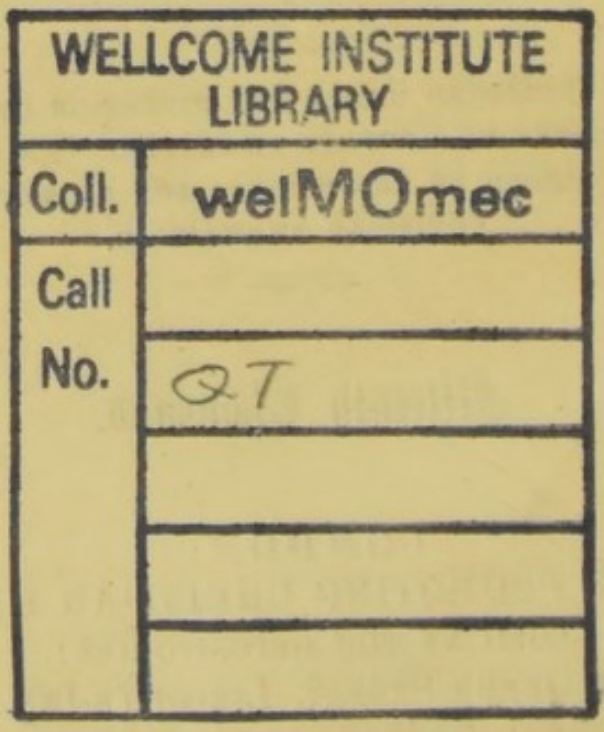


This book was passing through the press when its lamented and gifted Author was called away from his labours. He had read the proof-sheets but a few weeks before his death, and, at his own request, the work was finally revised by the Editorial Secretary, S.P.C.K.



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ON

PERSONAL CARE OF HEALTH.

CHAPTER I.

IN the play of Henry the Fourth Shakespeare makes the king in some pathetic lines contrast his sleepless nights, though passed in perfumed chambers and under canopies of costly state, with the sound repose of thousands of his poorest subjects, albeit lying on uneasy pallets, and hushed with buzzing night-flies to their slumbers. And returning to the same thought, he makes Henry V., in a soliloquy of unequalled power, strip off from greatness its covering of ceremony and title, and show how poorly "the tide of pomp that beats upon the high shore of this world" can supply the place of that health which may desert kings and yet be possessed by slaves. The poorest wretch, he says, "who winds up days with toil, and nights with sleep,"—nay, even the beggar, may have "the forehand and vantage of the king," for the power which can command the beggar's knee cannot command the health of it.

In these soliloquies Shakespeare shows with marvellous clearness what may be a compensation for inequality of worldly condition. In comparing the different fates of men, the wealth and ease of some, the toil and poverty of others, we are indeed too apt

to be dazzled by the outside, and to forget that happiness springs from within. One of the main elements of happiness is health, and this is the possession of no class and of no rank, and may bless the beggar while it is sought vainly by the king. The contrast, however, must not be pushed too far. Every great man is not sick and envious of the poor man's health; and, unhappily, many poor men have only too much cause to envy the healthiness of the rich. In this country the wealthy classes have longer lives and better health, especially in the early years of childhood, than the mass of the people, owing to obvious causes, but Shakespeare's meaning is still true. When health does exist, it is a blessing so great, so priceless, that all the luxuries of wealth and all the trappings of pomp are as nothing in comparison; and in his health a man possesses a gift of Heaven, which, if he were wise, he would not barter for the wealth of Crœsus.

How is it then that so few realize, until perhaps the blessing is lost, what is implied in "Health"?

Health is not merely freedom from bodily pain; it is the capability of receiving pleasure from all surrounding things, and from the employment of all our faculties. With health the hard conditions of labour soften into ease, and toil becomes sweet. As Henry V. most truly says, the poor hind who, "like a lackey from the rise to set, sweats in the eye of Phœbus, all night sleeps in Elysium." That is his compensation which a monarch envies. The sleep that he has earned outvalues the riches of a king.

Yet this precious health is squandered with a strange and marvellous carelessness. Esau sold his birthright for a mess of pottage, and many with equal indifference surrender for a moment's sensual pleasure this great gift of God.

We hear much of the pain and suffering from disease

which exist in the world, and in contemplation of which some have even doubted whether a merciful God can have designed and still controls a world so full of pain and misery. But the diseases which are so widely spread among us are certainly to a large extent self-inflicted, and when they are not so, they are yet often controllable by man. We must not venture to arraign Providence for loss of health, and for all the evils to us and others which follow it, until we are sure that the root of the matter is not in ourselves. Those who have most studied the causes of disease are most convinced that in the neglect of very obvious rules of morality and common sense the secret origin of many diseases lies, and that if he will, it is in the power of man himself to erase from the world a large portion of those sufferings, the sight of which weighs so heavily on our minds. It will no doubt be in a far-distant date when this truth shall have so penetrated into the popular mind as to bear its fruit. Generations must pass before reason, self-knowledge, and self-control will exert a predominant influence on health and disease. But to doubt that the day will come would be to doubt the ultimate ascendancy of knowledge and truth.

Tennyson in his poem of "Œnone" makes Pallas say to Paris:

> "Self-reverence, self-knowledge, self-control,
> These three alone lead life to sovereign power."

In that instance we know that Paris did not listen to the voice of Minerva, but chose pleasure, soft and effeminate, leading to "sword and fire, red ruin, and the breaking up of laws." But the Greek fable happily does not typify the choice of the human race, nor foretell its selection of evil in the place of good. Christianity and science are both on the side which

will eventually remove, to a large extent, the pain and suffering which now are blots on this world, which in the first instance was created good.

The present generation has seen a remarkable extension of sanitary knowledge and its application. Owing to various causes and to many people, but especially to the application of statistics to the mortality caused by disease, the public attention, not only in this country but over various parts of Europe and America, has been thoroughly roused to the fact that many diseases are preventable. From this has proceeded an effect, which seems to me directly owing to the teaching of Christianity. The essence of our religion is to fight against evil, and happily in England when an evil is clearly seen, there are always many who are ready to combat it.

Directly the infallible evidence of statistics showed that the people in some places were dying faster than by the evidence of other places they should do, a cry arose to remove the conditions which were robbing men of health and life. Legislation commenced, and from year to year has advanced, and under the name of State Medicine is endeavouring to ensure that the great common conditions of health shall be within reach of all; that all shall have pure air to breathe, good water to drink, and food which is not adulterated. To accomplish these objects has become the aim of our greatest statesmen, and although we are yet on the mere threshold of the work, the results already reached are undeniable. Many human lives have been already saved, and many hours of sickness averted, and the happiness of the nation must therefore have been increased.

The sanitary legislation of our time is a work of the greatest value, and indeed of prime necessity, but it

would be a fatal error to suppose it can do everything. It deals with many conditions which the individual man is powerless to control, but it cannot deal with others which belong only to the individual. From within proceed many diseases, which no public hygiene can remove. There is, so to speak, an individual or personal hygiene which must also be brought into action, and without which half the work must remain undone, and the burden of sickness and suffering be but half removed.

The object of this little book is to put forward in a simple form the chief rules of personal management of health. They are plain and in many cases self-evident, yet they are often much neglected.

As my object is to address individuals, I have not entered into the subject of the health of children. Up to the age of puberty a child is under the control of the parents.*

At puberty there occurs a gradual emancipation from the control of parents, and the young man and woman commence to act for themselves.

I have chosen, therefore, this period as that with which a work intended to convey advice on the personal management of health should commence, and it will include the years during which the growth of the body is passing on to completion.

* At least this should be the case. As an infant, or at school, the parents are responsible for the well-being of their children. We know too well that in practice there is terrible neglect of this; but as education and knowledge and religious influences advance we shall doubtless see that this responsibility will be recognized even by the poorest people.

At present the frightful difference between the infant mortality of the rich and the poor classes is chiefly owing to the extraordinary ignorance and carelessness of the latter, and is attributable only in a comparatively minor degree to their pecuniary circumstances.

When growth is completed, about the twenty-first to the twenty-second year, the period of manhood commences, which lasts for about forty years, and is succeeded by old age. Three natural divisions, differing somewhat in length of years in the two sexes, are thus made, and in each division the rules of health are somewhat different.

CHAPTER II.

PERIOD OF YOUTH AND COMPLETION OF GROWTH.

At the period of puberty, *i.e.* to say about the age of fourteen or fifteen in girls, and a year later in boys, a great change occurs in the body; the signs of sex become suddenly much more marked; bodily growth, which has been very active in the earlier years, becomes even more so, and the mental character undergoes changes. The bones, many parts of which have not yet joined, both grow and consolidate and unite, but the full union of all the bones is not completed until the twentieth to the twenty-second year. Until that time the frame is immature. As the bones grow and become stronger, so also do the muscles and the nerves, and gradually attain their full force and greatest perfection towards the end of this period. The activity of the mind also increases, and, like the body, it begins to take on the characteristics which will more or less distinguish it through all the future life.

This period is of the very greatest importance to men. Health is essential to development, and every

illness more or less checks the growth; the foundations of health may be firmly fixed, or, on the contrary, undermined during this period; strength and activity of body may be cultivated or neglected, and the faculties of the mind developed or arrested. The bodily and mental character is, in fact, formed partly from influences acting on it from the earlier years of life, but chiefly from those brought to bear on it during the six years from fourteen or fifteen, to twenty or twenty-one years of age. These influences are very largely under the control of the individual, though he may follow advice or directions, or be induced or compelled to adopt certain courses of life, still his personal action is predominant.

He may carelessly let events take their course, and allow circumstances to guide his actions, but he cannot avoid from time to time positions in which he is called on to make a decision for himself. Let no man think in after-years that his parents or surrounding circumstances were to blame for deficient growth or injured health. This is true only in some instances. In most cases, if a man be honest, he knows that it was his own action and his own fault to which the effect is due, and that he alone is responsible for not reaching the standard of stature, strength, and health which was possible for him.

The rules of health in this period must be given under different headings.

1. *Exercise.*

Parts when used grow, when not used waste and become small. The conditions of growth are that a part shall be exercised, and shall be supplied with food.

This is true not only of every muscle and nerve in our body, but of mental and moral qualities. The proper regulation of exercise forms, then, one of the most important rules of this period, and the object to be aimed at is to exercise all parts of the body which the will can influence. If we could place a young man or woman in the most favourable conditions (and among the richer classes in this country all could be thus placed), the following distribution of time would be the best :—At this period of life eight hours, at least, out of the twenty-four are required for sleep, and I believe nine would be often better. Of the remaining fifteen, three to four hours might be occupied with meals and rest during the day, and the remaining eleven or twelve should be given to exercise. Of the eleven or twelve hours, I believe that half the time might be given to mental and moral, and half to bodily exercise; but I do not venture to state this as a rule for all cases. The mental and the bodily exercises should be alternated. I believe two hours at a time is quite enough mental work, if the attention be fixed; and the results of the short-time plan in the agricultural schools show how much may be accomplished by fixing the attention firmly for a moderate time, and not overwearying it. The development of the mental and moral faculties by careful exercise during this period of life is a theme which I cannot pursue. I would merely say that the way in which memory, the power of comparison, rapid apprehension of facts, regard to truth, feelings of justice, benevolence, &c., may be cultivated by exercise, is quite as extraordinary as the way in which particular sets of muscles may be developed at will. It would seem almost to support the view that different parts of the brain are connected with these faculties for how else can we account for their growth so

readily as by supposing that exercise produces a more perfect nutritive condition of their material substratum. Bodily exercise is, however, the point I have to discuss. This is necessary in all periods of life, for without it the circulation of blood in the interior of the body, and especially through the liver, becomes feeble ; the heart grows weak, and the lungs expand and work less perfectly. Diseases of liver, lungs, and heart may be produced or favoured by too sedentary habits. But in this period of life exercise is all-important, for without it the muscles and the nerves, and even the bones, remain comparatively weak and small.

In the richer class, young men are at schools or colleges during most of this period, and happily, owing to the general liking for bodily exercises and field sports, a good deal of muscular exercise is taken, though not always perhaps in the best way. But among the young women of the same class this is certainly not the case as a rule. Physical education is very much neglected, and any one who looks at the young ladies of our time cannot avoid noticing that large numbers of them are growing up tall, narrow both in chest and hips, and with every sign of rather feeble health. A race depends largely for its stamina on the mothers, and must degenerate if these are feeble and want bone and muscle. It cannot be sufficiently known that young women ought to be physically trained as carefully as men ; they will never have the same strength, nor is it meant that it should be so, but they ought to have strong, firm muscles and well-developed chests and haunches. These things can never come without bodily labour, and I do not think that five or six hours daily real exercise is one minute too much even for them.

In the poorer classes, employed as they are during

this period in shops, factories, farms, and in a thousand different ways, it is not easy to say what is the average amount of muscular work each takes, or whether it is in excess or the reverse. It seems clear that the indoor, sedentary, and quiescent occupations have increased in an extraordinary ratio during this century as compared with the outdoor, active, and laborious trades. And some writers believe they can even now trace in our manufacturing towns a decided decline in the height and power of both males and females. It must be admitted that that is likely, for in many trades a boy or girl begins to work at fourteen or fifteen, and requires to use the muscles very little. They grow up narrow-shouldered and with soft, small muscles; these acquired conditions will be transmitted to a certain extent, and the next generation may perceptibly lessen in size. In individual families I am certain I have seen this, but whether these causes are producing effects on our town populations as a whole is difficult to say, and some writers have even supposed that the people are growing larger. This is one of those grave questions which cannot be solved without a large inquiry which a Government only can effectually make. It ought to be made, for there are few graver questions, and though legislation cannot control trade, yet if an evil is once recognized, men will eventually set themselves to remedy it.

The richer classes could easily regulate the amount and kind of bodily labour, but the poorer classes, who are obliged to follow their occupations many hours daily, cannot do so.

Happily many trades demand bodily labour; we may be certain that the farm boy, the smith's or the carpenter's apprentice, and in many cases even the shopboy, will have quite enough bodily work. But

other trades are sedentary, and both boys and girls may be in one position, or at any rate will have very little bodily movement for nearly the whole day; as, for example, the dressmakers, whose hours are in some shops from eight to eight, with about an hour for meals. How is this to be met? I believe that if young people fully understood the necessity of bodily labour to them, they could often manage to obtain it. Or if the employers of labour would recognize the importance of this matter, and would allow intervals of physical exertion to intervene in the case of long sedentary occupations for young people, what is wished for might be accomplished.

Christianity, if rightly followed, would solve this difficulty at once, for the health of our neighbours should be to us as our own health, and be cared for like it.

Whatever sort of muscular exercise is taken, there are certain rules which every one should attend to at this time of life. At the age of fifteen to twenty, bones, muscles, and nerves are all immature; they gradually attain during this time their firmness, bulk, and full perfection. But they require gentle treatment. Violent, and especially rapid, exercise is quite out of place in the earlier years; what should be aimed at is slow exercise, with frequent short intervals of rest. I can perhaps illustrate what I mean by an example: a youth or young maiden goes to a gymnasium. Now the object should not be to attain dexterity in certain exercises (though this naturally comes after a time), but to train and develop the muscles; and yet very commonly we see them attempting by the most violent exertions to accomplish some difficult or rapid feat which leaves them panting, half exhausted, and with muscles overstrained. No good instructor would allow this. Whether a particular

gymnastic feat is accomplished or not is a matter of no consequence; the important matter is that the muscles should be at work in a way which sufficiently exercises without overstraining them. It may be said, indeed, in this period of life, that great rapidity and sudden violence of muscular work should be altogether avoided. At a later period the fully-developed man will do things with a rapidity and force which the youth could not imitate without injury. This is often seen in running. Running is an excellent exercise, but young people sometimes injure both lungs and heart by the strain which they put upon their untrained organs. There is no exercise requires such care, such slow and cautious training, as running. The young man or woman, then, should use all strong and athletic exercises slowly, and should be satisfied with gradual progress. Emulation, especially, is out of place, as leading to improper exertion.

In all exercises it should be a condition that when completed a very few minutes' rest should restore all parts to their former state. Thus, anything like soreness of muscles, breathlessness, or beating of the heart, lasting after exercise, shows it has been too prolonged or too fast.

Another point is that exercise should reach all the muscles of the body. Walking, for example, is in many respects a good exercise, for it acts on several muscles of the trunk, as well as on the legs, and also somewhat increases the breathing power of the lungs. But it leaves the upper part of the body unaffected, and by itself is quite an insufficient exercise. Swimming is far better, for almost all the muscles are exercised, and the support given to the body by the water renders the circulation through the lungs easier. Happily, in many of our great towns, swimming might be practised even by the poorest.

Having regard to this rule of the play of all the muscles, one special exercise should not be allowed to exclude others. Rowing is excellent exercise, and brings into use a large number of muscles, but it throws the work too much on the shoulders, arms, and loins, and should therefore not have the lion's share of the time, as is too often the case. Many of our common games are also excellent, and generally include short intervals of rest, which are of great utility. For exercising all the muscles of the body there is nothing, however, like good systematic work in a gymnasium. When a gymnasium is properly arranged with progressive exercises, on the plan, for example, of Mr. Maclaren of Oxford, and if the instructors know how to train young muscles, by slow and cautious steps, not outrunning time, nothing is so effectual. Every muscle has gentle, slow exercise, and gradually develops and brings out a finely-proportioned frame. It is most earnestly to be hoped that cheap gymnasia in our large manufacturing towns may soon be common, and afford this exercise to the artisans engaged in sedentary trades. The only objection to enclosed gymnasia is that the exercise is not taken in the free air; but all good gymnasia are made as open to the air as possible, and thus the objection is partly met.

It has been an argument for compulsory military service that every young man would receive for one or two years a good physical education, for the army training is excellent. To me this argument seems to have much force, particularly when the results of drill and gymnasia on the weedy recruits of seventeen or eighteen years of age are seen. I have known a young man grow four inches between seventeen and twenty-two, and develop into a splendid man, which would never have been the case had he not enlisted.

Let me take, perhaps the worst cases of want of physical development which we see in young men, viz. the copying clerks. In many offices they seem to me to present far more examples of thin, attenuated muscles, and narrow, flat chests than any other class in the community. And yet, as a rule, their office hours are (except on days of pressure) only from nine to five, or eight hours, and of this some part is given for dinner. Giving eight hours to sleep, and four to five to meals and recreation or study, there are still three or four hours for exercise, and these, if properly used, would be enough to do great good. But these are usually wasted, perhaps in smoking or billiard-rooms or worse places. I will suppose such a young man walks to and from his office, which he should do in all weathers. An hour may be occupied with this; then he might easily have half an hour's gymnasium morning and evening, and in summer vary this with boating, swimming, or other exercises, which most persons are able to get. By a little arrangement and at very small expense, he would certainly give himself the chance of a good physical development and good health in after-life.

I may conclude this section by repeating that every young man and woman at this growing period of life should have the muscles cultivated, just as the mind is cultivated at a college or in a trade; that this cultivation should be like mental tuition, systematic, continuous, and slow; be never carried beyond the powers, and be gradually made stronger and more vigorous as the muscles and bones perfect themselves.

There is, however, another aspect of this question. In some trades there is too much bodily labour for the young frame. It is, indeed, sometimes heartrending to see the tasks quite young people are put to.

Happily, legislation has so shortened the hours of labour (for children especially), and a so much better spirit prevails in the masters and managers of our laborious trades, that it is probable this overwork is less common than formerly. When young persons are overworked, it is soon detected by a want of, or an unequal, development; the muscles are not firm and elastic, but soft; they are, in fact, overworked and underfed, and without sufficient rest. A boy at very strong manual labour who is well fed, and yet does not develop, is overworked. Of course the sense of uneasiness and aching at the end of the day's work also show that the exertion is out of proportion to the age and strength.

2. *Food.*

In order that all parts of the body should grow, two conditions have to be fulfilled: exercise the parts and feed them. The food taken into the stomach and prepared by digestion passes into the blood, and then is pumped with great activity by the heart to all parts of the body. The muscles and nerves and other parts, during or after exercise, attract the nutriment in the blood, and not only make up for that which may have been wasted or used in the exertion, but grow in size during this period of life. Exercise increases this power of attraction of the muscles and nerves for food, though we do not know the exact steps of the process.

In this growing period food should be taken rather frequently, for digestion and circulation, and waste and repair, are all rapid. The grown man, especially as his bodily activity declines, and digestion is feebler, may take food at longer intervals; but in the period of growth the utmost limit between meals during the day should be four hours. The meal hours of our

ancestors seem to me singularly well adapted for this period of life; breakfast at 8 or 8·30; dinner at 12 or 12·30; tea at 4 or 5; and supper at 8, divide the day well. Some rapidly growing young people ought to have five meals a day if they take sufficient exercise. This amount of food would be too much for after-periods of life, but is useful in this, provided there be activity of mind and body. Nothing can be worse for young people than the present fashionable practice of taking the largest meal in the day at 8 or 8·30 in the evening. The food should get into the blood during the period of exertion, *i. e.* early in the day, and a good breakfast and good dinner (at 12 or 1 o'clock) are by far the best meals for this time of growth. The meal-times of our labouring classes are, in fact, physiologically much better for growth and labour than the present fashionable hours.

But what amount and what kind of food should be taken by the young man or young woman in this period of life?

It is impossible to state the amount of food in figures, for it will change with the years and with the degree of labour. But happily appetite, if not hampered by luscious diet, but fed on plain and simple well-cooked food, is a guide we can trust.

Every young person in good health and exercise should eat well; it is sometimes said that when we take our meals we should leave off with the sensation of hunger not quite satisfied. This rule may be good for later periods of life, though I doubt it, but it is not true for this time. A young man should eat until appetite is appeased, provided always he does not improperly stimulate it by condiments, and that he is taking exercise, mental and bodily, in proportion. It is easy to tell when too much food is taken. Young people should not know, as the saying is, "that they

have a stomach"; digestion should give no sensation; there should be no weight, or uneasiness, or sleepiness after meals; feelings which show that the stomach is overworked. There should be no muddiness of complexion, no heat of breath, no occasional outburst of little pimples somewhere on the skin, and no unhealthy condition of the secretions.

Above all, the test of sound sleep is a guide; if too much food is eaten, and the system is oppressed by more than it can deal with, sleep is disturbed; the nights are restless and dreamy, and there is often perspiration towards morning, showing that there has been slight fever. With a little common sense, and with due regard to the work of the day every one can guide himself as to the amount of food.

The question of the best kind of food for this period of life is of the deepest interest. It is difficult to debate it in a small popular book like this, but yet it is of so much moment just now to the wage-earning classes in this country, that I must venture on a little discussion.

There exists in the air which is all around us, but which we cannot see, though we can feel it blowing in our faces, a gas called nitrogen. This gas forms nearly four-fifths of the air. It is shown by chemistry that this substance also exists in another form, which we may term solid, in every part of the vegetable or animal kingdom which has the peculiar properties of life. That is to say, if a part can feel, as a nerve does, it is sure to contain nitrogen; if it can contract like a muscle, it contains nitrogen; if it thinks like a brain, or sees like an eye, it contains nitrogen. This substance—nitrogen—is, in fact, one, and perhaps the most important, of the physical bases of life.

The growth of a part is closely connected with a

supply of nitrogen. Take a dog, and give it any kind of other food you like, but give it no food containing nitrogen, and it cannot grow, but will soon die. Our bodily structures must then have nitrogen to feed them, and as during the daily action of the body some nitrogen is always passing off, the supply must be daily renewed.

Now how do we get the nitrogen into our bodies to feed and renew our tissues? Not from the air we breathe, though at first it might be thought that we must do so; but it appears we gain no nitrogen in that way, we gain it only by our food. The food which contains this nitrogen is called "nitrogenous food." What then are the nitrogenous foods? First of all, there is the flesh of animals, *i. e.* their muscles; the dried pure muscles of an animal contain in every 100 grains nearly $15\frac{1}{2}$ grains of nitrogen. Meat then will supply this nitrogen; but not only meat but other foods will do so. In milk, the food of the young, or indeed of all ages, there is a curdy substance which can be made evident by adding rennet or any acid, and which is called casein. This casein when pure and dried contains also $15\frac{1}{2}$ grains of nitrogen in every 100. Cheese, of course, as made from milk, contains the same substance. In eggs is a substance called albumen, which contains also $15\frac{1}{2}$ per cent. But many vegetable foods are just as rich in nitrogen as these animal products. In wheat there is a substance called gluten, containing as much nitrogen as meat; in barley, oatmeal, maize, rice, and millet (a grain much used in many warm countries), substances exist very closely allied with the gluten of wheat, and all containing very nearly the same amount of nitrogen. In peas and beans a similar substance is found, called legumin, which also contains nitrogen, but in slightly greater amount. The similarity in composi-

tion of these substances, animal and vegetable, and others like them, is very remarkable.

Which then of all these substances will feed our bodies with this nitrogen? The answer is, they all will do it, and do it so perfectly, that if he have enough of any nitrogenous food (and receive also proper quantities of other kinds of food which are non-nitrogenous), a man will grow up strong and healthy on any of them. Formerly, for example, throughout the north of England and Scotland, there were successive generations of some of the finest men in the world who lived on oatmeal and milk; and, literally, men would live their lifetime without taking anything more, except it may be occasionally fruits and green vegetables. On the opposite side of the globe we find the splendid races of Northern India living on barley, wheat, millet, and rice, as their staple nitrogenous foods, or in Southern India we have millions of healthy men living on beans, and peas, and rice. In Africa the negro often attains a gigantic size on his millet and other vegetable foods. The Roman gladiator trained on barley, and the Roman soldier in campaigns when meat could not be got, carried corn, which he ground in handmills and then boiled in water, and made a strong vegetable soup, something like the old English fermenty. On this food he marched and conquered as no other race has done. In Europe again we find whole nations using meat, and not inferior to any of the others in the world for size and power, while in certain parts of Europe fish is the chief nitrogenous food of the people. The fact is that the old controversy between the respective merits of animal and vegetable food has now lost its significance. Both these kingdoms supply nitrogenous foods which man can use, and with any of which he can attain his highest bodily and mental development.

But still one kind may be better than another; meat may be better than its vegetable representative, especially for the period of growth. Is it so? Those who hold the view that meat is the best of these foods, point to its easy digestibility; its likeness to our tissues, so that it is presumed to be appropriated by them more easily than vegetable nitrogenous food; and to the fact that another important part of our diet, viz. fat, is mixed up with the muscular fibres in the way best fitted it is believed for digestion. These are great advantages, and must I think, if true, give meat some preference over the other foods. Yet the vegetable nitrogenous foods will, and actually do, do all that is wanted for the nourishment of the body.

But what then is the practical recommendation? What is to be done with young growing people?

If the pecuniary circumstances permit, it is best to let meat supply a considerable part of the nitrogenous food, but not the whole, for the vegetable nitrogenous foods should also be added. A strong, growing, active lad of sixteen or seventeen should have meat twice daily (preferably in the early part of the day), and will be probably found to take from 10 to 12 ounces of uncooked meat, which is equal to 7 to 8 ounces of cooked meat, daily. At eighteen or nineteen, if well developed, he will take with advantage one pound of uncooked meat, or 10 to 11 ounces of cooked meat. In addition he ought to receive nitrogen in other forms, such as bread, oatmeal, rice, milk, cheese, &c. He ought certainly not to be too exclusively a meat eater, but should use a variety, even of nitrogenous foods.

But it is possible that the pecuniary circumstances of a family are such as to render the supply of meat to a large family a matter of difficulty, or of impossibility. With the present very high price of meat

there are many labouring men whose pay would be exhausted by the meat bill alone.

To them it can be confidently said that their children will do well without meat if they will give them plenty of the vegetable nitrogenous foods. These are all cheap, all good, all digestible, and all palatable. As to price, the following figures will show the gain of the vegetable foods:—One and a quarter pounds of oatmeal will supply as much nitrogen and almost as much fat to the body as one pound of uncooked meat of ordinary quality, yet the meat costs 10d. per pound and the oatmeal only 3d. or 4d. For the same money a man gets nearly three times as much nourishment in oatmeal as in meat, and the oatmeal is more cheaply cooked. Indian corn (maize) is even cheaper; one and a half pounds of maize equal one pound of uncooked meat in nitrogen, and surpass it in fat, and yet this quantity of uncrushed or crushed Indian corn can be bought retail for about 2d. So that for 2d. a man will buy more food in maize than he will get in a pound of meat for 10d. It requires care in cooking, but that is a matter of practice. Whole barley and wheat sell for nearly the same price as maize. Dried peas and beans have nutritive value, as far as nitrogen is concerned, much superior to meat, while their cost is only one-sixth or one-seventh. They are, however, deficient in fat. Buck-wheat, used under the term of Sarrazin very largely in Normandy and Brittany, is not quite so nutritious, but is still the chief food of a fine, hard-working people, and is very cheap.

A labouring man, by ringing the changes on oatmeal, maize, peas and beans, rice, and macaroni (which is made from corn), to which may be added cheese and bacon occasionally, may bring up his children as well nourished as those of the richest people,

and at a small cost. It is, indeed, surprising to see how oatmeal, the most nutritive of the cereal grains, and formerly the staple food of our finest men, is now neglected; * so also the entire grain of corn is badly represented by bakers' bread, though I do not wish to decry the staff of life. Indian corn, or maize, again, is scarcely used by the people generally, though it is largely and most usefully employed in our prisons, where the diet is largely vegetable, and where the men are very healthy and very laborious. Peas and beans, and rice, are far less used by our poorer classes than should be the case. It is very much to be desired that in schools of cookery opened in our large towns, special attention should be paid to the means of preparing these sorts of foods, which are so much cheaper than meat, and therefore so important to the poor man. Instruction as to diet is, indeed, most needed, and it is satisfactory that attention is now beginning to be paid to it by some of the School Boards.

I have spoken hitherto only of the so-called nitrogenous foods; but there are other substances equally entitled to be called foods which contain no nitrogen. Oil, or fat, is a food, and a very important one, and all nations take this in some form, but it contains no nitrogen. We take it in the fat of meat, or in butter and milk, and other articles of food; the Hindoo has his clarified butter, or a vegetable oil; many African nations take it in the form of vegetable oil (olive or palm, or some other kind); some of the Northern nations take it in fish oil; but all take it, and it is an indispensable food. It is used in muscular and other actions, and is also consumed in the body, and supplies a part of the animal heat. Another food is the starch or sugar group, which also contains no nitrogen.

* See also the remarks on Food in the next chapter.

These substances (which largely exist in wheat, oatmeal, rice, potatoes, arrowroot, &c.) are also most important, and contribute to the bodily work, and to the animal heat. Men engaged in heavy labour always take a good deal of fat food, and I believe it should be supplied largely during the period of growth. How is it to be obtained by a poor man who cannot, perhaps, afford much butter? Fat bacon and dripping are largely used to supply fat, and both are good foods of this class. If they cannot be got, then the vegetable foods which contain most fat should be used. Maize, for example, contains much more fat than wheat or oatmeal. But if neither butter nor fat, nor fat meat of some kind can be given, cakes fried in vegetable oil might be used; in fact, more use should be made of oil in cooking by our poorer classes.

The starches entering largely into bread and all the cereal grains, are sure to be given in sufficient quantity when bread is used for food. Potatoes, also, which are invaluable as protective against scurvy—which, without them, would soon largely prevail in England—contain a large quantity of most digestible starch. Besides, sugar and treacle are now very cheap, and used by all. During growth mineral substances, such as the phosphate of lime and the phosphate of magnesia, are required for the formation of the tissues, and especially for the bones. The deficient supply of these substances has, no doubt, much to do with the rickety and contorted limbs of many poor children. If we can give meat enough, or oatmeal, corn, or maize we may be sure that these mineral substances will be in sufficient amount, so that we need not trouble ourselves about their supply.

Mastication of Food.—The thorough division of the food in the mouth, and the mixing with the fluids secreted by the glands there, is so necessary for good

digestion that every young person should take great trouble to cultivate the habit of eating slowly, and of thoroughly breaking down every particle of food. Many cases of indigestion arise simply from the habit of hasty eating.

3. *Drinks.*

Should alcohol be taken? At a subsequent page I have discussed the question whether alcoholic drinks should be taken by grown-up men and women. As will be seen, the point is a very difficult one, and one on which I hesitate to come to an absolute conclusion. But at this period of life I feel no difficulty. I strongly advise every young man and woman to be a total abstainer, and for these reasons:—

I cannot see that alcohol can do any good in the period of growth in healthy persons. What is then wanted is exercise and nitrogenous food to develop the muscles and nerves; now alcohol contains no particle of nitrogen, and cannot, therefore, assist in building up the tissues of the body. But it may do good in some other way, it may be said; it may supply force of some kind, or aid indirectly in building up the tissues. But what does it supply? It does not aid muscular force, for if a certain limit is passed, muscular power is unquestionably lessened by alcohol. A tired man may, indeed, feel revived from alcohol, and return to work, but the reviving effect is transient, and is succeeded by increased languor. It does not aid nervous force, for though it may increase the rapidity of thought by its action on the circulation, it certainly lessens the real power of the mind, and its effect on the other nerves is that of deadening sensation and of lessening action. It does not increase animal heat, for though it causes a sensation of

warmth, it has been shown by numerous experiments that it does not raise, but rather depresses, the temperature of the body, and that to take alcohol "to keep out the cold" is a terrible fallacy. Instead of keeping it out, it lets it in. What, then, can it do? Increase appetite? But the appetite at this time of life is good enough, and it is not certain that alcohol would increase it. Indeed, in large quantities, it lessens appetite. Assist in the construction of tissue? We have not a particle of evidence that it can do any such thing.

These arguments, however, would lose weight if experience and actual observation proved that it did do good in the period of growth. But experience rather shows that it is hurtful. When alcohol is given to young animals it stops growth; though for this some quantity is necessary. When given to children, with an idea of increasing vital force, it never seems to promote growth; on the contrary, children seem injured by it. They are very easily affected by alcohol, and tolerate it badly. Now a doubt even of this kind is sufficient to make us decide. If no good can be proved, and harm is suspected, what should we do? Why, manifestly not use that which cannot be proved to be useful, and which possibly may be hurtful.

But another argument is even stronger. In this period of life habits are formed. Now of all errors that of indulgence in excess of alcohol is the most fatal. What thousands of promising careers are blighted by drunkenness; what miseries and tortures it causes! But a young man or woman who takes alcohol in this period is laying the foundation of a habit, and that habit has a most dangerous side. Prudence, then, counsels what knowledge recommends, and that is, to abstain from what is not a

useful friend and may easily become a deadly enemy. Those who can drink water have indeed much to be grateful for.

If no good can be traced to these alcoholic liquids in the period of growth, what folly it is to spend money on them. A pint of beer costs 2d., but half a pound of oatmeal would only cost the same, and the beer will do scarcely anything for nutrition, while the oatmeal forms a substantial, nourishing meal. In a matter of purchasing vital force, for it comes to that, alcohol is the most expensive thing we can buy. Of course there may be cases of feeble health when alcohol is useful, but these should come under medical care.

I can see no harm in the use of tea, coffee, and cocoa for young growing people, in moderation; but when it can be procured I would strongly recommend milk instead, at the meals when hot liquids are usually taken.* At an earlier period of life milk is, of course, the most important food, but even in this it would be highly useful in aiding growth. It is out of the reach, however, of most, though Liebig long ago remarked how extraordinary it is that in the agricultural districts of England, skimmed milk (which contains all the nutritious casein and sugar) should be given to pigs and not to human beings. Skimmed milk is a very nutritious drink, and as pigs can be fed on so many things and men cannot, it would be an economy of force to sell the milk to the men rather than give it to animals which could make flesh and fat as well on other foods, as on milk.

* See also the Appendix for some simple drinks recommended to working men.

4. *Smoking.*

On this point also I have no difficulty in strongly recommending young men not to smoke. Happily in England this advice is not wanted by young women. When a grown man has got over the first poisonous effects of tobacco, and his system has become accommodated—as it does do in so wonderful a way to what at first half killed him—he may find no bad effects from moderate smoking, but, on the contrary, may believe it to be soothing and useful to him. To such a man, smoking in moderation, nothing can be said, except that he has subjected himself to the tyranny of a habit it may be hard to break. In other men too much smoking does produce evils—such as indigestion, impaired action of the heart, and sometimes it manifestly depresses the nervous system, making a man nervous and out of spirits. Youths, however, are far more affected by tobacco than men. They more slowly accustom themselves to it, and it frequently for a long time lessens their appetite. I have also often observed that young smokers are generally pallid. In England, in an out-door occupation like that of a farmer's boy, or errand boy, the complexion is fresh and ruddy if the boy is well fed. But when he takes to smoking he frequently becomes pale, and has an unhealthy skin. Moreover, boys who smoke much are less disposed to bodily exertion. Smoking interferes then with appetite, impairs bodily activity, and in some way must damage the circulation or the composition of the blood. Add to this that a young man without the least good to himself is forming a habit which may become very burdensome, and that if he is a poor man he is spending money for which there are fifty better and more pressing applications. I hope

then I have said enough to persuade some young men to keep from a practice which brings with it doubtful good and very certain harm.

5. *Clothing.*

For children and old people the best kind of clothing is a matter of importance, but for the period of life under consideration it is less so. The clothes should be loose, so as not to impede muscular movement, and in the case of young girls nothing should be done to support the spine by stays or other contrivances.

When a young girl's spine begins to curve, there is some error in position or in exercise, or some weakness in general health. Regulated exercise, good positions for rest, avoiding the causes which have led to the curvature (and these are often easily made out), and general strengthening measures with good food, will remedy the evil in many cases.

If support must be given, special instruments are required which transfer some of the weight of the upper part of the body direct to the hips; but to make a girl tightly brace herself with stays is a great mistake. Her ribs should have the fullest play, and her clothes should be as loose as those of a boy, and for the same reason—viz., that every muscle may have unrestricted play, and that the lungs may expand without impediment. For both sexes girdles and belts, which especially bind the lower ribs, should be avoided.

After exercise care should be taken to put on additional clothing. During exercise the circulation increases everywhere, and the skin especially becomes full of blood and perspiring. This perspiration is of great use, for it lowers the heat of the body which is

raised by the exercise; but as soon as the exercise is over and the production of heat ceases, the skin becomes very susceptible of cold. The perspiration is checked, and rheumatism or some internal inflammation may result. Therefore during exercise light clothing, and after exercise dry, warm, and especially woollen, clothing is the proper rule.

A question often arises whether young people should be warmly clothed, or, on the other hand, should be lightly clothed, in order to accustom them to endure the vicissitudes of weather. This is a point not easy to answer in general terms, as individual conditions differ so much. People who have hereditary tendencies to lung affections may require to be always warmly clothed; but with perfectly healthy young people I think it is a good thing not to be too much clothed, but to get accustomed to changes of temperature. But every one ought to judge for himself, and to see what he can bear, and clothe accordingly.

The old practice of attempting to harden children, as it was termed, by clothing them very lightly, was certainly an error. They should be clothed warmly, but this is less necessary afterwards. It must be remembered, however, that in many trades the work shops are kept at a high temperature. In such a case, and particularly if the circulation is feeble from long sitting, young workpeople should not risk the transition from the inside heat to outside cold without additional clothing. Every one, in fact, must exercise common sense; must consider the circumstances under which he works, and arrange accordingly, and a little consideration will soon show him what is best.

6. *Care of the Skin, Teeth, &c.*

The skin is not merely an organ of touch, it is a breathing organ—that is to say, it gives out gas (carbonic acid) and vapour of water. It has a most beautiful structure, and there are thousands, indeed millions, of little glands, called the sweat-glands, from which the perspiration comes. I may refer to Mr. Le Gros Clark's little Manual of Physiology (published by the Society for Promoting Christian Knowledge, 1873) for a good description of the skin (page 37). The true skin is covered by a sort of horny layer, called the scarf-skin, or cuticle.

This scarf-skin is always being detached by friction with our clothes, else it would soon lessen the transpiration of the skin, but this mode of removal is not enough. It should be washed and rubbed off regularly. Frequent ablution over the whole body is a necessity for health. If it can be done, all healthy young people should wash in cold water all over the body every day, and should use strong friction afterwards. The application of the cold to the skin is wonderfully bracing, and the body becomes less susceptible to the weather. If circumstances do not permit this to be done, still every one can, in the present day, get frequent baths, which are very cheap, and thus secure this important point. In the summer, bathing is within the reach of most working men, and those especially who have strong labour should be especially careful as to cleanliness. For those who have time and can afford it, the Turkish bath, with the final application of cold water, is probably as good a cleanser of the skin as we have. If the skin is not kept clean, the perspiration and scales of the cuticle often partly decompose, and become very acrid and strong-smelling; skin diseases may occur, or if not, a sallow-

ness or slight yellowness of the skin is often seen, which affects even the face, though that may be washed. This is a sure sign of an unwashed, dirty condition. If the skin is not kept pure, it cannot perform its functions of evaporation, then substances which should pass off are retained, and the health suffers. Both as regards health and beauty, perfect cleanliness of the skin is an essential condition.

The *hair* also ought to be kept clean by frequent washing and brushing, else it forms a harbour both for plants and animals, which cause skin diseases.

The care of the *teeth* is an important matter. If we reflect on the great importance of thorough mastication of our food, we shall perceive the importance of retaining the teeth as long as possible. One great cause of the decay of the teeth is the presence of bits of food, which stick between the teeth, and then soften and ferment in the heat and moisture of the mouth, and become acrid and injure the enamel. Then the enamel is first slightly discoloured at one point, then gets soft, and eventually a little hole forms in it, and decay then begins in the bone or dentine of the tooth. Again, the secretions of the mouth, mixed with the food, dry on the teeth and between them, and form the so-called tartar which eventually ruins the teeth. Perfect cleanliness of the teeth is the best preservative against these kinds of decay. This can only be ensured by washing out the mouth after every meal, and, if it can be done, cleaning the teeth with a brush and good tooth-powder. The avocations of many working men, which take them from their homes, may not allow them to brush their teeth after meals, but every one could wash the mouth out thoroughly with water, and thus remove most of the food, which would otherwise adhere. A little permanganate of potassium (Condy's fluid) in the water is useful. The

teeth under no circumstances should be cleaned less frequently than twice a day with a good brush. The brush should be carried on the inside as well as on the outside of the teeth.

Attention to the proper action of the bowels is another point. The formation of a regular habit as to time is of importance. It is very curious how periodically, and as it were mechanically and unconsciously, the body repeats actions, which, in the first instance, proceed simply from the will. In the particular referred to, this is very marked; it is difficult to explain, but certain it is that the bowels can be trained to act at a certain time every day, by persisting in trying to make them act at that time. If the bowels are costive in young people, it may be for want of power in the muscles of the abdomen and bowels. Exercise of the abdominal muscles, as for example, by bending and raising the body and legs, or by some work, such as digging, or by some gymnastic game which acts on these muscles, will strengthen them. If this is not the cause, there may be a little want of due secretion by the lining membrane of the bowels. A tumbler of cold or tepid water the first thing in the morning will often remedy this, or the use of rather laxative foods, such as bread with the bran in it, or oatmeal, or fruits. All aperient medicines and other appliances should be avoided as much as possible, for they injure digestive power. If aperient pills are taken, they should be weak, and it is better to take a feebly acting pill for two nights running, than a strong dose on a single night. Better than pills are some of the laxative mineral waters taken in the morning, but even these are better avoided by young people.

7. *Fresh Air. Pure Water. Healthy Houses.*

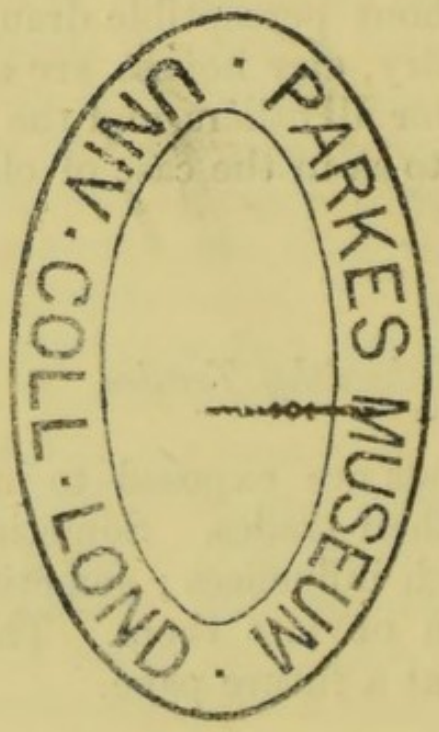
At a subsequent page (42) I have entered into these subjects as far as space permits, and I would refer the reader to that chapter. I would only say here that a good supply of air in bed-rooms is essential for young people. The cubic space for boys and girls from fourteen to sixteen years of age, ought certainly not to be less than 500 cubic feet, and more should be given if possible ; above that age, from 600 to 800 feet of cubic space or more should be allowed per head. This seems an impossibility for poor people, but it should be at any rate tried for. Also this air should be constantly changing without perceptible draughts. Good water to drink, and dry, airy houses are as important for young people as for all others, and the same points have to be attended to as in the case of older people.

8. *Unhealthy Trades.*

Many young persons are exposed to influences injurious to health in their trades. Sometimes they are powerless against such influences ; sometimes by care and thought they can obviate them. This subject is discussed more fully at a future page.

With the exception of the supply of good food, and of good air, and the exposure in unhealthy trades, which points may be perhaps met with difficulty by our poorer classes (though I think a little knowledge and contrivance would do much even here), there is nothing in the above recommendations that could

not be easily carried out by all classes ; and if carried out, it is certain that if not extremely unhealthy people by inheritance, then, with the exception of accidents and unavoidable exposure to infectious diseases, or other unhealthy agencies which may not be always avoided, young men and women would grow up strong and healthy, able to encounter with courage the struggles of life and to bear with fortitude its sorrows and trials. The recommendations are simple, but they must not be despised on that account. They are sufficient for their purpose, and I earnestly hope may aid in securing to some a larger portion of the priceless gift of health and vigour, than would otherwise have been reached.



CHAPTER III.

MANHOOD.

WITH growth completed, and let us hope with healthy, well-developed bodies and minds, the young man and woman enter on the period of maturity. If they have escaped severe illness, and have committed no faults against themselves, they may not unreasonably look forward to a long period of activity and endurance. Until the age of sixty or sixty-five, a healthy man may feel little falling off from the power and even the freshness of youth. Yet it is not actually so. During all these years the bodily frame has been slowly losing power, as is shown by the fact that the mortality gradually increases all through this period, and, when large numbers are taken, does so with a regularity which shows that influences are at work, regularly though imperceptibly, lessening the vigour of the body, and permitting the action of unhealthy agencies upon it. Sometimes throughout the whole body, sometimes only in one organ, processes called by physicians "degenerations of tissue," slowly progress, and at sixty years of age there are few men who are not, at some point or other, below their youthful standard of health.

In discussing this period I propose to address myself chiefly to men. For during this time women have the cares of maternity, and for many reasons require advice specially addressed to them. I have thought it best, therefore, to refer especially to men, though there are of course many things equally applicable to both sexes.*

* I do not think the ladies who have lately chosen medicine

1. *Marriage.*

In novels we generally find that inclination and fortune do not go together, and in real life I fear it must be said that considerations of health would often point one way and worldly prudence another. No doubt marriage should not take place until the frame is consolidated, but when growth is completed I think it may be said that, in a health or physiological point of view, an early marriage is the best. When the body has reached its highest vigour, viz. about the age of twenty-two or twenty-three in men and twenty or twenty-one in women, the children born to the marriage are likely to be more vigorous than when the parents are older; the troubles of maternity are more easily borne by the woman, and her power of feeding her child is greater. Moreover, the cares of the children fall on the parents in the period of comparative youth, when their maintenance is more easy, and before old age is reached the children of an early marriage will be out in the world and their parents relieved from their charge.

But even more important for the man is the fact that marriage protects him from the most serious temptations and dangers to health; dangers which members of my profession know too well cause a considerable proportion of the illnesses and breakdowns of early and middle manhood. Statistics also show,

as their profession could do a better service than to write a popular treatise showing women how to manage their health during the period of maternity, and how to bring up their children. Although very good works have been published on the management of mother and children, a short easy treatise seems to me much wanted.

when they can be brought to bear, that married men have a less mortality than single men, and this can only be from the absence of serious causes of ill health. I say nothing of the good effects of a well-assorted marriage on the moral and intellectual growth of men and women, and on the cultivation of the affections, which is one of its happiest results; but speaking merely as a matter of health, I think that for the man, for the woman, and for the children, early marriages are to be encouraged. But prudential motives may forbid them, and I will not say these should be overridden. Certainly no man ought to marry who has not fair prospects of maintaining his wife in comfort, and of giving his children good housing and clothing, sufficient food, and education. But when he can do this, his wisest course is to marry. So also among women there is much ill-health, which would never have occurred if they had married, and in the discharge of family duties had found their healthiest and happiest occupations.

It is not necessary for me to pursue this subject further; but I may point out that Christianity in forbidding a man to have more than one wife is in precise accordance with physiological knowledge.

How remarkable it is that in the midst of a custom so common as polygamy was nineteen centuries ago, a religion should have arisen which forbade it. And we can now see that this was done in the best interests of humanity, and was essential to the full bodily and mental development of both men and women.

2. *Choice of a Dwelling.*

Let us suppose that the young artisan or labourer, not having spent all his surplus earnings in drink and tobacco, has not only joined his club, but has saved a few pounds to furnish his rooms and to have a reserve against a rainy day. He then at twenty-three or twenty-four years of age marries, and has to look out for one or two rooms. Or a man of the middle class sees his way to a sufficient income and a prospect of regular employment, and takes at the same time a wife and a small house. Or one of the wealthier class, wisely surrendering what are called the pleasures of bachelorhood, but which are like the apples in the Oriental tale—bright and captivating outside, but within full of dust—marries, and as a consequence requires a mansion. How in a few lines can justice be done to the question, Is my abode a healthy one? There are, indeed, some leading principles common to all classes of dwellings, but yet it is difficult to write in a few pages what may be of use to all. Since, then, the rich can command skilled advice to help them choose a dwelling, I shall address here chiefly the poorer classes who have not the means of getting such assistance.

In choosing a dwelling a man should ask himself these questions—Is it dry? is it airy? has it a good aspect? is the water good and sufficient? is the drainage good? A rich man who can go anywhere might also inquire into the nature of the soil (gravel, clay, chalk, &c.), and make a selection.

Dryness.—A damp house is always unhealthy. The damp may come from the ground, and may rise in the walls to a considerable height; or it may come from a leaking roof or choked rain-pipe, or from rain beating through thin, porous walls. In country

cottages the floors are often placed on the ground without any excavation. If the floor is of brick, which is often porous, the cottage is always damp by evaporation from the moist bricks; even wood is thus constantly moist if laid on the ground. A labourer often has little choice, for he may not be able to live far from his work; and there are numbers of families now suffering from what could be easily remedied. Taking up the floors, excavating a little, and arranging for a current of air beneath, and then relaying with wooden floors supported on hard impervious bricks, will often make a cottage floor dry. Wet rising in the walls can only be cured by a damp-proof course, and nothing can remedy rain beating through thin porous walls but cement.

In towns, cellar habitations, which were always damp and ill-ventilated, are now forbidden by law, and Boards of Health also ought to have powers to see that country cottages are so built as to be dry, and not to be cellar habitations in disguise. In towns the cellars generally prevent damp rising, and what has chiefly to be looked to is dampness of the walls, especially from the roof.

If a labourer can have a choice, let him therefore avoid a damp house; and, even if there is a little increased rental, it would be really economy if he could secure complete dryness.

There is one common practice in the country which often makes a cottage damp; all the dirty water of the house is thrown on the ground or into a "slush-hole" close to the cottage, underneath which it passes. If this water were poured into a tub, and then used from time to time for the garden, it would be of use, as it contains fertilizing substances; but as it is, a labourer's wife often does her best to keep her house damp.

Good Air.—We shall never have a perfectly healthy people until all have learnt the importance of breathing pure air. When education has advanced, and when men know both how they breathe and why they breathe, we shall see an universal carefulness to ensure purity of air. Over-crowding, that terrible evil, will then cease, for men will see that it is based on a false economy, and to gain a few shillings health is imperilled. If possible, a man should choose a house which has plenty of space round it, so that he may not breathe his neighbour's air. Windows should open at the top and bottom to the external air, and not on a passage. If a workman has only a single room, he should get as large a one as possible, and a little more rent is well bestowed on greater space. In a single room where the people sleep, cook, wash, &c., the air must become impure; and the greatest care should be taken to let in fresh air at every opportunity; whenever it is possible the window should be opened. Especially after getting up this should be done, and the bedding spread out and freely aired. Opening the window lets in, it may be, a large body of cold air, and this cannot be long borne, but even in the coldest days in winter a chink may be left open at the top, or if this cannot be borne, a plan proposed some years ago answers well: lift up the window at the bottom two or three inches, and insert a piece of wood the whole length so as to support the window, and close the opening; the air then enters at the middle of the window between the sashes (as the sash of the lower window is raised above that of the upper) and passes upwards towards the ceiling; it mixes so gradually with the air in the room that no draught is felt. A still better plan, if the landlord will do it, is to make a slanting opening in the wall to the open air at a point as far as possible from the fireplace: for

a room of 12 feet square, and with two people, a square, or better, oblong, opening of 5 inches to the side (or 8 and 3 if oblong) is enough; this opening inside should be 18 inches, or 2 feet from the ceiling, and be as slanting as possible, the end inside being the highest. The entering air preserves the upward direction given to it by the opening, and passes towards the ceiling; it then descends, but so slowly as not to be felt, and thus renews the air in the room without draught. A lid, or slide, should be made, so that this opening may be partly or wholly closed when the wind blows directly upon it, as it may then cause draughts. Many of our barracks are ventilated on this plan (with, of course, larger openings), and it answers admirably. The cost is so trifling that every landlord could do it.* This simple plan will do for any room, but in richer houses there may be more expensive contrivances, but none are really better. With a larger room two openings can be made.

Impurity of air is often owing to impurity of floors, walls, and furniture. An artisan should have the walls well cleaned, and be careful that there is only one covering of paper, and not half a dozen. If the walls are limewashed, he should take care that the lime is hot. With a little care a man will find that even in a single room he can k ep the air pretty pure, and can let it constantly enter without feeling any draughts, or making it too cold. There is one cause of contamination of air which should be avoided. Gas should never be burnt in a room unless there is a tube to carry off the products. If there is no such tube, a very large quantity of fresh air has to come to

* A very simple plan is to take out a brick and then put inside the room a triangular wooden box open above, running up five or six inches above the top of the opening, so that the air may pass upwards. A lid can close it when necessary.

dilute the gas effluvia, and this may make the room too cold. If this fresh air is not allowed to come, the gas products are breathed, and are very hurtful. It is really barbarous to see open gas-burners in rooms without the least provision being made for the removal of the products of the burning.

Good Aspect.—In this country a house or room should be chosen with a warm sunny aspect; both light and warmth have a considerable influence on health, and it is easy to shut out the sun if desired. The Italians say "where the sun does not come, the doctor does," and as indicating, especially for young people, the bad effects of want of light in our rooms, the popular saying is true.

Good Water.—In cottages in the country it is too common to find the well and a cesspool close together, and frequently there is drainage from one to the other. This will never be altered until a house thus arranged is found to be unlettable, or unless the law is made much more stringent.

In other cases water is taken from a surface stream. Wells, if they can be secured from pollution, are safer than surface streams. If a labourer must take his water from a suspected source, he should filter it, and a block of animal charcoal, which will stop all grosser matters, can now be purchased so cheaply as to be within the reach of all. (See also Appendix for description of a cheap filter.) If he cannot afford this, he should boil the water and then put it into a clean covered stoneware jug to cool. If he has to fetch water from a distance, he should procure stoneware jars with covers to put it in, and should always keep it from the air. He should never let the water stand in buckets or open jugs exposed to the chances of absorbing impurity.

In a town a house receives, it may be, water from

a water company; then the company is responsible for purity until the water reaches the premises.

If it is stored in cisterns on the premises, these should, if of slate or cement, be regularly cleaned out; if of lead, they should not be touched, for fear of disturbing the protecting layer which coats the lead. Two points should be insisted on by rich and poor: first, the cistern should be covered and so placed as not to be in any way exposed to effluvia from closets; second the overflow-pipe should never lead direct into a sewer.

This will be the best place to give a few simple directions about judging of the water used for drinking. A common notion is that a clear, transparent water is a good one; and there is a certain amount of truth in this, for some of the most hurtful matters are those which are suspended or float in the water. There are, however, some turbid waters which are not unwholesome; for example, a little red or yellowish sediment is very common, and is merely iron from pipes or iron sand from the bottom of deep wells; so also water off a moor or common will sometimes have a little discoloration and sediment from peat or moss, which is quite harmless; but these things are soon known.

In spite of these exceptions we can lay down the general rule that a water should be clear, transparent, and free from suspended particles.

Sometimes, however, a perfectly clear water may be unwholesome; this is rare, but seems to occur in certain cases when there is much organic matter in the water—a water of this kind is often sparkling and agreeable. The best way of finding this out is to consider where the water comes from—if from a surface well, for example, the ground round which is likely to be contaminated if houses are near it; if from

a graveyard, or if the well is near a cesspool, or other possible source of impurity. It may also be sometimes detected by putting the water in a stoppered glass bottle half full, and after putting in the stopper placing it in a warm place. In four or five days the water may acquire a disagreeable smell from a sort of putrefaction of the organic matter.

Water should be entirely without smell; all bad-smelling waters are unwholesome; sometimes boiling the water will cause a smell to be perceived which otherwise would not be. The taste is not a very good test, yet still is useful sometimes. The water should be tasteless, though a very slight taste of iron is no objection.

As the agencies of some diseases are known to be carried by water, it is of great importance to ensure that no chance of contamination shall occur. Every man who has control over the sources of water supplying his house should watch over them most carefully and see that no drain-pipe runs near his spring or well, and that no possible source of impurity from overflow shall poison his well or streamlet. When water is supplied by a company, there must, in spite of all care, be an occasional chance of impurity; therefore every one should filter the water; the easiest way of doing this is by means of a siphon animal charcoal filter in the cistern, through which the water must pass just before it is drawn for use. The man who cannot afford this should filter through a charcoal block, which can be bought cheaply, and which, if the surface is brushed when clogged, will act for a long time.

Is the Drainage of the house good?—This is a question asked by all who take a house, and the invariable answer is, "It is in perfect order." Events often show it is quite in a contrary condition, but how is any one to ascertain the fact? It is generally quite impossible

without half pulling down the house. The drains are all concealed, and inside wainscots, or between walls, or underground, and no one knows what state they are in. Often, indeed, no one knows where the drains are. Now metal pipes have a very limited term of life if organic effluvia act upon them. Dr. Fergus has shown that a good lead pipe may decay in from eight to twelve years, or even in less time; even earthenware pipes crack or get loose at junctions, or have never been properly joined. Often also the laying of pipes is done most carelessly, and this important part of a house may be left to the most indifferent workmen. Instead of this, it ought to be insisted on by all architects, that the builder and plumber should keep their pipes in sight, that the pipes and drains should never be embedded in walls or be carried under a house, but if covered, should be merely so with wood screwed on, so that all the pipes in a house may be inspected, their junctions made good if necessary, and worn pieces replaced. So also at the outlet from the house there should be a subway where all the drains meet, and where it could be seen that everything is in good order.

Till this is done the question, "Is the drainage right?" and the invariable answer will be a mere form. All that architects can now do is to pour water down, to see if it runs away at once, and whether any reflux of foul smelling effluvia can be perceived.

The condition of our house-drainage is in fact very unsatisfactory, and it is worse for the rich than the poor, as drains are now carried so frequently to closets near bedrooms; and the chance of sewer air passing into the bedrooms is increased.

Every one taking a house should insist that the exit-drain shall be well ventilated just after it leaves his house, so that at any rate he may be safe from the

air of the common sewer penetrating into his house. He should also insist, as already noted, that the overflow pipe from his cistern should open over a grating, and not pass direct into a drain.

In the case of a labourer's room in a town house, a danger now exists which formerly did not. Water may be carried into his room, or into a lobby or kitchen opening into it. Then a sink is provided to carry off the water, and the sink pipe runs into the sewer; it may be not trapped or badly trapped, but whether trapped or not, the warm room is sure to draw sewer air from the sink. These pipes from room-sinks should open over gratings, and not into sewers.

In fact very great dangers now arise from our very progress in the supply of water, and in the removal of foul water, and it requires care and judgment to arrange matters so that unexpected evils shall not occur. Happily there are so many good medical officers of health and sanitary engineers, who have studied these questions, that the evils are being remedied. It is chiefly the small builders who run up houses on speculation, who do their work with this great ignorance and indifference to consequences.

There is no doubt that, after all, the grand thing in a house is to prevent the entrance of foul air from pipes and sewers. The warm house so draws the air from all openings, that if there be a leaky or broken pipe it must let foul air come in. Then it is breathed at night when it is perhaps not perceived, and many bad effects on health are produced. The poor who have no pipes in their cottages are often far better off, even with their small, low, ill-ventilated rooms, than their richer neighbours. And yet this great evil is capable of complete remedy. Why then should it exist one moment longer?

If then a house is dry, with a good exposure and

capability of external ventilation ; if the floors, walls, ceilings, and furniture of the rooms are kept clean ; if the rooms are well ventilated, and are perfectly free from sewer air or from emanations from the ground, and if the water is good, the house cannot be accused of any illness which occurs in it. The illness must arise from conditions external, so to speak, to the home.

3. *Trades.*

Much unhealthiness arises from trades. Sometimes neither master nor man can alter this ; sometimes the masters could remove, or the men could avoid, the causes of unhealthiness. For example, formerly there were no more fatal callings than those metal trades in which sharp, jagged particles of iron or other metals were thrown off into the air, and then were drawn in breathing into the lungs, which they destroyed. By alteration of processes this evil has been greatly lessened, though not altogether avoided. Even now men suffer from the metal trades ; from solid particles in the air ; from fumes, as of copper and zinc ; or from swallowing the metal accidentally, as in some trades using mercury or lead. A large field is open here for improvement, and it is only just to the masters to say, that many of them are most anxious to find means of obviating these evils. Frequently the wishes are not seconded by the men ; it has been known that workmen have even wished to keep a trade unhealthy, in order to earn higher wages. Even when this is not the case the carelessness of workmen is extraordinary. I never pass painters at work and notice their hands and faces, without involuntarily recalling the number of cases I have seen of health destroyed and families rendered miserable by lead colic and palsy among painters.

And yet the commonest precautions, such as never eating or drinking without washing the hands and face, are neglected, though even this simple measure would lessen greatly the chances of becoming poisoned. So in the pottery factories, where, as in metal trades, there is much dust, very simple plans, such as wearing in certain operations canvas masks or respirators, are never thought of; certainly the men as a rule do not help themselves, but go carelessly on in the old way, letting ill-health come as if it were inevitable.

The inquiry into the healthiness or unhealthiness of trades is part of the great subject of Public Health, and ought to be systematically prosecuted by every Government. What has hitherto been done has been accomplished almost entirely by private inquiry, but this is not enough. Government alone can make an investigation which is long and extensive enough to show all the evils and how they are to be met.

To discuss here the thousand trades would be useless, and I can only give some general hints. I would advise every workman to consider his trade, and to recognize what is likely to be injurious. There are, in fact, few workmen who do not know pretty well whether their trade is bad for them.

The most dangerous trades are those in which solid particles of any kind float in the air. In all these cases special measures of ventilation, use of water, employment of covers for the mouth and nose, will do much to stop the entrance of these particles into the lungs; growing a beard and moustache does something for the mouth, but the nose is not closed. Workmen cannot be too careful to avoid breathing these particles. Fumes, especially of metals, but also of some other substances, such as phosphorus or turpentine, are hurtful to some workmen, but recent changes in these trades have much lessened the risk.

Gases, if irritating to the lungs, are also injurious, but happily at present the good ventilation enforced in factories where acid fumes are disengaged prevents much effect. Offensive effluvia might also be supposed to be unhealthy, but, curiously enough, it appears that in some of the very offensive trades the men, after getting accustomed to nauseous smells, are not affected in health.

After those trades in which something solid or gaseous is in the air and is breathed by the men, come in order of danger the trades in which metals, such as lead, or mercury, or copper, or arsenic get into the system, usually by being swallowed, as in the cases of painters, or of makers of artificial flowers, who use arsenical colours, &c., in their trade.

Then follow those trades with constrained positions, which are not, happily, very numerous. Formerly, shoemakers suffered much disease from the pressure on the pit of the stomach as they were using their tools, but they can now manage without this. Coal-miners are still obliged to work long hours in most awkward positions, a practice which often contorts their limbs, and probably only to be completely stopped by the substitution of machinery for hand labour. Again, the completely sedentary trades are unhealthy, and must be so until the hours and customs of labour in these trades are altered by the progress of public opinion.

Other trades are hurtful simply from inattention to common sanitary principles: the air is poisoned by gas combustion, or ventilation is so neglected that the air is pestilential, or the men work in damp and cold shops, or are unnecessarily exposed to weather or to great changes of temperature. The Factories and Workshops Acts are gradually correcting many of these errors, and though health still suffers in many

trades, there is reason to think that there is much less injury than was formerly the case. The great employers of labour, especially in the various spinning and weaving trades, have done very much of late years for the health of their hands, and it is chiefly now in the smaller shops, where a master is working on a small capital, that the sanitary arrangements are most defective.

4. *Food.*

Lord Bacon calls the stomach "the father of the family," and it is certain that if the father be a bad one, the whole family will suffer. How are we to treat this organ by which all the other parts of the body are built up?

The mechanical expression of the day is that man is a machine who takes food, from which his internal mechanism produces muscular movement, or animal heat or thought, as a steam engine converts water into steam by the burning of its fuel. The simile may easily be pushed too far, for we know no machine made by human hands which has a curious power of regulating itself and of increasing in size for a definite period like the animal body, and then, after another period, during which it regularly repairs itself, of falling to pieces, though we can see no reason why it should not go on for ever. But admitting the simile as true to a certain point, it will bring home to every mind the importance of food. How is the best work to be got out of a machine? Clearly by giving it the best fuel, and by using the machine properly. But men use their wonderful bodies as if it did not matter what went into them, or how it went into them. One man, engrossed in business, swallows in five minutes a mass of food, which passes unprepared into a stomach which would

groan if it could, and does in its own way often remonstrate. Another man, leaving, perhaps, an engine which he has been carefully feeding with the best coal, and oiling it so scrupulously that every motion is perfectly smooth, rushes out and sends into his own delicate internal mechanism a quantity of raw spirits, which at once begins to put everything inside him out of gear. This is a proceeding about as sensible as if he were to pour oil of vitriol into the joints and bearings of his engine. How few men understand the paramount importance of food, from which our wonderful bodies evolve power! Is there anything more important to the health of men than a good knowledge of what food is, and how to use it?

I question whether an artisan or labourer in receipt of pretty good wages, which he does not spend in drink, is not the best-fed man in the community, if he has an industrious wife who knows how to cook. If she is an understanding woman, she will give him enough variety, and he receives every day, at the same hours, well distributed over the day, about an equal quantity of well-cooked, simple food, over the eating of which he does not hurry. If such a man is a teetotaller, or does not take more than one or two pints of beer daily, it will be seen that he changes little in weight during this whole period of maturity, and that years tell little on his appearance. If he takes too much beer and spirits, as so many do, he begins to get fat about forty, and then ages.

Compared with such a temperate working man, the wealthy classes, as a rule, are, I think, clearly less well off. They have the best description of food, and the best possible cookery, but they have neither the regularity of time nor quantity that the sober workman has. The perfectly-cooked made dishes of our day are no doubt extremely digestible, but that advantage

and their variety leads to a large consumption. As a rule, the wealthy classes eat too much (with, of course, exceptions), and it eventually tells upon them. Both men and women get stout, and between forty and fifty years many begin to suffer from affections which are called by diverse names, and affect diverse organs—lungs, liver, or other parts—but which are more or less allied to dyspepsia and gout.

It is, of course, always hazardous to extend to a class the conclusion drawn from a few instances, but in spite of the excellent health conditions in which most of our rich people are placed, we do not see so great a superiority in health in the later years of manhood as should be the case.

Although also there is very little intemperance among them, in the usual sense of that word, they take a good deal of alcohol in one way or another, and I think most medical men will agree that Abernethy's advice is the only cure for the manifold ailments of many of their rich patients, viz., "to live on sixpence a day and earn it."

There are, however, unhappily, people among us who have neither the simplicity of the poor nor the gratification of the rich man's diet, but who suffer in another way. I allude to the numerous class who are dependent upon ill-trained servants for their cooking. A married clerk, receiving some £200 or £300 a year, is really very badly off in this way. His wife having received the usual ornamental education of our time, knows nothing useful, and would think it a degradation to descend to the kitchen and be busy in providing for her household.

Yet what increased health and happiness would arise to her husband and children; what pleasure would come to herself (for labour is happiness), if she were a good cook, and would give three or four

hours' work in preparing what is so essential for health and energy. If young ladies would only see that cooking is really a branch of chemistry, and that it is therefore a scientific as well as a most useful art; and if they would get over the ridiculous pride of thinking honest labour a degradation, instead of what it really is, a blessing, how many of our countrymen would dine well instead of badly, and be robust instead of weakly? The social effects of such a change in sentiment and in action would be surprising; it would solve many difficulties of servants which are felt more and more every year, and it might even give a reply to that important question which is always arising but is never answered, viz., "Whether it is right to marry on £300 a year!"

At the age of twenty-two or twenty-three the body is almost as heavy as is natural to it; (having in Englishmen an average weight of from 126 to 168 pounds),* yet many persons become a little heavier up to thirty years of age. But after thirty, a perfectly healthy man will change little in weight up to sixty. If he becomes much heavier in middle life, which is generally from becoming fat, it shows one of three things; either he is eating or drinking too much, or he is less active in body and mind, or if neither of these causes exist, some of his organs, especially his lungs, are beginning to act less perfectly. If, on the contrary, he loses much weight, he is either undergoing much more exertion, or he is eating less or digesting less perfectly, or he is ill and requires medical skill. By the terms heavier or lighter I mean considerable changes. A perfectly healthy man in the

* That is from 9 to 12 stone, but of course there are cases on either side this average, though very few young men of twenty-two or twenty-three reach 12 stone when the weight of the clothes is deducted. There are more below 9 stone.

course of a year will often vary in weight two or three or even four pounds; this is nothing; it depends on various slight causes, and is compensated by corresponding changes afterwards. Difference in the weight of clothes often causes some variation, which is not always taken into account. Regard being had to these variations, the weight taken every six months is the best test we have, if food and exercise are in the proper ratio. At the same time I do not wish to exaggerate the importance of this. A man who weighs 10½ or 11 stone at twenty-three, and increases 10 or 12 lb. by the time he is thirty, will often weigh 13 or 14 stone by the time he is forty or forty-five, and feel himself perfectly well. Nor do I think that this increase in weight is to be held a profoundly serious matter; it depends on fat being stored away,* chiefly in the loose parts, where it most easily finds room, and the great vital organs may be untouched.

But this increase still shows that the in-goings and out-goings of the body are not in equilibrium; the constructive and destructive processes do not balance. The health is really not perfect, and sometimes the fat is deposited on organs, or it may be, *in* organs, as the heart or liver, and leads first to imperfect function, and then to graver nutritional changes. Besides, the mere accumulation of fat is sure to lessen bodily activity, and the changes in the body caused by such activity. Without therefore making too much of the increase of weight, I would strongly advise every one

* Sometimes, however, especially in men who become more active and are better fed, the increase of weight is owing to a real increase in the size of the muscles, and this is beneficial. Sometimes the nitrogenous constituents of the large glands increase from too much meat being taken, and the liver and other glandular organs increase in weight. Still this adds little to the total weight of the body, and as a practical rule increase of weight after the age of thirty means increase of fat.

to try and keep the weight fairly constant, and to lessen food or increase work if he finds he is getting much heavier. On the other hand, if a man gets much lighter it is generally a graver matter; sometimes, indeed, men who are past fifty do lose weight from a slight failure in digestion and appetite; this seems often a natural condition; the vigour of manhood is gone, and a man should accept this decline as a matter of necessity; but this is generally a slow process. If a man loses weight rapidly it is more serious, and should be looked into; it may be increase of work or some loss of appetite easily accounted for by anxiety or pressure of business or loss of sleep; or there is some impairment of digestion which a little lessening or alteration of food for the time may remove; but if this is not the case, it is best to take the doctor's advice.

The chief practical rules of diet may fall under the five heads of times, regularity, quantity, kind, and cooking.

In the period of growth rather frequent meals are necessary; but in manhood, and especially towards its latter part, digestion is often slower, and it is found better to take meals less often; three or often two a day suit some men best.*

Individual needs must decide this, but it is, I think, wise not to make too long fasts. Even with a feeble digestion, six hours will generally complete the stomach's work. I believe, also, the first good meal

* About one hundred years ago, in the northern Highlands of Scotland, where there were always an unusual number of old people, the custom was to take only two meals a day, about nine in the morning and five or six o'clock in the evening. The people appear also to have been very temperate in those days; and the diet was largely farinaceous, but also some meat was used.

of the day should be taken, as usual in this country, before the work of the day is commenced, and not after working four or five hours, as is done abroad, and that the second meal should be the principal one, the evening meal being lighter.

But whatever hours be adopted, time should be given to the meals; they should never be hurried over; no very violent exertion should be taken immediately afterwards, though it is not necessary, probably not desirable, to observe perfect quietude, as some recommend.

Regularity as to hours is really very important. The human body is wonderfully given to periodical conditions; if accustomed to receive food at a certain time, the stomach seems to take on a condition of readiness at those times; if treated with irregularity, it resents it by not being so ready, and though there is extraordinary power of accommodation possessed by our bodies, it is well not to rely too much on this. The regularity of the workman's meals is certainly a very important point in his favour. There is a rule as old as Hippocrates, that if the regular time of a meal is long passed, and any faintness is perceived, we should not eat largely; the stomach will not digest it. A small quantity only should be taken.

As to quantity, it is remarkable that though individuals eat such very different amounts, yet if the food of 1,000 men of about the same age and trade is weighed for a month, it will be the same as the food of another 1,000 men of the same age and trade. So that the average is fairly constant, though the individual amounts differ so much.

Expressed as perfectly dried food, the diet of the average man is composed of about $4\frac{1}{2}$ to 5 ounces of the so-called nitrogenous food (either animal or vegetable), 2 to 3 ounces of fat (animal or vegetable),

and 14 to 15 ounces of starchy and saccharine foods, besides some mineral substances; that makes about 22 or 23 ounces of perfectly dry food. If we add the water which is really present in what we cal. solid food, it makes about 42 to 46 ounces of solid food taken daily; and, in addition, about 40 ounces of water are required. A man in very laborious work will take 1 or $1\frac{1}{2}$ ounces more nitrogenous food and as much more fat, so as to increase these two parts of his food which are especially concerned in producing mechanical work.

But this statement of an average is of little use to an individual. Each man must fix his own amount; his appetite, which is controlled by the amount of body and mental labour he goes through, and by the vigour and weight of his body, must decide how much he eats. A man soon learns to know how much is good for him; where he fails is in not acting up to what he knows. As a rule, all literary and sedentary men should be spare eaters; though mental work requires food, it does not seem to require so much as strong muscular exertion.

An ancient physician recommended that men should sometimes take much more food than they want, and sometimes much less, so as to give the body variation in quantity, but modern experiments lend no support to this old rule. The healthiest bodies are those in which the food is nearly the same, and the processes in the body go on tolerably uniformly from day to day. If on one day additional food be given, as when a man goes out to a great dinner, the effect is traceable for three or four days, or even for a week. After such an unusual meal there should be some abstinence the next day, so as not to overtask the organs. There will always be some variations from day to day, as appetite varies, but there should be no arbitrary changes.

The old rule that a man should rise from table with appetite unsatisfied is usually thought to be a good one for this period. If any weight or uneasiness is felt after appetite is satisfied, we certainly ought to stop short. But if not, I think a sensible man may satisfy appetite and yet not exceed, as seems to be implied by this rule. That a meal is not too much is shown by alertness of mind and body being preserved, by the sleep at night being good, and the secretions natural. Excess of food sometimes produces costiveness, sometimes diarrhœa, and sediments in the water. With respect to the kind of food, some variety is important. The succulent vegetables, and especially potatoes, have great uses as anti-scorbutics.

The question between meat and the vegetable nitrogenous foods has been already discussed at page 18, to which I beg to refer. But I cannot avoid again directing the working man's attention to the great cheapness of the vegetable nitrogenous foods. Take, for example, oatmeal, which is one of the best. In some parts of Scotland the farm labourers, who work very hard, and are fine strong men, still live on oatmeal and milk, and a ploughman's allowance is daily $2\frac{1}{2}$ lb. of oatmeal and 1 pint of milk. Taking the cost of oatmeal at 3d. per pound, and of milk at 2d. a pint, the daily cost would be only $9\frac{1}{2}$d. In one of my experiments on diet, I kept a strong soldier thirty years of age, and weighing $10\frac{1}{2}$ stone, and doing hard work, on oatmeal and milk alone, and found that he was kept in perfect health and at a constant weight by $1\frac{3}{4}$ lb. of oatmeal and 2 pints of milk. The cost was 5d. for the oatmeal and 4d. for the milk, viz. 9d. a day, or 5s. 3d. a week. The man himself was very sorry to return to his soldier's rations of bread, butter, meat, and potatoes, &c. I mention these facts to show

how, with the present price of meat, a man may live better and cheaper on other foods.

The rich classes in England are certainly too large meat-eaters; for example, follow a dinner at a rich man's table, and see what the guests will take: a soup, into which meat largely enters; fish; two or three made dishes, probably all meat of some kind, perhaps a joint, and game; the farinaceous food is scarcely touched, and when it is remembered that at breakfast and at luncheon meat has been also taken, the very carnivorous nature of this diet will be evident.

Sir Henry Thompson attributes the great prevalence of cases of gravel and stone to alcohol, and no doubt he is correct, as he has had unusual opportunities of judging of this; but, in addition, when we know the large amount of animal food taken by the class of people who resort to him for treatment, it cannot but seem probable that the diet is also at fault.

If there is decided gout, the vegetable nitrogenous substances which are noted at page 22 should be substituted for meat, and alcohol given up.

When a man is getting very stout after thirty-five or forty years of age, he is often advised to adopt Mr. Banting's plan, *i.e.* to take more meat, and to give up entirely, or almost so, sugar, pastry, bread, and farinaceous food generally. This plan is often useful, but it may fail, for men can make fat out of the muscles of animals. Before resorting to Bantingism, it is as well to try if a lessening in weight cannot be brought about by giving up all alcohol, by lessening the food by one-third, or even more, but not altering its character, and increasing exercise.* This plan will lessen fat without lessening strength or injuring digestion. If it fails, Bantingism should be tried.

* See page 87 for a good case of reduction of corpulence without any meat being taken.

I may say, finally, that in youth most harm is done by taking too little food, and after fifty years of age most harm is done by taking too much.

With regard to cooking, or the preparation of food, it is too great a subject to be dealt with, except in a special treatise. The great object in cooking is to make food tender and palatable. The tenderness of food, and the changes in fibre and starch grains produced by heat, require a good management of temperature, and of the various modes of heating, as by radiant heat, boiling water, dry air, &c. The giving agreeable palatable properties to food is another branch of the art, which must, however, be placed second. The first great point of cooking is to soften and swell the food, and thus to aid the teeth, but certainly not to supersede them. Every kind of food, no matter how tender, should not be allowed to pass the mouth without being thoroughly mixed with the fluids secreted into it, and ground also by the teeth. Some eminent dentists have supposed that the teeth of the young generation of the upper classes in this country decay earlier than formerly, and that the jaws are becoming narrower, and less able to hold the full number of teeth. They ascribe this to disuse of the teeth, as the food requires less crushing, and this leads to lessened nutrition of the teeth, which acquired condition is then transmitted by inheritance. The difficulty is to prove a statement of this kind, and also the time which can be assigned for the change to have been observed by these gentlemen, viz. (two or three generations) seems far too short for an organic alteration in the body such as this. Changes of this magnitude will surely require many generations to produce them.

5. *Drinks.*

A man requires from 40 to 60 fluid ounces of water daily; this is partly supplied in the food, and partly is taken as drink. In some shape or other men must have water; happy is the man who can take it, and it only, as his daily beverage.

One of the great questions of the day is, whether alcohol should be taken as an article of usual and daily diet. To this question it is, I believe, impossible to give at present a decided answer. The exact changes which alcohol undergoes in the body (for it does in large measure undergo changes) and the effect it produces must be more perfectly known before we can give what may be termed a really scientific answer, that is, a reply based on complete knowledge of all the facts.

No doubt, in course of time, we shall be able to give an absolutely correct reply, but now I think it is wisest not to attempt to do so.* We can say, however, that the tendency of scientific inquiry seems to be that alcohol does not serve any very prominent purpose in diet, and that its uses in health (if any) are far less important than has been supposed.† It is, in fact, a luxury.

Failing, then, to get a complete scientific answer, such facts as are undisputed must be arranged, and guidance sought in them.

It will, in the first place, be admitted by all, that

* In this I am running counter to the view of Dr. Richardson, for whose opinion I entertain the greatest respect. He believes, from his numerous scientific researches, that alcohol is simply useless and hurtful. It would very much simplify the argument if this point were quite decided. I trust it may soon be so to the satisfaction of all.

† This does not however affect its use in disease, which is quite a different question.

any form of alcohol taken in excess destroys the health of the drinker. It produces gradual nutritive degenerations in several of his organs, especially in the nervous system, the liver, the lungs and the heart, and deprives him of many years of life. The class which gives the largest mortality in this country is that of the publicans.

Mr. Neison's statistics (which it is said have been lately confirmed by observations made by the Board of Health of New York) show that if a man becomes intemperate at twenty years of age he will live only $15\frac{1}{2}$ years instead of 44. If at thirty he becomes intemperate, he will live only $13\frac{2}{3}$ years instead of 36. He thus shortens his life by nearly 30 years at the first age, and by 22 years in the second age. The immense disease-making of intemperance is appalling. We must, of course, remember that this may not be entirely the effect of alcohol, but of the exposure and privations to which the drunkard subjects himself.

Still the larger part is probably directly owing to the bad effects of excess of alcohol on the body. How much disease alcohol indirectly causes, by starving wives and children, will never be known till the day when all things are declared.

It is no wonder, in the face of facts like these, and with such ominous evidence of brutal ignorance and indulgence as is shown in the fact that the earnings of the working classes in a time of great prosperity have gone so largely in drink, that there should be teetotal societies springing up on all hands to try and save, if it may be, some of these poor wretches from their certain doom. To reclaim these and stop excess is one great argument and justification of total abstinence, and every one must surely wish success to so great a work.

By the side, however, of the undisputed facts of the

terrible consequences of intemperance must be placed another class of evidence.

There are men who, during long lives, have taken alcohol in moderation, and who seem none the worse for it. I know a gentleman who has almost reached his ninety-ninth year, and who, though always moderate, has taken wine or beer, or both, every day of his life since he was grown up, and still takes them. At ninety-two years of age he could shoot for hours, and when more than ninety-seven did some part of the service in his church, and visited his parishioners.

Other instances of very long lives could be cited, and also many perfectly healthy old men must be known to all, who take alcohol in moderation. Whole nations also are wine or beer drinkers, and no evidence of harm is forthcoming. In the face of such facts it seems impossible to contend that alcohol in moderation can do harm.

This inference is to a certain extent confirmed by experiment. When the amount of alcohol is kept within what may be termed the limit of moderation (viz. 1½ fluid ounces of pure, *i.e.* what is called absolute alcohol, in twenty-four hours), it is impossible to say, from experiments on strong healthy men, that harm is done.* When this amount is, however, exceeded, and passes over two fluid ounces, the evidence of hurtfulness becomes certain; and I therefore call anything over 1½ fluid ounces of absolute alcohol in twenty-four hours by the term excess.

Shall we then conclude that, whatever may be its real use, alcohol in quantities not exceeding 1½ fluid ounces in twenty-four hours (which is equal to about

* The limit may be 2 fluid ounces, but I think it safer to adopt the lower standard.

1½ pints of beer with five per cent. of alcohol, or half the quantity of French wine containing ten per cent.) does no harm, and may therefore be taken? Or shall we say that as a large quantity undoubtedly does harm, a smaller quantity must be supposed to do so, though the slighter effects elude us? I do not see that ill effects must of necessity follow the use of a small quantity because large amounts are hurtful, and I should have concluded that we have no evidence of harm from moderate quantities of alcohol if it were not for some rather startling statistical evidence.

That teetotallers live much longer than drunkards is admitted by all, but it is also affirmed that they live much longer than moderate drinkers. It is difficult to find classes of abstainers and moderate drinkers which can safely be compared. There are, however, some statistics, read by Mr. Vivian to the British Association at Bristol in 1875, which cannot be passed over.

Mr. Vivian is the Chairman of the United Kingdom Temperance and General Provident Institution,* an office which has two classes of insurers, those who are total abstainers and those who are not. This is believed to be the only difference between the two classes. In the second or general section of insurers no person is admitted who is known to be intemperate, in fact, precautions are taken in this, as in all insurance offices, to exclude persons given to excess, as the tendency to shorten life is well known. We may assume, then, that in this second section we have only moderate drinkers, who represent a respectable sober class of the community.

* The statistics of payments for many years of this office are also greatly in favour of teetotallers. If any one like to see these, he will find an abstract in a foot-note in my "Manual of Hygiene," 4th edit.

The difference in the mortality of these two classes is quite extraordinary. For example, in nine years (1866-74) the calculations of the actuaries showed that 1,110 deaths were expected among the teetotal section, but only 801 deaths took place; therefore 309 teetotallers lived in spite of the calculations which told them they ought to have died. In the general section, on the other hand, in the same nine years, 2,002 deaths were expected, and actually 1,977 took place, or only 25 less than the calculation, which was in fact almost perfectly correct for them.

The difficulty in estimating the value of these figures is our want of knowledge of the amount of alcohol the general section actually took. It may have been much more than the daily 1½ ounces which I have assumed to be moderation, and yet the people may have been called sober. Also, after all, the numbers are small, and we know that great fallacies arise in statistics from the use of small numbers, which have a large range of errors. At present, therefore, I do not think these statistics of Mr. Vivian can give us a practical guide.

Let us pass to another class of facts. When a man who has been a hard drinker becomes a teetotaller he may feel strongly for a time the deprivation of his accustomed drink, but no harm is done to his health. He has taken alcohol for years, yet when he suddenly gives it up he suffers no injury; in fact, he often feels benefit. How is this consistent with the notion that alcohol plays some great and indispensable part in the body?

Again, we find men who have abstained for years enjoying the most perfect health, and we know that whole nations never touch alcohol. It is not necessary, then, for health. Many a man has also told me that the benefit to his health from abstaining was

quite surprising. Against this, however, we must in fairness allow that there are persons who are benefited by alcohol in moderation. I know two gentlemen who were both teetotalers for many years, and who, on returning to alcohol in small quantities, were certain they had benefited by the change; and many other cases could be cited.

But let us take up another class of facts; let us see what alcohol actually does in the body as far as we know, omitting, however, its subtle influences on the blood or on the elimination of carbon and nitrogen, which are not yet perfectly known. In small quantities it is said to increase appetite and to aid digestion. In some persons it really seems to have this power, but not in all, and further inquiry is necessary to substantiate these assertions. When the quantity is very large it destroys appetite.

It quickens the heart's action to the amount of three or five beats per minute, for three hours after it is taken in what I have termed moderate doses; and then the heart beats more slowly than usual to compensate for its previous extra activity. If given in excess, it causes too great action of the heart. It causes dilatation of the small arteries of the skin, and, it is supposed, of all parts. It therefore for a time, by this and by the action on the heart, aids circulation, and for this and for some other properties it is largely employed in medical practice.*

From its action on the circulation (probably) it causes in a tired person a feeling of revival, and

* I think some active teetotallers are making a mistake in trying to stop the use of alcohol in disease before there is sufficient evidence to prove their case. Alcohol evidently has actions which may be useful in disease, and whether they are so must be decided by the only certain method, viz., observation in cases of disease.

enables him to go on with his work ; but this soon passes off, and is often succeeded by increased languor, so that it is best not to use it during manual labour except under special circumstances, when only a sudden violent exertion is demanded. In large quantities short of intoxication it destroys continuous muscular power in a very remarkable way, though a maddened drunken man is capable of great efforts for a time.

Its action on the nervous system appears to be twofold ; it first excites (perhaps merely from the quickening of the circulation), but soon deadens ; and this can be perceived long before obvious drunkenness comes on. In large quantities it lessens sensation so much that it has been in old times employed to deaden pain in operations.* It seems probable that it enters into direct union with the nervous structures, as its effects are so marked in producing disease of this system.

Although it causes a sensation of warmth when taken, this seems to be owing to the dilated vessels and quickened circulation, for no rise of animal temperature follows its use, but, on the contrary, there is rather a decrease. It cannot, therefore, be used to raise temperature, though it may make a shrivelled skin warm by relaxing contracted vessels and letting the blood pass through them more freely.

Without going into disputable points, these seem its obvious actions. Now, with a healthy digestion which does not want aiding (if we admit that we can be thus aided), and with a healthy heart

* In the old time, in the West Indies, when the men were not cared for as they are now, it was the habit in some regiments to take what was called a "mosquito-dram" just before turning in, as it deadened the pain and annoyance produced by the swarms of mosquitoes.

which does not want urging, there seem no useful effects to be anticipated from the use of alcohol in health.*

We should suppose it was not a very important matter whether we took it or not in moderation, and this really accords with the evidence of the ease with which men can leave it off without interfering in the least with their nutrition.

But what, now, should be the conclusion as to the use of alcohol in health after growth is completed? Admitting the impossibility of proving a small quantity to be hurtful, and at the same time acknowledging the dangers of excess, there arises an argument which seems to me somewhat in favour of total abstinence. No man can say when he has passed the boundary which divides safety from harm; he may call himself temperate, and yet may be daily taking a little more than his system can bear, and be gradually causing some tissue to undergo slow degeneration. He may be safe, but he may be on the verge of danger.

This uncertainty, coupled with the difficulty at present of saying what dietetic advantage is gained by using alcohol, seems to me rather to turn the scale in favour of total abstinence instead of moderate drinking. But if any one honestly tries, and finds he is better in health for a little alcohol, let him take it, but he should keep within the boundary-line, viz., that 1½ ounces of pure or absolute alcohol in twenty-four hours form the limit of moderation.† I do not then think he can do himself any harm.

* Some physicians of reputation and accuracy have found that alcohol has a great sustaining power in some diseases, when food cannot be taken, preventing wasting, and maintaining strength and weight. It is most desirable to know if this is true.

† It may be useful to mention again the different quantities of drinks which contain 1½ fluid ounces of pure alcohol.

I would strongly advise him also to take it only with meals, so that it may not act too strongly on the stomach, and be not too rapidly absorbed. And though it cannot be shown that the alcohol is different, it seems wiser to take it in those liquids in which it is formed by fermentation, as good beer or wine, and not by distillation, as in spirits. By this last rule the danger of taking fusel oil, or substances of that hurtful class, is avoided. If beer does not fatten or cause gravel, it is probably better than wine.

In this difficulty of decision, some will be disposed to turn to the New Testament for guidance; but, if I apprehend Christianity aright, we cannot expect this.

Weak table-beer, costing 1s. per gallon, is, if made of malt and hops alone, an excellent drink for those whom beer suits. It contains about 3 per cent. of pure alcohol, and therefore a man might take 50 fluid ounces, or two pints and a half, without exceeding the 1½ fluid ounces of alcohol. The stronger ales and porters contain 5 or more per cent. of alcohol. Adopting 5 per cent. as the most common, 30 fluid ounces, or 1½ pints, would contain 1½ fluid ounces of pure alcohol. Rough cider is about the same, but varies a good deal in strength. The light French clarets and Burgundies, and Rhine wines bought in this country, seldom contain less than 10 per cent. of alcohol, as some spirit is added to preserve them. Consequently, 15 fluid ounces, or three-quarters of a pint, would contain 1½ fluid ounces of alcohol. Ports and sherries, as bought here, contain 20 or more per cent. of pure alcohol; therefore 7½ fluid ounces would contain 1½ fluid ounces of alcohol. But, as in so many cases of ports and sherries, the percentage is 24 or 25, it is safer to let 6 fluid ounces of these strong wines represent the limit of moderation. Spirits contain from 40 to 60 per cent.; taking it at 50, then 3 fluid ounces contain 1½ ounces of pure alcohol. Spirits are dangerous, unless mixed with a large quantity of water. Raw spirits act very injuriously on the lining membrane of the stomach, irritating and inflaming it; also, deleterious substances are often produced during the distillation; as fusel oil. I would strongly advise all to abstain from spirits, and to keep to weak beers and the light wines. It is very desirable, also, as said before, to take the alcoholic drinks only with meals.

We find, as might be anticipated, the strongest expressions against excess, for excess destroys the man's soul and body, corrupts all his moral faculties, and makes him literally a brute, caring for no one but himself. This excess is condemned in abundance of passages, but our Saviour in His teaching, and His followers in their records and writings, went no further by direct precept. Whether alcohol in moderation is good or bad is not stated, because it is a matter of reason and inquiry. In the few texts in which reference is made to its moderate use, it seems to me neither advocated nor condemned (certainly not condemned), any more than any other article in common use at that time as food.*

It is, I conceive, left to us to decide this for ourselves; all we are ordered is, to be temperate—*i. e.* not to exceed—and, beyond that, the reason we are gifted with must guide us.

With regard to tea, coffee, and cocoa, there is really nothing to be said. They are all wholesome, and all useful. The outcry occasionally raised against tea in particular is surprising. Like everything else, it may

* The difference between the narrow teaching of Judaism and the world-wide precepts of Christianity, is well illustrated by this matter of diet. The pig is a foul feeder, and will live on garbage, and, if permitted to do so—as no doubt was the case in Palestine—its flesh is unwholesome. But if fed properly, its flesh is as good as that of the sheep or the ox. Judaism declared the pig unclean, and forbad its use, and was justified in so doing by local facts. But this was a narrow rule, and humanly based perhaps on results arising from ignorant feeding. Christianity does not condemn the flesh of the pig (for this flesh may be perfectly wholesome and useful to men); if its Founder had been a mere man He would have showed in this, as in many other matters of the kind, a knowledge and foresight which, in a peasant brought up in the strict Jewish ritual, would seem impossible.

be taken to excess, and some persons have, no doubt, injured digestion by drinking immoderate quantities of warm tea; but, used properly, it is a gentle excitant, and seems rather to promote digestion. Coffee is a more powerful excitant of the nervous system, and in excess may even produce muscular tremors and other symptoms of poisoning, but in moderation it is highly refreshing, reviving, and allays thirst. Certainly there are some people with very susceptible nervous systems, who cannot take either tea or coffee, but these are exceptional, and cannot be considered quite healthy cases. Good cocoa is an excellent food and fattening.

6. *Exercise.*

The exercise which is essential in order that parts shall grow is equally necessary to keep them in their proper bulk and vigour when grown. It is also essential for the circulation in the organs of the body, and for the due action of some of the great emunctories. For example, as explained in another chapter, the eliminating or discharging functions of both lungs and skin, and, in a lesser degree, of the bowels, are greatly influenced by exercise.

The great fault of our middle classes is, without doubt, a deficiency of muscular labour. The rich classes have their field sports; the lower, their trades, which are often mechanical and muscular; the middle, literary, professional, and trading classes are sedentary. It is no doubt extremely difficult to overcome the inertia of a sedentary life, and to compel oneself to take sufficient exercise. Nothing but a conviction that good health—with all its blessings of happy feelings and energetic work—is impossible without it, can overcome this inertia, or the engrossing calls of a busy occupation. Yet it must be overcome. A friend of

mine, whose occupation obliged him to sit many hours daily, and whose opportunities for exercise were limited, found himself getting out of health, and luckily attributed it to its right cause. He got up one hour earlier every day and went to a gymnasium. In a short time his health was quite re-established; some very threatening symptoms disappeared, and he continued this exercise for years with manifest benefit. Here one single hour's proper work was enough to turn the scale. But three or four hours exercise in the open air is what every man should try to get.

When a man has been accustomed during the period of growth to a good deal of exercise, he ought not to give it up when he becomes a man. There is often a disposition after forty to lessen exercise, which must not be indulged.

As to the kind of exercise, a man who is in constant work, and whose muscles, lungs, and heart are all in order, can do the work extremely fast without injury. Yet when he has passed fifty years of age he will do well, while keeping up his exercise, to avoid great rapidity and all overstrains. If a man lives a sedentary life, when he takes any exercise he should remember that he is in the same condition as the half-grown youth; his muscles cannot be in efficient working order, and he should make no violent exertions at first, but let the movements be gentle, and with rests. It is much better to give a little longer time to it, and to do the work slowly. For a sedentary man, riding has always been considered to be one of the best exercises. It exercises many muscles, and the lungs are specially acted on by the movement through the air. But if he cannot do this, nor attend a gymnasium, he should use light dumb-bells, as well as out-door exercise.

Should the daily amount of exercise which is found

to be sufficient to keep the health perfect, and the body at equal weight, be continued during the whole of this period up to fifty-five or sixty years of age? I believe it should always be, with the proviso that as years advance, violent and sudden exertions should be lessened and at last avoided. We see that men who are accustomed to constant exercise retain the size and power of muscles quite up to sixty or even beyond it; they have not perhaps the endurance of younger men, but they can do their work. There are many agricultural labourers whose work is slow, who feel little diminution of strength until they approach even seventy years.

There is a rule as old as Hippocrates, and a very valuable one; it is, that after very violent and long-continued exertion, the next meal should be an extremely light and digestible one; nervous power appears to be for the time exhausted by the exercise, and the digestive power is lessened. I am certain this is a very important rule. In continuous exertion carried on for many hours (ten or twelve, as in long marches of troops, or heavy manual labour), light digestible food should be given every four hours, but not be great in quantity.

7. *Personal Habits.*

The various mechanisms of the body use up a certain amount of material, which is then effete, and is got rid of by four ways: by the lungs, the skin, the bowels, and the kidneys. As already often intimated, the weight of all the substances passing off by these channels in a healthy man, is precisely equal to that of the food and drink and air which passes into the body by the stomach and lungs. If these channels do not act, but less passes out than should do, and if the entry remains the same, the body must get out of

health; something is kept in which ought to pass out. It is then of great moment to keep these great eliminating organs, as they are called, in good working order. How is this to be done?

The lungs discharge carbonic acid and water; they are kept in order by muscular exercise. When we are perfectly quiet and lie down, the lungs act only slightly; their discharge of carbonic acid sinks to a small amount. Preserve this attitude during a whole day and the amount of carbon got rid of is far below what it should be. But rise from this recumbent position and stand upright; that single simple exertion increases at once, though slightly, the passage of carbonic acid from the lungs; walk at the rate of a mile an hour, the out-flow is still greater, it is in fact nearly doubled; walk two miles an hour, the passage outwards still largely increases; run, and it still increases; work hard for hours and the carbon will be eliminated or got rid of by breathing in very large amount. Hence, when we work hard we want more food; and especially food containing carbon in large proportions, as in fat and starches. The water from the lungs is also increased by exercise.

When the lungs are little used, as in a sedentary life, we can see that if carbon is introduced with the food in a large amount, and is not eliminated by the lungs, it must remain in the body in the form of fat, as no other organ can perfectly take up the work of the lungs. Hence the reason why it is said, in a former page, that a man getting fat without increase of food has less play of his lungs than he should have; they are not doing their work.

In addition, then, to all the other effects of exercise it does this for us—viz., it aids the discharging action, if that term may be permitted, of the lungs.

The same may be said of the skin; muscular exertion causes the vessels of the skin to be fuller of blood, and increases the perspiration greatly. As with the lungs, a sedentary life prevents perfect action of the skin, and throws more work on the kidneys. But the skin, unlike the lungs, can also be acted on directly in two great ways—viz., by washing and friction. Perfect cleanliness and action of the skin can be thus secured. The body should be washed all over daily, and if the health will bear it, in cold water; for this is strengthening and preservative against chills, as it hardens the nerves. Hot water is relaxing, and also produces a sensitiveness to cold, but yet largely increases the action of the skin. Swimming, which both washes and exercises, should be encouraged as much as possible. The Turkish bath is extremely cleansing, and also very useful in rheumatic conditions. It is well, however, always to have the cold plunge or douche afterwards.

The cleanest nation in the history of the world, was probably the Roman people in their best days. It would be interesting to know what led the Romans to give such care to the skin as is shown in their enormous baths, not only in Rome, but in all the provincial cities; and in their large supply of water, which in Rome was nearly eight times as much per head as in modern London, and six times more than in Glasgow. They made also great use of friction and shampooing.

Probably it was their gymnastic exercises (established first as a military training, and which led to the splendid physique of the Roman soldier) which caused them to see the importance of cleanliness of the skin, in relation to its action as an eliminator of water during great exertion.

The kidneys are not so much under control, but

whenever reddish deposits occur which are not to be accounted for by heat of air, and great perspiration or great exercise, it is an excellent plan to drink more water; barley water or linseed tea, or weak lemonade, or simple water taken to the extent of half a pint to a pint and a half in twenty-four hours additional, will clear away these deposits. It may be said, indeed, that taking diluents in this way is a good thing occasionally for the kidneys.

The action of the bowels has been already alluded to (page 32). I would only add to what is said there, that as age advances the bowels become naturally a little sluggish. Most physicians consider that, in persons approaching to or past middle life, if the bowels are sluggish they should be aided a little. I believe this is correct, but it should be by the most gentle means. Strong aperient medicine soon weakens digestion; it is better to take very feeble medicine more frequently, than strongly-acting agents from time to time. But better still are the natural slight aperient waters, as they influence the kidneys also if these are not fully acting. The use of injections is very widely spread, and has no doubt some advantages, especially in saving the stomach and upper bowels from irritation by medicine. But if used, the quantity of fluid thrown up should be as small as it can be to be effectual.

As formerly mentioned, regular exercise of the abdominal muscles will often keep everything right and prevent any trouble.

Besides the care of these four so-called eliminating organs, attention has to be paid to the hair and teeth.* With regard to the hair, it is of the highest moment

* See p. 31 for some remarks on the necessity of great cleanliness of the teeth if they are to last long.

not to use any dyes with lead. Lead is so easily detected by simple chemical methods, that the buyer of a hair-dye ought at once to assure himself of the absence of this metal, which has caused several cases of lead paralysis by being used as a hair-dye. Mercury is also a dangerous dye. Some of the other metals are less so, but on the whole it would be much better if people would let time assert its natural sway, and not seek to disguise its inroads on the hair.

In the case of artificial teeth, which are of high importance to health as aiding mastication, it should be seen that no preparation of mercury, such as vermilion, is used in colouring the india-rubber framework now so commonly used. Several cases of injury from local mercurial poisoning have been recorded of late years from the red frames used to imitate the gums.

8. *Clothing.*

In the period of growth I have recommended that as a rule the clothing should not be too warm, and I believe this is a good rule for early manhood. But at forty to fifty years of age, and particularly if there are any slight rheumatic or bronchitic attacks, it is necessary to clothe more warmly, especially as respects the under garments. Flannel next the skin, and especially worn thickly over the abdomen, is desirable; and especially if the secretion of the kidneys seems liable to get out of order. Some men get very susceptible of cold, and should clothe very warmly as middle life advances, both by night and day. But of course there is much individual peculiarity, and no general rules can be laid down.

9. *Sleep.*

All writers on health notice the importance of sound sleep; how is this to be procured? and how

much should be taken? Nothing will ever secure good sleep but good digestion; if digestion is disturbed, or if healthy it is still active on going to bed, sleep may be heavy but will not be refreshing. Three hours should pass after a good meal before going to bed. So also, if possible, the mind should not be excited nor too active before going to bed, and every student knows that when he is engrossed with any subject, it is useful to turn the thoughts in another channel for half an hour before rest. An active, well-spent day, and taking only light digestible food in the last part of it, will secure good sleep, and there is no other possible rule or advice.* As to the time, there are great individual differences. Some authors say not less than six or more than eight hours, and this may do as a rule, yet some men require only five, and some nine. But if a man requires nine hours, it is generally because he is rather weakly. Some men require very little; a remarkable instance is that of Sir George A. Elliot (afterwards Lord Heathfield), who commanded in the great siege of Gibraltar; it is said that during the whole siege, and it lasted nearly four years, he never slept more than four hours in the twenty-four.†

* The custom of taking spirits just before going to bed is a very bad one; no doubt it aids sleep, but it is artificial sleep, like that from chloral, and leads eventually to enlargement of the organs, and to gout.

† This great soldier was remarkable in other ways; he was a water drinker and a vegetarian, and very sparing in his diet, but very hale, and took constant exercise. He lived to eighty-four years of age. At one time, when provisions were running very short in Gibraltar, he tried on how small a quantity of food he could live, and the historian of the siege (Drinkwater) informs us that for eight days he actually lived on 4 ounces of rice a day.

10. *Serenity of Mind, Good Temper, Cheerfulness, Hope.*

All writers on health and longevity lay great stress on an even, cheerful temperament, and strongly counsel all to cultivate such a frame of mind. Unfortunately, while it is easy to give the precept, it is difficult to enforce the practice. Certainly cultivation of such a temper is possible, as indeed everything is possible to education; but it is to be feared few will set themselves seriously to work. Yet it is no doubt very important to health, as the "passions of the mind" often play havoc with the corporeal frame. A good digestion is a great aid to cheerfulness, and therefore, if a man keeps that in good order he has done something to this end. Very frequently some little digestive disturbance, some blocked-up duct is at the bottom of much ill-temper, and we know that vast issues have occasionally been decided by an attack of indigestion. Disturbed bodily health influencing temper, indeed, plays no small share even in the conduct of empires and the chances of war. And, to pass to smaller matters, every man must be conscious that when an affair of importance has to be looked at in all its bearings it must be regarded after dinner as well as before, and in the morning as well as in the evening. The stomach to a large extent rules here as in other matters.

I have been forcibly struck with the fact that in some people alcoholic liquids, or, I should rather say, spirits—for I have chiefly noticed it with them—produce a kind of irritation of the nerves, which puts men out of temper.

It is often said that, whatever men may do in a more natural state of society (whatever that may be), in our present condition of struggle and worry a man

requires wine to enable him to bear the ills of life. But in my passage through life, as far as I have been able to see, it is certainly the temperate men, who are most even-tempered, and seem best able to bear "the slings and arrows of outrageous fortune."

However this may be, if a man wishes to find an additional reason why he should cultivate equability of temper and serenity of mind, he may find it in the thought that all writers, from Hippocrates and Galen downwards, have considered those qualities as very favourable to longevity.

CHAPTER IV.

OLD AGE.

Friar Bacon wrote a book called the "Cure of Old Age"; but he neither succeeded in curing himself nor anybody else since his time. It is, indeed, a malady which is incurable, but will be best endured by those who have previously most carefully cultivated health.* Old age sick and peevish, incapable of exertion, yet fretful of inaction, a burden to itself and a trial to others, is indeed a gloomy thing to see, and may well make young men dread the passage of time. Yet, happily, there is an old age different from this—an age of health and even of activity, when the body may be getting feebler, but the mind is even brighter and clearer than of old; and when the moral powers cultivated through life assume a completeness and

* "Though I look old yet I am strong and lusty,
For in my youth I never did apply
Hot and rebellious liquors in my blood;

almost a perfection, which seems to make the dreary creed that such faculties are to be annihilated at death, and are thus cultivated merely to be obliterated, an empty dream. Such an old age I have known, and found it beautiful and dignified, and a worthy crown to a life of beneficent and unselfish activity.*

There have not, indeed, been wanting those who have contended that old age is the happiest time; the turbulent passions of youth are over then, and a juster and calmer view is taken of the struggles of life; the keenness of feeling is blunted, and it is more clearly seen that compensations occur, making the "crooked ways straight and the rough places smooth," and dimly showing us that among the strange perplexities of life the hand of a Higher Power must be guiding the world.

> "Nor did I with unblushful forehead woo
> The means of weakness and debility;
> Therefore my age is as a lusty winter,
> Frosty but kindly."
>
> *As You Like It*, Act II. Scene 3.

Old age may be said to commence at sixty, with some a little earlier, with others later, and in some exceptional constitutions a man may reach midway between sixty and seventy and yet be not entitled to admission to the ranks of the really old. Healthy old age is a gradual process; it begins with a slow lessening of the various internal changes in the body; the senses and the several organs gradually get

* I cannot resist the desire of saying that the beautiful old age referred to was that I witnessed in Sir James Clark, late Physician to Her Majesty the Queen; a man of singular moral power, and of very balanced and even mind; in character most lovable; the incarnation of beneficence and affection. He lived to nearly eighty, and was active and useful to the last.

feebler; the lungs are less permeable; their air-cells enlarge and the breathing power slowly lessens; the heart is less strong, and beats slower; the stomach is less capable of digestion, and the liver and the eliminating organs are not so effective. The only part which may not suffer is the mind, for, curiously enough, when properly used, this often remains active when the rest of the body is decrepit.

Gradually, as these changes occur, the man feels he is getting old; he eats less; gets thinner, which is natural and healthy; and when age has fairly advanced upon him his very height lessens, and he becomes shorter than in youth.

What, now, shall a man do who at sixty or sixty-five feels that at last the hand of age has touched him, however slightly? First of all, shall he relax his mental and his bodily activity; shall he withdraw more or less from occupation; or continue as before? As to mental activity, we have abundant evidence that the more the mind is exercised the longer it lasts; and, indeed, this continuance of mental power is the real compensation for the declining bodily strength. The full powers of the mind can be preserved to the most advanced ages. Harvey, the discoverer of the circulation of the blood, tells us that, though much more than seventy years of age and sorely failing in bodily strength, he yet found his mind still so vigorous that he prosecuted profound studies on an obscure physiological subject and found in them solace and balm for grievous public and private calamities.

The great Swedish chemist Berzelius, who may be said to have passed a very long and laborious life in constant work in the laboratory, corrected with perfect knowledge and accuracy the proof-sheets of chemical investigations a few hours before his death. In our own time we have seen the great Chancellor

Lyndhurst, when nearly ninety years of age, address the House of Lords with a logic and power of argument which astonished all who heard him. The wonderful mental energy of his rival, Lord Brougham, lasted almost as long. I might cite the case of another judge now living, whose advanced age has only seemed to render his judgments more powerful and more searching.

In the stormy and exciting world of politics—which might be supposed less favourable than the calmer realms of science and law—we have seen in our own day men of a great age, even in a revolutionary period, successfully facing, with tact and quite youthful versatility, the heaving masses of the wild democracy; or guiding the difficult party government of England with a hand from which age has taken nothing of its cunning. It is true these are giant intellects; but the process is the same for the small as for the great; the steel is sharpened by use, no matter if it be a sword or a dagger. Let the mind then work on, and even when the body is greatly failing it will retain much of its vigour, and all its clearness.

The only caution here is, that the old man, when he has reached seventy years, let us say, should never strain his mind; there may be insidious structural changes, and if he feels that his mental power is really failing, and that a great effort is necessary to enable him to do what a few years before he could have done with ease, he should desist. He must then accept the inevitable lot, and work up only to the borders of comfort.

Some have supposed emotional actions of the mind are bad for old men; but age deadens the sense of emotion so much that it may be questioned if this is correct.

Some writers have taken a different view from that here advocated, and advise old people to give up all active and engrossing mental work, on the ground that the brain is not really capable of work, and will be injured by an attempt to make it act as in the days of manhood. But it seems to me that the evidence is much against this view.

With regard to bodily activity, however, the case is somewhat different. A man, as age creeps on, should certainly try and preserve his bodily activity as long as he can by judicious exercise, but he should do it with caution. "An old man," it has been well said, "is a tower undermined." He cannot ensure that all his organs are sound. He should avoid, then, sudden and rapid exertion; exercise should be abundant, but should be gentle. A man of sixty may ascend an Alp, but he should carefully train himself first of all. Let him do what he can to keep his muscles and his lungs and heart in good action; but let him remember that they cannot have the structural perfection of his youthful days. He should avoid excessive rapidity, and extremely long continuance of labour without rest and food. With regard to different kinds of bodily exercise several writers on health have strongly recommended garden or light agricultural work for men past seventy; it is, in fact, a very good exercise, as it calls into play the muscles of the abdomen and back, which in old men are often but little used, and the work is so varied that no muscle is long in action. It has the great advantage also of keeping a man in the open air. After the age of sixty-five gymnastics, and even dumb-bells, unless very light, can hardly be recommended, but riding and walking should be kept up.

The advice to exercise the mind, as long as the effort is well borne, may be considered to be, in the

case of many men, equivalent to saying that they should go on with their business, whatever that may be; but to do so may be too much for their bodily strength, and there must be a compromise between the two. This may occasionally be the case, but it strikes me as unlikely to be common. In the most laborious trades there is least exercise of the mind, and when a man's strength does not permit him to continue any longer at his work, his mind is not likely to be much less exercised than it was before. At any rate, the rule may, I think, be laid down that a man should keep at his business, whatever that may be, as the best means of preserving his mind in good activity, until he receives a decided notice from either mind or body that a change is necessary. No doubt a man is not always a good judge of his own condition. Every one has heard the story of the professor who at sixty wanted to retire from teaching, as he thought his powers were failing, but his friends thought otherwise, and persuaded him to continue. When he reached seventy years the position was reversed; his friends wanted him to retire, but he now saw no failure, and desired to remain. This was certainly unfortunate, but in spite of an occasional "veteran lagging superfluous on the stage," it will, I feel sure, be for the interests of the larger number of old people to continue to be active in mind as long as possible, and naturally in most cases this can only be in the same direction as that in which the mind has been previously exercised.

The old man has neither the appetite nor the power of digestion of his manhood, and the attempt to make him eat largely in order to keep up his strength is a dangerous plan. Gradually, from vigorous youth downwards, the internal changes in the body become less

active; the lungs of an old man absorb less oxygen; his blood carries that oxygen less quickly; the nerves which govern nutrition and the great glands are all feebler; the eliminating organs act less largely and perfectly. To this lower change of vital changes his food must be accommodated.

I would not advise even here that the dictates of appetite should be neglected. If an old man has a good appetite, and can digest well, and is in good health, he should continue to eat as his appetite counsels. But, as a rule, the healthiest old people are the rather spare eaters. Some writers have, indeed, advised that all old people should place themselves on an extremely rigid diet, so that there can never be introduced into the body any superfluity which the organs of the body are not able to deal with. It is, in fact, certain that some of the evils of old age are owing to more food and liquid passing in than the emunctory organs can get rid of. Hence arise indigestions, bowel troubles, gouty affections, some skin diseases, and general discomfort of feeling, all of which can be removed at once by lessening the diet. The extent to which some old men have reduced their food with great benefit is very remarkable, and gives us facts or hints which ought not to be forgotten. There is no reason to doubt the truth of the autobiography of Louis Cornaro, a Venetian gentleman of the 17th century, who, after a wild and turbulent youth which destroyed his health, restored himself after the age of forty to perfect health by a most rigid diet. The amount of food was regularly weighed and measured for nearly sixty years, and amounted daily to 12 ounces of solid food and 14 ounces of wine. The solid food consisted of bread, meat, yolk of egg, and the wine, no doubt, was the usual weak domestic wine of northern Italy, where he lived

(Padua). He wrote his book when he was eighty-three, and lived on this frugal fare till he was nearly one hundred years old, and enjoyed excellent health; his wife, who was, it is presumed, subjected to much the same dietary, lived almost as long.* At eighty-three Cornaro rode on horseback, and could go up hills on foot, and all his senses were perfect.

Another case, though not so extraordinary, was that of a far greater man, John Wesley, who practised all his life extraordinary temperance, and after reading Dr. Cheyne's work† on "Health," became a spare

* Yet Cornaro's strict plan did not answer quite so well in the case of his translator into Latin, the Jesuit Lepsius, who followed his rule, but lived only to seventy-nine, and laboured under many disorders. The advocates of matrimony may say that it was because he was not married, for married men have a longer life than unmarried on the average. A translation of Cornaro's treatise from Italian into English was made by George Herbert, and published with his works.

† Dr. Cheyne, to whom Wesley alludes in his journal, was a physician, who, at a comparatively early stage, became extremely corpulent and gouty; in order to get out of his carriage the whole side was made to open. He reduced himself to a manageable size, and secured much better health by greatly lessening the amount of food. In the reduction of corpulence an extremely spare diet has been often used. A more striking case even than Mr. Banting's is that of Thomas Wood, an Essex miller, whose case was described by Sir George Baker in the last century to the College of Physicians. At the age of forty-four Mr. Wood had become enormously stout, from intemperance in beer, and from eating to excess of fat meat and large quantities of butter and cheese three times a day. He then commenced a spare diet, and lived for nearly eighteen years on a daily pudding made of one pound of the flour from which the coarse kind of sea biscuits was made, with three pints of milk and two eggs. The weight of this pudding when boiled was 3 pounds, of which he took half at his breakfast at 4 or 5 o'clock in the morning, and half at dinner. He took no other food, and for nearly seventeen years took no fluid but that in the pudding. He took, of course, no alcohol, but much exercise. Under this regimen he lost, it is believed (for he

eater and drank only water. His constant travelling in order to preach the Gospel also added to his health; and though he was very weakly in youth, and suffered from several severe illnesses, he travelled when he was seventy-three years of age about 4,000 miles every year (which in those days of bad roads and horse travelling was very good), and felt himself better able to preach than at twenty-three. He had that extraordinary power of sleeping at once if he wished to do so, which some few men have possessed. At eighty-two years of age he tells us he felt as fit for exercise of mind and body as he had been forty years before. He died at eighty-eight, retaining his health until within a few days of his death.

Sir John Sinclair, in his "Code of Health" (p. 168), says, "A respectable magistrate (the late Alderman Watson), who at the age of seventy was free from every bodily complaint, informed the author that he had never paid five shillings a year to the faculty in the course of his life, which he attributed to his having restricted himself to 14 ounces a day of solid food."

would never weigh), 10 or 11 stone in weight; his health became perfect, and he had no gravel, which before had much troubled him. A few days before his death (which occurred at the age of sixty-four from inflammation arising from exposure to cold) he had ridden sixty miles on horseback without any sense of fatigue. I must observe, however, that Mr. Wood's diet, though no doubt very small compared to what he had been accustomed to take, was not deficient in quantity. Thus, supposing his flour contained twelve per cent. of water, his milk twelve per cent. of solids, and that his two eggs weighed 4 ounces, and had ten per cent. of shell and seventy-three per cent. of water, he must have had daily nearly 21 ounces of water-free or quite solid food. Now the standard for a healthy male adult is only 23 ounces of water-free food, so that he was really eating nearly as much as his neighbours. His diet was certainly economical. Taking the present higher prices, his flour would cost 3d., his milk 6d., the eggs 2d., and the total daily cost would be 11d., and he did very hard work on this, and had perfect health.

The case of "Old Parr" may also be cited as an instance of long life, not with very small, but with very simple diet. He was supposed to be 152 years old, and was brought up to London to see Charles I., where he died. In our time this great age is very much doubted, as I believe the evidence on which it was chiefly based—viz., the existence of three leases of some land, each of thirty years—is not considered good. But, whatever may have been his exact age, there is no doubt he was extremely old, as he lived all his life in one place, and there were old people who had seen him old when they were young. We may, I think, safely say that he was a centenarian, at any rate. He died in London, and was dissected by the great Dr. Harvey, the discoverer of the circulation of the blood, by command of the king. Harvey appears to have been much interested about him, and did not apparently doubt his great age. He says that Parr's "ordinary diet consisted of sub-rancid cheese and milk in every form, coarse and hard bread, and small drink, generally sour whey." When he was brought to London he was tempted to eat more than customary, and also, Harvey says, to partake of strong drink. It was also thought that the air of London was hurtful to his lungs, which had been accustomed to the pure keen air of Shropshire.

I would never recommend any old man of seventy to copy Cornaro's diet, and to weigh out twelve ounces of solid food every day,—but, on the contrary, I advise him to consult his appetite and digestive power. He should however watch the effect on his feelings, digestion, and weight, and should limit himself to that amount of food which seems to secure him perfect health. If he suffers at all from indigestion, gout, or gravel, he should lessen the amount of food, and make it chiefly farinaceous and milky.

What kind of food should an old man of seventy take? Of course, whatever kind it may be, it must be as well cooked and as digestible as possible. If meat seems to suit, it seems likely that very tender meat and the yolk of eggs are as good as anything. But some old men seem better without meat. Of the vegetable foods which then come in to supply, or partially supply, the place of meat, I think rice is one of the best for an old man. Its starch grains are very digestible, and it supplies nitrogen in moderate amount, well fitted to the worn and slowly-repaired tissues of the aged. Rice, eggs, milk, bread, and fruits fresh and dry (as they have a rather laxative effect, which is beneficial) are appropriate foods for the very old. Cod-liver oil in small doses (half-teaspoonful to a teaspoonful or more twice daily) has been often tried with very old men who were becoming too thin, and with very excellent results. It is a remedy which should be much more used for the very old than it is. If there is any tendency to gravel, meat should be given up altogether.

Sugar seems to suit some old men; in other cases it does not, as there seems sometimes a little tendency to a saccharine condition of the water (what is called diabetes).

An old man's meals should not be too far apart, but he should take little each time. The attempt to feed up old people by frequent and large meals is hardly ever successful, and sometimes dangerous.

A curious question arises with reference to advanced age—viz., over seventy: Is it well to limit the amount of liquid drink? The reason for this question is, that in old men both skin and kidneys act less perfectly, and water less easily passes through them. If much water is taken, it is not easily got rid of. I believe, in fact, that it is really desirable not to take a very

large quantity of liquid, but yet not to limit it if there is a wish for it. No theories of ours are of value against an indication of Nature. It was said by Galen, and the question is still undecided, that milk does not suit some old men ; if so, it may be because the amount of water in milk is so large, and they do not get rid of it, while in the young the water-pouring out organs are so active as to make it necessary to supply much water.

Should old men take wine or beer? That they should not take spirits, I think, is certain ; but is wine in moderation desirable? I do not know of any sufficient collection of good facts on this point. My own experience has been limited, but it is in favour of a small quantity of good, light wine, with a moderate per-centage (eight or ten) of alcohol. The effect on digestion seems good, and possibly the alcohol may relax a little the small vessels, which are always more or less disposed to rigidity in old people. Yet there is no doubt that many water-drinkers of great age, as in the case of Wesley, never felt the want of wine.

Sir John Sinclair, in his treatise on "Health and Longevity," mentions that a friend of his—Baron Voght, of Hamburg—retained at eighty years of age the full powers of his mind, and worked ten hours a day. He attributed his extraordinary health "to living on vegetables and drinking nothing but water."

Spirits, I believe, are hurtful even when largely diluted ; and I question whether beer, or at any rate, the stronger ales, suit an old man's digestion. Yet some writers have made a contrary observation, and thought good beer suited better than wine. There may be, therefore, individual peculiarities. In any case, however, extreme moderation must be used.

It need scarcely be said that an old man's food

should be most carefully cooked; that every fibre should be as soft as possible, as there is little mastication, even with artificial teeth. So, also, the diet should not be suddenly much altered in any way, either in amount or kind. There is not much power of accommodation in old age.

An old man must clothe warmly. After the age of sixty, any idea of hardihood and of facing weather must be laid aside; neither the skin nor the lungs bear cold. Cold is, in fact, the great enemy of old people, and it is a fact that if a man of sixty or sixty-five goes to a warmer climate than that to which he has been accustomed, his life is prolonged. Warm flannel clothes should be worn next the skin day and night, and there should be plenty of winter garments. If there is the least tendency to asthma or attacks of bronchitis, two or three folds of a silk or woollen handkerchief should be worn over the mouth, and, if the weather be very cold, over the nose also. Rooms, also, must be kept warm, for the animal heat in the man past seventy is often deficient, and in very old people even drinks should be taken warm, as the sources of animal heat are being dried up. Old people will often like rooms kept at a temperature of 70° or higher, when younger people are half-stifled.

The absence of sleep is often a trouble to the aged, but it is best not to remove this by medicine. Even chloral, which is the best of the sleep-giving medicines, is dangerous when continued. Opium is almost as dangerous for very old people as for children. Lessened sleep is natural to an old man, and the only way that he can safely encourage sleep is by taking as much exercise as possible, by not sleeping in the day, and by not going to bed too soon, as it is in the early morning that the old are most wakeful.

With regard to personal cares, cleanliness of the skin is as important as ever, and perhaps more so, as the scales of the skin do not so readily detach themselves. There should be frequent complete washings with warm water. Warm salt water is particularly good, if a man can get it, as it stimulates the skin. The flesh-brush or a rough towel should be much used, for the skin of the aged requires a good deal of friction. If a man can afford it, shampooing is very good for skin, muscles, and joints.

If any gravel is in the water, the solid food should be lessened, and the liquid a little increased. Aged men are subject to several troubles which cannot be here described; but, happily, surgical knowledge is now so far advanced that much greater comfort can be given than formerly.

The condition of the bowels is frequently a source of trouble; the muscular fibres are feeble, and the fluids deficient in quantity. It seems certain that some gentle but frequent aperient pills are generally necessary, and are better than any other plan. Rhubarb is considered the best drug, and two or three grain doses of extract of rhubarb, with perhaps, if necessary, a grain of colocynth pill, and one of extract of aloes, will be found effectual. A simple pill of this kind, taken every night or every other night, as late as possible, when digestion is completed, will often secure what is wanted. If not, it is better to try the effect of small doses of castor oil than to resort to stronger medicines. The saline aperient waters are also useful, but are rather more weakening. Injections of warm water are often necessary, especially if there be piles.

Various cordials have been proposed for very old people (past eighty for example), which are made of aromatic vegetable stimulants. Red lavender, carda-

moms, saffron, cloves, peppermint, rosemary (this last in particular being very celebrated in the Middle Ages), and many others have been tried. Musk has been also used, alcohol, ether, and other substances of that kind have been employed ; and in the Middle Ages the alchemists had a preparation called the "Secret Spirit of the Adepts," much used in gout, dropsy, and malarious fevers, and thought to have been chiefly composed of acetone, a very light inflammable substance, allied to the alcohols, and obtained by the destructive distillation of acetic acid, or of sugar or starch with quicklime. But none of these nostrums are really efficacious in old age, and it is best to trust to diet and regimen. Good cooked food in moderate quantity, careful cleansing of the skin, attention to the bowels, and as much gentle exercise as can be borne in the open air, must always be the great measures for ensuring comfort in extreme age.

In reading these remarks on old age, it may occur to some that I have been chiefly thinking of my own sex, and have not referred to the fairer part of the creation. But the rules appear to be the same for both. There is one curious point in reference to the sexes, which, though seen in the most recent statistical inquiries, was also observed in the last century. Life tables show that women live on an average longer than men, at all ages, even during the period of maternity, when they are exposed to more risks. Dr. Farr's life table tells us that at twenty years of age a woman's mean after-lifetime is 40·29 years ; a man's is only 39·48 years, and this superiority is manifested throughout life.

At sixty years of age a man's mean after-lifetime is 13·53 years, a woman's 14·34 ; at seventy the respective numbers are 8·45 and 9·02 years; at eighty,

the numbers are 4·93 and 5·26 years; and at ninety, they are 2·84 and 3·01 years. Now, why have women this longer life? Is it from something in the struggle of life which acts more hurtfully on men? or is it that women lead, on the whole, more temperate and well-regulated lives than men? This difference is really an important point, and I do not venture on a decided answer; but I incline to the view that the second solution will be found to be the true one. At any rate we may congratulate the fair sex on their superiority in this, as in so many other matters.

CHAPTER V.

WILL MEN FOLLOW THE RULES OF HEALTH?

In reading this book the thought is sure to present itself, that the principle of many of the recommendations is really contained in the Gospel rule—"Be temperate in all things."

And this is perfectly true, for this precept expresses in the most complete way the real foundations of health.

It may, however, be objected that the precept has had little effect on the mass of Christian nations; and that advice based on it is likely to be equally useless. We demand from men, it may be said, more than they will give us, perhaps more than they can; for to govern appetite, to restrain passion, and to exercise a constant judgment on the conditions around, is what we can expect from very few. All advice then, all proof even, of the good which follows the course recommended, is like throwing a stone into deep water; a little commotion may be caused at first, but the divided waters close again and the stone remains for ever at the bottom, inactive and inert.

What, then, is the good of laying down rules which the bulk of the people never have followed and never will?

It must be confessed that it is disheartening to see how little the great mass of men advance from age to age in this respect, but still, Have we gone the right way to work? This phrase, "be temperate in all things," is not really comprehensible without education and special knowledge of its full meaning. Surely, when it is seen that in it are involved the best interests of humanity—the decrease of sickness; the growth of cheerfulness, contentment, and happiness; the enlargement of mental powers, and the gradual perfection of the moral qualities (to train which is surely the object of our being here)—men will strive to carry it out. May we not receive it as a sure principle that, when men are once convinced that a certain course will bring them a material good, they will eventually pursue that course; and if once the principles of health can become implanted and taught to each generation, the tendency to follow the guidance of those principles will grow by transmission and inheritance? It cannot be contended that even our educated classes are sufficiently acquainted with the structure and formation of their bodies to perfectly realize the full meaning and importance of this precept, and among the uneducated class the injury done by deviations from the laws of health is incomprehensible to them.

It may take time, and several generations must clearly pass before men see that the Gospel precepts have their base deep in the needs of human life; but when that knowledge is acquired, it surely cannot be fruitless.

The amount of physiological knowledge which it would be necessary for a young man or woman to have, in order to see the importance of the rules of health, is very small. It is obviously impossible to

teach the bulk of the people technical physiology; nor even may it be possible to make universally known even the excellent little popular manuals of physiology which are beginning to be used in some schools. But it is quite easy to teach certain parts; the structure of the heart and its valves, and the marvellous pumping power which sends the blood racing through the body; the action of the lungs, contracting and dilating and sucking in the air; the passage of this air into the blood, and the changes it produces; the structure of the stomach, and how it digests the food, and how this is prepared by subtle chemical means to be fit to be added to the blood; the action of some of the muscles, showing the wonderful arrangements for securing the greatest force and speed at the cheapest rate; the structure of the eye, &c.;—all these points could be learnt in a few days, and if properly illustrated by a few models, the teaching would be interesting to every mind, and would give a general but clear view of the wonderful mechanism of the human body. So much physiology being learnt, the reason of the rules of health; the necessity of breathing pure air, and enough of it; of not deranging the great process of digestion by improper food; the use of exercise, &c., would be clearer, and at last, all would learn to treat their bodies with the respect and care which is essential. Then the deep meaning of moderation in all things would be seen, and men would not look upon the precept as a mere command based on no particular grounds, but as a rule founded on a deep knowledge of what is essential for man's welfare.

It would be also most desirable that the people at large should know something of the history of the so-called epidemic diseases which prevail in this country, and cause yearly a large number of deaths.

The State is doing all it can to lessen these diseases, but the intelligent co-operation of the people at large is necessary.

Take for example, small-pox. There are some persons in this country who try to refuse the protection of vaccination, and resist the law. Such persons simply do not know the history of small-pox and vaccination; if they did, they could never for a moment dream of opposing one of the most beneficent triumphs of science.

So important does this matter seem to me, that I shall venture to digress for a short space, and to give a brief history of what some of these diseases are, and how they spread, and why every one must help in stopping their spread.

Small-pox is now so seldom seen, that there must be millions of people who have no true idea of it, and do not know its history. It is, in my opinion, the most frightful malady which afflicts us. To see a bad case of small-pox; the thick crust of eruption masking the entire face and head; the swollen, distorted features which make the person unrecognizable; the closed eyes, half-glued together by matter; and the swollen, open, dribbling mouth; the swollen, nerveless, shaking hand, all form a sight never to be forgotten; and whoever has seen this can see, except leprosy, few things more loathsome. And when it is also found that this disease is in the highest degree contagious, and is caught most readily from person to person, nothing is wanting to give it the first rank in the horrible incidents of life.

One hundred and fifty years ago this disease was so common in England that the fear of it weighed upon the hearts of all; it was a constant dread. The young beauty looking in her glass may have seen

there the complexion of the dawn, but in her mind's eye she saw also a scarred, hideous face, which made her shudder. The young strong man knew that he might at any time rise from his sick bed, not merely scarred, but sightless and deaf, and perhaps weakened and feeble for life.

The number of persons blinded by small-pox in one or both eyes was large, and the scarred persons were still more numerous. In some of the rural districts a state of things occasionally occurred which reminds us of the stories still sometimes told of the ravages of small-pox among savage tribes. At that time the science of road-making was not known; Macadam was not born; and, especially in the heavy and clayey soils the roads in winter were knee-deep in mud, and almost impassable. Even in summer locomotion was difficult, and was in many parts chiefly on horseback, as carriages were heavy and unwieldy. Consequently, in some rural, secluded villages, the people were quite isolated; men were born, and lived and died, without leaving their parishes, or doing so, without seeing more than once the county town.

In such villages, sometimes, a whole generation would grow up without small-pox; then by some chance it would be introduced; a stranger would pass through and leave the germ, or a servant come home sickening with it, or in some way the peculiar poison would find its way in. Then would ensue a calamity so great that, though on a small scale, it must have been as terrible as any plague. A large part of the population would soon be down with small-pox; all but the most necessary occupations were suspended, care of the sick could hardly be attempted, the suffering was immense, and the means of relief inadequate.

At length, when the storm had gone over, the

survivors, more or less scarred and some blinded, began to take courage again; but it might be years before health was perfectly re-established and all losses made good.

It was, therefore, thought to be a wonderful gain when inoculation of small-pox was proposed. If the body could be well prepared by suitable regimen, if a good time of the year could be chosen, and only a small portion of small-pox poison put into the skin, it was found that very frequently the small-pox ran a mild course, which yet protected against future attacks. This, then, seemed a great step in advance; but a difficulty was soon discovered. Small-pox was largely inoculated, and the majority had the disease slightly; but then they gave the disease in the natural way to others who were not inoculated, and in this way the disease began to acquire a still wider spread, and became even more fatal.

This was a dilemma; and it seemed doubtful what should be done, when Edward Jenner made the wonderful discovery that a disease which affected the cow could be given to man, and when given, ensured him as complete protection from small-pox as an attack of small-pox itself did. And as this disease, which was called cow-pox, was in ninety-nine cases out of one hundred, or in four hundred and ninety-nine out of five hundred, so mild that even infants could have it without danger, a way was suddenly opened, by means of which the most frightful disease which ever afflicted men was robbed of every terror; was, in fact, or might have been, blotted out of the category of human ills.

But if it might have been blotted out, why has it not been so? Although now no one in England fears small-pox, it still exists, and, if vaccination were neglected, would soon be as bad as ever. How is this?

Apparently from two causes; first, the incredible carelessness and apathy of men in neglecting to have vaccination performed on their children. Now, happily, the law compels it; but every instructed citizen should aid the enforcement of the law.

The man who does not have his children vaccinated is creating a danger, not only for them, but for his neighbours; he is committing through carelessness an unjustifiable offence against the community in which he lives, and if that community realized all the facts of the case, it would not tolerate his conduct for a day. But secondly, another, though happily much slighter cause, has impeded vaccination; there are some persons who, from ignorance, or an incredible perversity, refuse for their children the benefits of vaccination on quite foolish grounds—chiefly that it is wrong to give one disease to prevent another, or because in some very rare cases harm may be done.

Why, it is the general practice of vaccination which alone gives them the opportunity of being thus headstrong. Were there no such thing, they, like all the rest, would suffer from small-pox, and would cry to heaven and earth for a remedy.

Here again the common-sense of the community must aid the administration by a sound public opinion being brought to bear on this mischievous fallacy, which would be truly destructive if it were to spread.

Let us take another instance. The most prevalent, and, on the whole, fatal disease of this class now among us, is the so-called typhoid or enteric fever.

Now, this disease is spread by persons swallowing in water or milk, or inhaling into their lungs very small portions of animal substance which has come from the bowels of other men, perhaps of men ill with this fever. Stated in this bare way it seems frightful; but I have purposely thus stated it, that the hideous nature

of the mode of spreading may be seen, and because until it is known by every one this fever will prevail. When once it is seen by all that the disease is really one of want of cleanliness and of defective attention to the disposal of the excreta, typhoid fever will die out. Let it once be clearly proved that it is entirely preventable, and that certain measures can prevent it, and then an educated people will insist on these measures, and will aid in their execution.

Another disease of great fatality is scarlet fever. To stop this disease is one of the problems which most troubles our sanitarians. It is eminently contagious, that is, it spreads from child to child, and no doubt from the scales of the skin, and from the mucus of the mouth and throat, floating in the air and being swallowed by other children. If every case could be at once isolated, the disease could be stopped; but this is quite impossible with our social condition. It only affects a child once in life, as a rule; so that, as it may attack, when there is an outburst, all or many of the children of a district, the place remains free until a fresh generation of children has grown up. Hence, it often returns in cycles of years. It can spread by the scales of the skin floating in the air and being absorbed by milk (for instances have occurred in which the children at a milk-farm having got scarlet fever, many children who used the milk took the disease, no doubt from the poisonous substance falling into the milk). Probably, also, water may carry it. Now what is to be done to arrest this disease? At present no sufficient means have been suggested, and it is a reproach to our skill. The best plan at present suggested is to anoint the skin with a disinfecting oil, so as to prevent the scales of the skin floating into the air. This, however, is only partially successful, and we can only earnestly hope that some Jenner may

suddenly discover an antidote, or some effective measures of prevention.

Measles is another contagious disease; but happily it is less important than scarlet fever, for it is less severe. It is very curious, however, when measles enters a community which has not suffered from it for many years what a fatal disease it may be. In the late American civil war the Army of the Potomac, composed largely of young men from agricultural districts, got measles among them, and, to the astonishment of those who only know it in its mild form, turned out a most severe and fatal disease. So also last year in Fiji, measles was introduced among a population which had never had a case, and caused a large mortality.

Happily, in England it is mild, and seems almost dying out, for we know no means of prevention except isolation, which can only be partially applied. One can speak more cheerfully of another disease, formerly a very formidable one, now much less so, and soon, it is to be hoped, to disappear altogether.

A century ago there prevailed in this country a disease called spotted typhus, but which is quite different from typhoid fever. Readers of the life of Howard, the philanthropist, will remember how he found it in every gaol, and what efforts he made to stop its ravages. It was the scourge of our army, and, in fact, affected all the crowded parts of our large towns. It is still seen, but is comparatively trifling, and is disappearing. What has caused this disease, so dreaded of old, to be now almost a thing of the past? The most simple measures—pure and abundant air, and soap and water for the skin and clothes, have almost stamped it out. Our army, which used to dread it—and, indeed, it has been called the scourge of armies—now does not know it; in some years no

single case has occurred in all the barracks in the United Kingdom. When the worst and most crowded parts of our towns are rebuilt, and ventilation and cleanliness are everywhere enforced, typhus will be as unknown as the Oriental plague.

Formerly there prevailed in England a great deal of ague. Along the whole eastern seaboard, but especially in the Fens, and also in some parts of the western side of the island, almost all the inhabitants of certain villages used to have the "shakes." Life was shortened and made miserable by this affection, which was sometimes attended with dysentery. Now the drainage of the land and the cultivation of the surface have made ague a rare disease, only seen in some few localities. The dysentery has entirely disappeared.

Some diseases formerly seen among us are now no longer known; and of two of these, plague and sweating-sickness, it may be interesting to give a short account.

The true or Eastern Plague is unknown among us, but it was not so always. What brought it among us formerly? What has now freed us from it? Like typhus, the true plague is no doubt caused by a yet unrecognized organic agency, but like typhus this agency is inert unless it finds certain conditions of existence. The conditions are filthiness of houses and of persons. Erasmus, the great scholar, writing to the physician of Cardinal Wolsey, points out how the plague in England might be stopped; the houses, he says, are without any free ventilation, and are built without the least regard to this point; no windows open, and no one cares to have a pure and wholesome air; then the floors are beyond measure filthy. "They are usually made," he says, "of clay covered with rushes that grew in the fens, which are

so slightly removed now and then that the lower part remains sometimes for twenty years together, and in it a collection of spittle, vomit, urine of dogs and men, beer, scraps of fish, and other filthinesses not to be named. Hence, upon a change of weather, a vapour is exhaled very pernicious to the human body."

This is not a pleasant passage to read, but it is essential to know what the habits of our forefathers were, that we may comprehend why the plague has left us.

The persons of the lower class of the people were as dirty as their houses; the clothes were almost entirely woollen, and were very seldom, if ever, washed. Bathing, except for the better classes, was a thing seldom practised. The scrupulous cleanliness of our present upper classes was unknown then to any class.

Gradually, during the long reign of Elizabeth, habits improved, and when the chief nests of the plague—the small, crowded, old wooden houses of London—were destroyed in the reign of Charles II. by the Great Fire, the disease began to grow less intense. But it was seen in England, though not very severely, nearly up to the year 1700, so that we have only been free from it 176 years.

That it has been this gradually increasing cleanliness of houses and persons, and better building and ventilation of houses which have destroyed the Oriental plague among us is quite certain; and is proved, if proof were necessary, by the fact that similar measures have arrested the same disease several times in India, and have now, it would appear, definitely stopped it in Egypt.

Another disease which now is unknown to us was the sweating-sickness, which a few centuries ago was very widespread.

The first outbreak occurred in England in 1485,

and was brought in and spread by the half army, half rabble who followed Henry VII. from Havre. In that year the English people were still suffering from the long wars of the Roses, and men's minds were in a very excited and perturbed state; a total eclipse of the sun, which occurred on the day when Ann, the wife of Richard III., died, increased in that ignorant age the apprehension of some coming disaster, and the fear of some national affliction was everywhere spread.

Richmond landed at Milford Haven in August, and pushed on to Lichfield (where he encamped on damp ground), and then to the field of Bosworth by forced marches. After the battle of Bosworth he marched to London in four days, leaving, however, parties of his exhausted army behind on the road.

His triumph was dimmed by the sudden outbreak of a mysterious disease, which spread everywhere in the rear of his army, and which broke out in London with great violence after his arrival at the end of August.

In London two lord mayors and six aldermen died within a week, and so great was the mortality at first that Holinshed, the chronicler, says that scarce one in a hundred recovered. The king's coronation was postponed, and the whole nation was seized with consternation. The malady was indeed most alarming, from the suddenness of the attack and death—for it sometimes killed in twenty-four hours. Many were struck down, apparently without warning, with a most violent fever; the internal heat and oppression were insupportable, and in a few hours were followed by a fetid and profuse perspiration which gave its name to the disease. By the end of the year all England was affected; it appeared at Oxford in August, professors and students fled in all directions, and Oxford was deserted for six weeks.

On New Year's Day, in 1486, a violent tempest arose in the south-east, and was believed to have purified the air, for soon afterwards the disease entirely disappeared, and was not seen again in England for twenty-one years.

That this strange disorder was carried through the country by Richmond's army, and was spread by it, seems certain; but there must have been something in the condition of the people which allowed the cause (whatever may have been its nature) to increase and develop. In 1506 the sweating-sickness returned, but it was a slight and not fatal outbreak. In 1517, however, a terrible outbreak took place, which spread over the whole kingdom, and caused immense mortality. It then disappeared, as the former epidemics had done, but in 1550–51 it appeared once more, and broke out at Shrewsbury, killing there 960 people, and thence spread all over England. Neither this nor the former attacks appear to have extended to Scotland, or but very slightly so.

This was the last visitation of this disease in England, though slight outbreaks of an affection somewhat similar have been seen even within the last forty years in some parts of France.

The causes of this disease have been much debated, and some writers attribute much influence to the diet of the English at that time. There was immoderate eating and drinking, among the upper classes especially, of sweet, luscious wine, and among the lower of large quantities of beer. What seemed to give support to this view was the curious fact that men in the prime of life were especially attacked, and that old men, women, and children almost entirely escaped. That it was something in the coarse and gross habits of the people which gave this disease its unexampled spread and fatality in England, seems certain; but no

explanation satisfies all the facts of the case, and we must, I believe, admit that we cannot now precisely say what were the agencies which caused the spread.

But the last outbreak was in the reign of Edward VI., and we know that the condition of the people gradually improved after that date, and especially during the long and peaceful reign of Elizabeth, when trade and literature alike revived. It seems, then, that a general improvement in habits and circumstances and the cessation of the sweating-sickness were coincident, and were probably cause and effect.

There is a disease in our own time which is also an exotic, and always comes to us from without, and which, in one point, resembles the sweating-sickness—that is, in the appalling rapidity of its action. Cholera is the enigma of our day, as the sweating-sickness was of the fifteenth century. Its peculiar cause is unknown, but the evidence seems conclusive that it must be a material substance, capable of being carried by men from place to place; and I think an opinion is gradually gaining ground that this substance is not usually developed by being breathed through the air into the mouth and then swallowed (though this may occur in rare cases), but that it is swallowed in larger amounts than exist in the air, either in water or food, into which it has found its way.

This belief has gradually led to certain preventive measures. It is thought that the material cause may be destroyed by chemical agents, and hence disinfectants of different kinds have been largely used.

Then the greatest care is taken to prevent any passage of the choleraic impurity into drinking water or food, such as milk; and finally, the advent of the disease is watched, and the earliest cases (almost

always in persons lately arrived from an infected district) are attended, with a view that nothing shall pass from them into water and air without disinfection.

The last epidemic in Europe presented some characters which, it may be hoped, showed that these measures and the general sanitary improvement in Europe have had some effect; at least the epidemic of 1872–1873 was this. It entered Europe through Russia, as in all previous outbreaks but one, and in some parts of Russia and in Hungary was as severe and fatal as ever. It entered Germany, as on most former outbreaks, from Russian Poland, and was carried by the traffic on the Vistula. But, though it spread over much of Germany and entered France, it produced nothing like the mortality of its former visits. In England its introduction on two or three occasions was discovered, and precautions taken, but we cannot doubt that slight cases must have landed in England, and brought the disease among us. Yet it did not spread.

Now, for this there must be a reason. Some may suppose that the cause was in itself feeble, and, so to speak, could not increase on account of an inherent inability to do so; but it showed no feebleness in Hungary, and in some of the German outbreaks. If it could not increase in the other places, we must put the reason of that not in some inherent difference in power of the poisonous agency, but in surrounding circumstances being unfavourable to its growth. And this, in fact, is the most likely explanation. During the last fifteen years, Germany, France, and this country have made immense progress in sanitary works. Purity of air and of water in our towns is far more common than formerly. May we not hope that the feebleness of the cholera epidemic of 1873 was the sign that just as plague and typhus, and the

sweating-sickness have died out for want of nourishment, so, at last, we have commenced to starve the cholera? We cannot, indeed, say we are safe from it until much more is done, but I think we may hope that our measures of resistance are the right ones.

What, now, is the upshot from this short sketch of these diseases?

Why, we can see that, in one way or another, some formidable pestilences have either disappeared or are much slighter than they were, or might be made so. Small-pox, by the curious observation that an insignificant disease will protect from it; and Oriental plague and typhus, by very simple measures of cleanliness, are practically under our command. Ague has disappeared owing to drainage. Typhoid fever and cholera are more subtle and difficult to deal with; but there is no reason to doubt that we can hold them also in effective check, and probably entirely remove them. The local causes which fostered the sweating-sickness are gone, and no one thinks for a moment that we need now fear an outbreak of that singular complaint. Other diseases, such as scarlet fever and measles, still baffle us; but we need not despair that eventually we shall either find the causes or learn their mode of spread, and so arrest them. All, then, speaks to the fact that man can, by searching out, obtain a mastery over even these foes, which have wrought him so much hurt. And not only in the case of these diseases. We may also look forward with hope to another class of inquiry, which will probably even in this generation assume unexpected importance. That animal and vegetable parasites can live on the human body and affect its nutrition has been long known, but it is only lately that the scope and importance of this subject has been seen. I can only

thus allude to it as another direction in which inquiry will doubtless lead to a diminution of several diseases.

When, therefore, we think over all these things; when we see how much a man can do for himself, how much he can do for others, are we not compelled to admit that man himself is answerable for much of the sickness and misery which afflict mankind? The evils are human, but happily they are not necessarily inherent in our nature, and incapable of remedy.

We now return to our question. What hope is there that men will follow the rules of health? I think we have good grounds for hope. Education is now made compulsory on the whole community, and this education cannot be merely intellectual. There must be moral training, and the value of the great Gospel precepts of temperance will at last be understood. Then I look upon it as certain that before long physical training of the body will be practised in all our Board schools. To have strong, well-developed citizens is a necessity for the State, for a small undeveloped race of men and women cannot be healthy. To cultivate the health of the people will certainly become, indeed, is now, the aim of our statesmen. This physical training will soon lead to questions of how it acts, and then a little instruction in the most elementary physiology, and in the common-sense rules of health, will readily be given.

Add to all this, that each generation will learn to regard life from a wider point of view, will see that this world can be nothing but a school, in which the intellectual, in some measure, but chiefly the moral faculties, are trained. It will become evident to all that health and strength of body are necessary for

the proper discharge of worldly duties with efficiency and happiness, and at last a man will shun as a crime any action which may injure his body.

If careful of his own health, he will not be less so of his neighbours', if he can influence it; and so by degrees these principles will become implanted in the rooted public opinion of the people.

Another condition may aid this, and that is the emulation of nations. We have entered on a curious national tendency. Whole nations desire to see themselves the best educated and the best cultured. In Germany and America this national desire that the nation shall surpass others in culture and in health is quite apparent, and other European nations will soon have the same wish. How this national emulation will urge on education, and physical education, among other nations, is evident. The press, daily extending its influence and its power of communicating the acts of one nation to another, will greatly aid in this work.

Is this a dream of Utopia? By no means. It lies within the possibility of facts. It will take generations to do it, and there must be constant exertion. Each generation will, however, place its successor on a higher level than itself, and gradually the wonderful effects of transmission by inheritance of thoughts and modes of action will aid.

There is no man who may not even now assist in such a work by attending to his own health, by inculcating good advice on those he can influence, and, if he possesses the power, by aiding State and municipal sanitary improvements. Such a work seems to me wholly good; a work free from the error and frailty that clings to so much that we do; a work unselfish, devoid of wish of personal gain, and instinct with the love of man. At a humble distance it is, indeed,

copying His actions whose quick compassion led Him to heal all manner of ills.

Sanitary work may be said to be only just commenced in England, and many years and generations must pass before it is completed. But let each generation do its part. Then at last it will be found that the teaching has not been in vain, that men will follow the rules of health, and find happiness, contentment, and length of days in so doing.

APPENDIX.

A few Simple Sanitary Hints for Working Men.

As I have found that working men, although often very intelligent about their own business, are careless about points of great importance for health, and are in fact often quite unaware of the necessity of breathing pure air, drinking pure water, and keeping their houses dry and clean, I have thought it might be useful to give some common rules in a very simple form.

Ventilation.

Plenty of fresh air is necessary for the proper action of the lungs and for the blood. Ventilation means the art of supplying fresh air without draughts. The simple plans soon to be noticed are all a working man can do ; but no doubt in future years we shall have cheap plans of warming fresh air in winter as it comes into the room.

To see if the air in a room is pure, go into it after being in the open air for ten minutes. If the room smells fusty and close, more fresh air is wanted.

Open the window at the top, as the air coming in is less likely to cause draughts.

If, after the window has been opened and is again shut, the fusty smell is soon perceived again, there must be some dirty condition of the floor or walls, or there is some way by which sewer air is getting in. Do not rest until you have found out the cause.

If you have only one room, always open the window and air the room well before going to bed, particularly if you have been smoking. During the greater part of the year the window may be a little open all night, if you have the means to give yourself and wife and children plenty of clothes · but do not let the air blow upon you.

If you feel the draught too much with the window open at the top, nail a piece of wood, placed slantingly, along the top of the window and reaching three or four inches above it; open the window about one or two inches, and the air will strike against the slanting piece of wood as it enters, and be directed towards the ceiling or will not be felt. Or adopt one of the plans noticed at page 40. The slanting opening there recommended is an excellent plan; it can be almost always open, or, if the weather be too cold, be partially or wholly closed; it is an addition to the window, but is not intended as a substitute for the open window.

Always air your room from the outside air and not from a staircase, unless the staircase is thoroughly ventilated. The reason is that a closed staircase is a shaft bringing up air from the basement or from other rooms, and that air may be impure.

Try and prevent any dirty accumulations round the house which may make the air impure before it enters the room, such as dust or manure heaps, &c.

If you have reason to think air from any drain is getting into your house, close all the doors and windows, light a fire in one or two of the rooms, and after the house is warm, enter it from the outside air, closing the door at once behind you, go from room to room and see if there is any smell. If there is, search for the opening or defective trap; if you can find none, the smell may come from under the floor, and that must be looked to.

If you have any fireplace which you do not use in the summer, never stop it up; the chimney is a good ventilator; also, never close the regulator if you have one in a grate; the regulator is only meant to be more or less closed in order to lessen or increase the draught to the fire; it is not put there for ventilation, or rather to stop ventilation, as it does when closed.

Cleanliness of the Room.

The air of a room can never be pure if the room is dirty. Uncarpeted rooms should be carefully swept every day, but not washed too often, as wood or bricks both absorb and retain water for some time, and make the air damp and cold

Wash in warm, dry weather, when the windows can be fully opened.

The walls should be also swept if papered; if bare, they should be lime-washed twice a year.

The greatest impurity is, however, often given by the bed or furniture. Take great care that these are wiped and kept clean; all the bedclothes and mattress should be fully exposed to the air for an hour every morning, and the blankets should be shaken.

Cleanliness and Dryness about the House.

Do not allow any heaps of refuse to remain near the house; the air cannot be pure if these are constantly adding effluvia to it. The dust-bin is often badly placed in houses, and is too seldom emptied.

Dust-bins become offensive because bits of food, and refuse of all kinds are thrown upon the ashes, and the ashes are perhaps allowed to become wet. Now the dust-bin should be only for ashes, and if these are kept dry they will not damage the air. But what then is to be done with all the house refuse, such as remains of food, sweepings, and dust? The answer is, all this is combustible, and should be burnt in the house if you live in a town. Potato-parings; bits of cabbage; remains of fish, &c., all however contain a good deal of water, but they can be burned in the following way. If thrown at once on the kitchen fire they will not burn, because they contain this water; but if they are placed under the grate in the ash-pit for four or five hours, they gradually dry and become quite combustible; they then become so much fuel, and give out heat in burning. It is therefore really an economy to dry and then burn all the vegetable and animal refuse. By burning these things and all the sweepings, the dust-bin is kept much sweeter. This simple plan of drying under the fire, and then throwing the dried substances on the fire, if universally carried out, would really simplify sanitary scavenging, as well as keep the air of a house purer. In the same way all the dust from the floor should be burnt and not thrown on the heap.

If you live in the country then potato-parings, pea-

husks, and remains of food may be put by for the pig or chickens.

If you live in a cottage in the country, and have a garden, put all the dirty house-water on the garden, and do not let it soak under the house, as too often happens. This water contains organic substances which are fertilising, and the remains of the soap used in the house is also very good for vegetables. If a butt can be obtained and the dirty water poured into it, the garden could be watered from time to time. Take care that the rain from the roof does not soak under the house, or cause dampness of the walls.

Water.

If you have to fetch water from a distance and to store it in your house, never keep it in buckets or open pans. It is sure to get foul ; dust falls into it, and it will absorb substances from the air. Wood also gets soft, and may make the water impure. Put it into glazed earthenware or stoneware jars with covers—these jars are cheap and strong —every now and then throw out all the water, and wipe the inside of the jars with a clean cloth. If the water is from a surface stream or shallow well, it is probably a soft water, and will act on metals. In that case do not use metallic vessels more than you can help. Use iron vessels for cooking, and, if they require mending, take care they are not mended with lead solder, which the water can dissolve. Many cases of lead poisoning have occurred from this solder being used. With such a soft surface-water do not even use zinc pails, but draw it in wooden buckets and store in stoneware jars.

If you live in a town and have a cistern, keep it covered, and, as already said (page 4), take care that the overflow pipe does not open into a sewer. If the cistern is of slate, clean it from time to time.

If the supply of water is what is called " constant," but which is sometimes stopped for a time, always be careful to see that the water is not impure after a stoppage. Let a good deal of it run away, and then see if a glassful has any unusual turbidity or taste or smell. If it has, boil it before use, or filter.

The filtration of water is not difficult, even if you cannot afford to buy a regular filter. The compressed charcoal blocks are cheap and good ; if they clog, rub them gently with a towel, or, if that does not clear them, with a hard brush ; if they are still clogged, they must be gently scraped with a knife. But if the charcoal block is too expensive, a simple filter can be made as follows. Get a common earthenware garden flower-pot ; cover the hole with a bit of zinc gauze or a bit of clean-washed flannel, which should be changed from time to time ; then get some rather small gravel, wash it very well and put it into the pot to the height of 3 inches ; then get some white sand and wash it very clean, and put that on the gravel to the height of 3 inches; then buy 2 pounds of animal charcoal, wash that also by putting it into a jug and pouring boiling water on it, then, when the charcoal has subsided, pour off the water, and put some more on for three or four times. When the charcoal has been well washed, put it on the sand and press it well down. Have 4 inches of charcoal if possible. The filter is now ready, pour water into the pot, and let it run through the hole into a large glass bottle.

After a time the charcoal will get clogged, take off a little from the top and boil it two or three times, and then spread it out and let it dry before the fire. It will then be as good as ever. From time to time all the charcoal and the sand also may want washing. The sand may be put over the charcoal, and not between it and the gravel ; but this plan sometimes leads to the charcoal being carried with the water through the gravel and out of the hole. The sand stops it.

By filtering in this way, and by boiling the water, many dangers are done away with.

If you have a rain-water tank, always filter the rain-water before using it for drink or cooking, as rain-water often is collected from dirty roofs or becomes impure in the tank. If you live in the country, either on a chalky or gravelly soil, and the well and cess-pit are near together, you never can be safe from possible contamination of the water. Do all you can to get your landlord to remove the cess-pit, or, better still, to give you a dry-ash or earth-closet.

Closets.

As by far the greatest evils in a house arise from the air or water being made foul by ill-arranged or dirty closets, or by escape of foul air from drains, you cannot take too much care. If living in a town, insist that all the occupants of the house who use the same closet shall be careful to keep it clean ; take care it never gets stopped, and have it looked to if it does. You may often be at the mercy of a bad landlord, or of careless fellow-lodgers, but still much may be done by perseverance. Take care also that about three times a week the pan (if it is a water-closet) is nearly filled with clean water ; then pull up the handle, and let the water rush down and clear out the pipes. Do this two or three times.

If when the water thus rushes down you perceive foul air coming up, the pipe is both dirty and wants ventilation, and the landlord should be pressed to put in a pipe and to properly ventilate the soil-pipe.

It is very little use letting a small stream of water run continually down a closet-pipe ; it is simply a waste of water ; a strong forcible stream every now and then is the proper plan.

Be careful to let nothing be thrown down the closet ; people foolishly throw all sorts of rubbish down, and the consequence is frequent choking of pipes, and then great annoyance to everybody, and expense. Keep the closets entirely to their proper uses.

If you have an earth or ash-closet, you can get plenty of dry earth in the summer by spreading the earth out in the sun ; or, in winter, by putting the earth under the kitchen grate for five or six hours.

If you use ashes and throw them on with a shovel, take care they are put all over the excreta.

If you have a garden, put the material from your earth-closet into a hole in the ground every week, and then, when you can do so, dig it in for manure. Take care it is as far as may be from your well.

As good an earth-closet for a cottage as any, is simply a zinc bucket coming up close to the wood of the seat, and with a handle to enable it to be lifted out. The wooden top

of the seat should be made with a hinge, so that it can be lifted up and the bucket removed and emptied from time to time. Very little earth is necessary if no slops are thrown into the bucket, and the earth can be thrown in with a shovel.

About fifteen to twenty shillings covers the cost of this.

All places of this kind, as well as water-closets, require attention and give a little trouble ; but he must be the most careless of mortals who, in a matter so important for health, will not give half an hour's work every week to preserve cleanliness, and really no more time is demanded than this.

A few words on Food and Cooking.

The subject of cooking and receipts is too large for me to enter upon ; indeed, the rules as to heat (whether it should be moderate or great, whether there should be simmering or boiling, &c.), and as to preparation and cutting up of vegetables (so as not to crush them and lose the juices), and as to the time of cooking and flavouring, and other points of the like kind, require actual practice in a kitchen. It is earnestly to be hoped that women generally, both well to do and poor, will in time to come all be instructed in this most necessary art.

But I think a little enlargement of what has been said on the use of the vegetable nitrogenous food (pp. 22 and 58) may be useful.

All these foods require different kinds of cooking ; Indian corn, even if crushed, requires soaking for five or six hours before cooking, and the meal even has to be boiled for two hours at least ; otherwise it may irritate the bowels. Oatmeal requires quick boiling, and thorough mixing and stirring all the time ; hence the term "stirabout" given to oatmeal porridge. Rice requires careful washing, and often a little soaking in cold water before boiling. Peas and pea-meal require a good deal of slow heat.

Many of these foods mix well together, and are improved by the mixing ; they are more palatable, and perhaps more digestible. For example, Soyer, in the Crimea, recommended a simple pudding, made of 1 lb. of pea meal, ½ lb

of Indian corn meal, 1 oz. of dripping, ½ oz. of salt, and ¼ lb. of treacle. This makes a very nutritious and palatable pudding, when well mixed and cooked. He recommended one still more nutritious: the same quantities of peas and Indian corn, but leaving out the treacle and adding another ounce of dripping and ¼ lb. of fat bacon. In the same way macaroni, which is not half used enough, can be mixed with common cheese, and becomes very palatable and nutritious, and is still a very cheap dish. Oatmeal, again, mixes very well with fat bacon, and forms a most nutritious dish. Rice and wheat flour, again, mix admirably in puddings; and rice-water, with a little lemon or cinnamon, is an excellent drink.

With vegetables, again, potatoes and onions are both cheap, and both are most useful; onions give flavour to almost everything, besides aiding digestion.

But there is really no end to the combinations and the variety which can thus be introduced into food, even when the supply of meat must be limited.

The excessive monotony of many poor men's diet ought not to exist, and will not exist when cooking is better understood by working men's wives. At present, many of them look to the baker for bread, and buy a little inferior meat; and this often badly roasted or stewed, with tea and a little butter and a few simply boiled potatoes, forms the almost invariable diet. This is really to neglect the riches within reach.

Drinks.

If you wish to keep good health to old age, never touch spirits, and only drink one pint or one and a half pints of strong beer, or two pints of weak beer, with your dinner and supper. Better still if you can abstain from beer altogether, and spend the money in more food or better clothing. It is astonishing how much may be done with the money spent on beer. Instead of beer there are various agreeable drinks. If a little rice is washed in cold water, and then is boiled in a good deal of water, the fluid, if a little sugar is added, is a pleasant and nutritious drink. It is much used in India by our men. In winter it may be taken warm, in summer cold; and in summer, if you buy an ounce of powdered tar-

taric or citric acid, which is very cheap, and put a small quantity in this rice-water, a very refreshing acid beverage is obtained. You will soon learn when you have got acid enough; and it should not be too acid; only just enough to be pleasant. The boiled rice, of course, must be used as food.

If you live in the country and can get skimmed milk, nothing can be better, both for you and your family, than to drink this at dinner and supper. It is well always to boil it, and a little sugar makes it still more agreeable; no acid must be added to this.

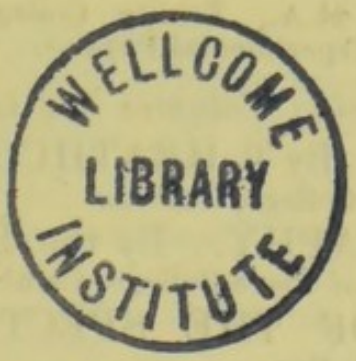
If you have a garden, and can get either currants or raspberries, the pressed juice, boiled in water and then mixed with a little tartaric acid and bottled, will keep a long time, and is a very wholesome and agreeable beverage. A little oatmeal boiled in water, and then a little sugar added, also gives a good drink. So that you can have a choice of beverages if you find the want of something besides water. But if you can get to like plain water you are a lucky man.

When you have any heavy work to do, do not take either beer, cyder, or spirits. By far the best drink is thin oatmeal and water with a little sugar. The proportions are a $\frac{1}{4}$ lb. of oatmeal to two or three quarts of water, according to the heat of the day and your work and thirst; it should be well boiled, and then an ounce or $1\frac{1}{2}$ ounces of brown sugar added. If you find it thicker than you like, add three quarts of water. Before you drink it, shake up the oatmeal well through the liquid. In summer drink this cold; in winter hot. You will find it not only quenches thirst, but will give you more strength and endurance than any other drink. If you cannot boil it, you can take a little oatmeal mixed with cold water and sugar, but this is not so good; always boil it if you can. If at any time you have to make a very long day, as in harvest, and cannot stop for meals, increase the oatmeal to $\frac{1}{2}$ lb., or even $\frac{3}{4}$, and the water to three quarts, if you are likely to be very thirsty. If you cannot get oatmeal, wheat flour will do, but not quite so well.

It is quite a mistake to suppose spirits give strength; they give a spurt to a man, but that goes off, and if more

than a certain quantity is taken they lessen the power of work.

For quenching thirst, few things are better than weak coffee and a little sugar. One ounce of coffee and half an ounce of sugar boiled in two quarts of water and cooled, is a very thirst-quenching drink. Cold tea has the same effect; but neither are so supporting as oatmeal. Thin cocoa also is very refreshing, and supporting likewise, but is more expensive than oatmeal.



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