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HEALTH FOR EVERYMAN

BY

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With a Preface by

RT. HON. SIR KINGSLEY WOOD

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PREFACE

BY RT. HON. SIR KINGSLEY WOOD

I HAVE been glad of the opportunity to read this attractively written and informative little book, and I find myself in the most hearty agreement with Dr. Cove-Smith's general theme, on which the whole book is based and which is summed up on page 139, that "the object before us should be health, not as an end in itself, but as a means whereby our lives may be of better use to the community and greater joy to ourselves."

ACKNOWLEDGMENT

I HAVE refrained throughout this book from inserting references or marginal notes as I so frequently find them to be a source of intense irritation to the reader. I am, however, heavily indebted to the following authors to whose works I have had frequent recourse for information and confirmation of facts :

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Acknowledgment is also due to the British Medical Association Reports of the Committee on Nutrition and the Committee on Physical Training.

CHAPTER I

HEALTH AND EFFICIENCY

HEALTH is one of the fundamental factors of human well-being. Healthy people are happy people, yet when we attempt to define health its definition proves extremely elusive. As we attempt to find some short cut that will lead to the "Royal Road to Health" as try to limit its boundaries by a simple definition. Health itself depends on so many variables and so many positive values go towards building up the individual into a harmonious whole that we need a detailed description to do it justice. Perhaps we cannot do better than adopt the phraseology of the British Medical Association's Report on Physical Education which says that the aim should be: "To obtain and maintain the best possible development and functioning of the body and thereby to aid the development of mental capacity and of character. The mind and the body are so essentially one that the divorce between them in what is commonly called education appears as

unscientific as it is pronounced. However brilliant the intellect, a neglected body hinders the attainment of the highest capacity possible to an individual; and conversely the maintenance of the best possible functioning of the body must react as a beneficial mental stimulus. An educated body is a balanced body, just as an educated mind in the true sense is a balanced mind. Balance of body, mind, and soul should go together and reinforce each other; and perfection of balance, physical, mental and spiritual, can be the only scientific aim of education."

Life is a great gift and to obtain the best from it the personality of each individual must be broad-based and well-balanced. The character of each one of us is built upon the tripod of body, mind and spirit; evenly equated this gives us a balanced personality that is a beautiful and satisfying thing. Efficiency, success and ultimately even happiness are largely dependent upon health and those of us who can realise that real health is no mere matter of luck, but a positive constructive condition of life that can be achieved by a little extra trouble and thought, will soon find its pursuit worth while.

"The preservation of health," said Herbert Spencer, "is a duty. Few seem conscious that there is such a thing as physical morality." Even

if we are not particularly anxious on our own account, we certainly owe a debt to the community and to succeeding generations whereby we can make some attempt to combat the artificial limitations of civilisation and contribute some item to the improvement of the stock. It is by no means inevitable that some of us should go through life seedy, ailing, and often miserable, showing ourselves less useful citizens, less capable workers, and less efficient parents. Ill-health is usually the result of some offence against Nature, some physiological sin that in ignorance, carelessness or laziness some ancestor or we ourselves have committed.

Some people of course come into the world heavily handicapped, but Nature possesses a vast storehouse from which many compensations can be drawn, whereby to make the most of what gifts they have.

The body when functioning well is a beautifully balanced machine and we are only just beginning to realise that disease and premature death are the logical outcome of causes which we can in many cases already control, but as long as we persist in cultivating the causes so shall we reap a harvest of suffering. Prevention is far better than cure, and it is easier to *keep* well than to regain a good state of health when we have once allowed our standard

of vitality to fall. Plague, cholera, smallpox and typhus we have banished from our shores in epidemic form. Tuberculosis, typhoid and diphtheria are on the wane, and although the medical profession must maintain a big bombardment with heavy artillery, it is by the microbial resistance of the individual man and woman in the front-line trench that the invaders of disease will eventually be overcome.

The healthy person thinks quickly, moves briskly and acts promptly, his circulation being free from toxins and poisons that hamper the activity of brain and muscle. His outlook is bracing, his mind happy and his presence a joy to those about him. His work is efficient because he can concentrate without the pains and aches of his body continually obtruding upon his mind and sapping his energy. He is vital, energetic, and full of the joy of life.

Far too many people are listless and apathetic because they fail to realise the serious import of impairing the efficiency of the human machine. To use the machine wrongly in a manner for which it was not designed is the surest way of wearing it out too soon. Henry V is said to have worn himself out at the age of thirty-five, "Old Rawley" of Vanity Fair was forty-three, yet although we claim to have progressed much since

the Middle Ages the cry of "too old at forty" is still too often heard. Increasing girth, decreasing agility and impaired breathing all indicate the extra load that impairs our efficiency and prevents us from staying the course even as far as the "three-score years and ten."

Health therefore depends upon right living, and in the subsequent chapters I shall hope to outline briefly some of the fundamental factors whereby we can achieve that happy health which is the natural birth-right of all human beings.

Why, you may wonder, are we concentrating so much nowadays upon national health. Well, the main reason is that the general trend of modern civilisation is leading us away from natural paths. Physical strain is being replaced by mental strain, nervous ailments are on the increase, and our brains seem to be becoming too big for our bodies. We must therefore endeavour to equate the biological balance and release the human spirit from its bondage of neurosis. Plato tell us "the mere athlete becomes too much of a savage and the mere musician is melted and softened beyond what is good for him—the two should therefore be blended in right proportions." The Greek ideal of a citizen was something of an artist, an athlete, a soldier, a statesman and a philosopher

all rolled into one. A tall order you will say. Yes ! but the effects of Greek culture still persist and one thing that the Greeks have taught us is the importance of being an active participant. The industrial revolution and the machine age have wrenched most of us away from those manual handicraft tasks which gave us muscular activity and a margin of true play in making and fashioning things for our own use and amusement. All-round development such as the pioneer and the craftsman knew is increasingly a thing of the past, while repetition work and mass-production seem to be the keynotes of modern industry. Our jobs to-day are less active ; in the office we are sedentary and subject to the same routine for weeks on end, and even in the factory, where we may use our muscles, it is all too frequently the same set of muscles day in and day out. We do less with our hands than our ancestors, we do not carry burdens, we ride instead of walk, we live in urban communities, we no longer hunt for our food, thus developing an appetite in chasing it, we do not need to defend ourselves from attack, and no longer develop great muscular strength or endurance.

Therefore, it would seem obvious that some form of compensation, including physical exercise, is essential in order to evolve an effectively

balanced harmonious individual. The harmoniously developed person is not merely healthy but also beautiful, for beauty of function is sure to follow ; thus the road to health becomes the road to beauty as well. Health, too, is more than the mere absence of disease ; it is not an end in itself, but a means to an end whereby healthier, happier living is possible. No one, however, can *make* us fit if the desire to be so does not exist in ourselves.}

In ancient Greece, health and hygiene had its roots in religion, but it also had another and more practical basis which had its roots planted in public necessity. Beyond the religious and practical sphere there was a belief in healthy individuals as such, so that health had a social implication and became a social ideal for the betterment of the community at large. This ideal might well be more fully pursued nowadays, for indifferent health is uneconomic and poor health a definite drawback to efficiency

CHAPTER II

NUTRITION

MANY factors must be considered in keeping fit. Physical fitness really comprises full functional efficiency of the body, good health, lack of defect and deformity with capacity to withstand strain for long periods without ill effects.

Nutrition is, of course, of paramount importance, for without a properly balanced diet and an adequate supply of vitamins normal growth and the replacement of wear and tear cannot be maintained. It is amazing how frequently people mistake the value of quantity for quality, yet the body will not function well on a badly balanced diet any more than a motor car will run well on bad petrol or a poor mixture. The whole question of proper feeding is much more involved than at first appears, and no dietary suitable for everyone has yet been evolved. Diet must naturally vary with the nature of the individual, his age, work, and conditions of living, but there are certain

NUTRITION

principles that can be laid down upon which the outline of a sound diet can be built.

In the first place body-building foods must be provided for the purpose of growth, repair and replacement through wear and tear. These are the

Proteins (repairers), to be found in meat, fish, ²⁵cheese, milk, eggs and also to a lesser degree in bread, peas, beans, etc.

Next we need foods to supply the body with the heat and energy used up in the process of living. These are the

Carbohydrates (energisers), to be found in sugars, starches, ~~cereals~~ ^{grains}, fruit, flour, bread, potatoes.

Fats (warmers), to be found in butter, cream, milk, lard, suet, yolk of egg, etc., nuts and margarine.

Then certain minerals are essential, particularly :

Calcium and Phosphorus (for making bone), to be found in milk, fish.

Iron, Manganese and Copper (for making blood), to be found in egg-yolk, peas, spinach, raisins, watercress, oatmeal.

^{side} Besides these main planks in the platform of ^(around grain) nutrition there are several very important struts without which the whole structure is liable to

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become incapable of adequately supporting life. These are the vitamins or accessory food factors that are perhaps better classified as protective foods, for they are essential in protecting the body from the ravages of disease. Certain diseases are directly due to a lack of vitamin, while most of them are more easily resisted and overcome if the vitamin supply is adequate. All the vitamins are necessary for growth, but each in addition has a special part to play in the maintenance of health.

Vitamin A keeps the lining membranes of the body in a healthy condition, prevents the onset of catarrh, and increases resistance to infection. It is found mainly in milk, egg, calves and sheep liver, codliver oil and the fish oils; green vegetables, spinach, lettuce, watercress, carrots.

Vitamin B is specially necessary for the health of the nerve tissues and skin; chiefly found in cereals (maize, wheat-germ, etc.), pulses (peas; beans, lentils); nuts, cabbage, lettuce, yeast and marmite. It is to be noted in this connection that wholemeal flour contains much more Vitamin B than does white flour.

Vitamin C prevents scurvy, and is used up rapidly in chronic diseases like rheumatism and tuberculosis, being found chiefly in the citrus fruits (orange, lemon, grape fruit), apples

especially Bramley Seedling and Blenheims), and tomatoes.

Vitamin D is essential for the proper formation of bone and teeth, and if not present in sufficient quantity leads to rickets. It is found chiefly in milk, butter, eggs, codliver oil and other fish oils. It is the sunshine vitamin and is always more potent in foods produced in the presence of sunshine—e.g. summer milk from pasture fed cows contains more than winter milk.

Vitamin E is the reproductive vitamin and affects fertility. It is found chiefly in vegetable oils, especially wheat-germ, green peas, lettuce, etc.

The importance of these accessory factors can easily be seen from perusal of the foregoing details, but a good mixed diet includes most of them in sufficient quantities to avoid gross deficiency. Lack of balance between them, however, may be responsible for a good deal of the digestive upset and "below par" feeling that is all too common in the community at large.

From the frequency with which milk occurs in the above list its usefulness as a food becomes obvious, and large scale experiments have proved the value of an extra pint of milk per day in growing children whose diet had already been thought adequate. In Canada an added amount

of Vitamin B in the form of wheat-germ (unfortunately usually removed in the production of white bread) has produced astonishing increases in growth.

The Advisory Committee on Nutrition to the Ministry of Health some time ago stated that in order to discover whether diet is satisfactory we must know if it supplies requisite amounts of (1) calories (heat units), (2) first-class proteins (animal food), (3) mineral matter, (4) vitamins. Professor Bayliss stated also that if we look after the calories then the proteins will look after themselves, but I would be inclined to alter that and say with Professor Winifred Cullis that if the vitamins are right the chances are that the rest of the diet will be satisfactory.

Professor Hill, in an Investigation on Munition Workers' Food, drew up a table in which each article in the amount stated below supplies about one-tenth of the daily energy needed. By choosing any ten of these portions the average worker obtains sufficient for a full daily diet.

To balance this up adequately out of each total of ten portions, three or four must consist of bread while fresh vegetables, salad or fruit should also be added.

As almost two-thirds of the body weight is made up of water, an adequate supply must

N U T R I T I O N

be included in the diet, for although able to go for long periods without food, no one can exist for long without water. All nutriment is carried round the body in fluid form, and about

Type of Food	Portion supplying $\frac{1}{10}$ daily energy = about 320 Calories	Amount of Protein present in portion
Butter or margarine	1 $\frac{1}{2}$ ounces	—
Bacon	2 " "	1 $\frac{1}{2}$ ounce
Pork	3 " "	1 $\frac{1}{3}$ "
Cheese	3 " "	3 $\frac{3}{4}$ "
Oatmeal	3 " "	1 $\frac{1}{2}$ "
Sugar	3 " "	—
Split peas or beans	3 " "	3 $\frac{3}{4}$ "
Lentils	3 " "	3 $\frac{3}{4}$ "
Rice	3 " "	1 $\frac{1}{4}$ "
Flour	3 " "	1 $\frac{1}{3}$ "
Barley flour	3 " "	1 $\frac{1}{3}$ "
Maize meal (cornflour)	3 " "	1 $\frac{1}{4}$ "
Bread	4 " "	1 $\frac{1}{3}$ "
Meat (free from bone)	5 " "	3 $\frac{3}{4}$ "
Syrup, jam, marmalade	5 " "	—
Milk	16 fluid oz.	1 $\frac{1}{2}$ "
Eggs	4 in number	1 "
Potatoes (2% for waste)	17 ounces	1 $\frac{1}{3}$ "

4 to 4 $\frac{1}{2}$ pints of water are excreted daily through the kidneys, skin, and lungs, so this quantity must be replenished. The ordinary food, particularly vegetables, supplies about half of this amount, so a further 2 to 3 pints of fluid should be drunk daily. This helps to flush the stomach, digestive tract and excretory organs. In addition

a glass of cold water taken on an empty stomach—first thing in the morning often proves beneficial in correcting habitual constipation.

Meals should be as varied as possible, moderate in quantity, of fresh good-quality food, well cooked, appetising, and attractively served. Milk and butter should be included every day with some meat or fish or cheese or eggs, fresh green vegetables or fruit. Every child and young person should have at least a pint of milk daily and if this amount were also taken by adults in addition to raising their fluid content, it would prove beneficial in checking acidity.

The preparation of food is really as important as its quality, for an attractive meal has a psychological value in stimulating the digestive juices to give of their best—one's mouth waters and the fermentations flow around the succulent morsels with added enthusiasm and increased vigour; whereas a dull distasteful meal depresses the digestion and often leads to dyspepsia.

Admittedly an insufficient variety, poverty of fuel and need for cheap buying limits the scope of the dietitian in poor households, but even where these things do not occur much good food is sometimes spoilt by lack of skill in preparation. A few more cookery classes for the prospective wife and mother, in place of shorthand and

ing, might well improve the physique of the nation as well as the domestic harmony. Even nowadays in households where there is no lack of means one often comes across a surprising lack of knowledge of nutritional needs.

Sir John Orr recently stated at the Blackpool meeting of the B.M.A. : " Modern dietetics is now more concerned with the requirements for vitamins and minerals than the requirements for proteins, fats, and carbohydrates, which are essentially the energy suppliers and hunger satisfiers. Foodstuffs rich in vitamins and minerals are relatively expensive and if a diet contains a deficiency of these it is unlikely, in ordinary conditions, that it will be deficient in energy-yielding constituents, which are abundant and cheap."

After pointing out that there is a higher standard of health than the mere absence of obvious disease, Sir John went on to deal with the question of the standard of fitness in relation to nutrition. " This question of the degree of physical fitness, which should be taken as the standard, is of the first importance in determining the requirements for an adequate diet. It has been customary to take the average state of health of the community as normal and regard that as the standard. But dietary surveys have shown that the great majority

of diets are deficient to some extent and minor degrees of ill-health due to these deficiencies are very common. The average, therefore, is below the optimum. Children with what are unfortunately regarded as minor defects, such as slight rickets, a slight degree of nutritional anæmia and carious teeth might, according to the standard be regarded as normal. Although they can run about and attend school, children with these defects are, in fact, suffering from malnutrition due to faulty diet. Numerous large-scale tests have demonstrated beyond a shadow of a doubt that improvement in the diets of such children is followed by an improvement in health. It is the universal experience that as the standard of living rises, with a resulting improvement in the diet, the average physique and health improves. The normal of to-day is a higher state of physical well-being than the normal of twenty-five years ago. There has been a good deal of futile discussion as to the physical measurements and clinical signs which should be regarded as the indication of a suitable standard of health. The only way to determine the proper standard is to go on improving the diet so long as the improvement is followed by an improvement in health. For public health purposes the standard which should be adopted is a state of physical well-

being which could not be improved by any change in the diet. Anything below that level should be regarded as malnutrition."

Sir John submits that with the great powers of production which science has given to humanity we should aim at the optimum standard, and if we cannot have it for the whole population we should, for the future of the race, endeavour at least to obtain it for mothers and children. A comparison of the kind of diet in common use with this standard shows that in those with lower incomes the consumption of protective foods is hopelessly inadequate, but that as income rises the diet approaches closer to the standard.

The general level of nutrition has certainly improved during the last twenty years, but there is still room for further improvement. It is unfortunate, of course, that milk, butter, cheese, eggs, meat, fish, green vegetables, and fruits should be more expensive and less filling than the less satisfactory bread, flour, margarine and cereals. One still too often comes across the child with bowed legs and flabby muscles whose mother proudly boasts that he has plenty of porridge and bread and likes his vegetables, but eventually admits that he never has butter or meat and only very occasionally a yolk of egg. Particularly when a child first starts moving about

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should "muscle and bone foods" be added to its diet.

Another dietetic fallacy is one that occurs in young people just starting out in city life. Leaving a good home where the provision of food is adequate, they are forced to live in "bed-and-breakfast" houses to be near their work and often on their meagre salary can only afford twice-cooked "mush" at cheap restaurants. Sooner or later they show signs of sore gums, septic teeth and foul breath arising from secondary infection upon a weakened mucous membrane. As a rule this can be remedied by adequate supplies of fresh milk and fruit and by attention to dental hygiene, but if neglected this condition is liable to lead to pyorrhœa.

Dental decay is probably one of the commonest causes of poor digestion. Headaches, lassitude, sore throats, gastric ulcers, appendicitis, and other stomach troubles can often be traced to swallowing the poison from septic teeth. Unfortunately the body cannot repair the ravages of decayed teeth as it can repair cuts and injuries elsewhere, therefore extra care should be taken to guard against decay. Teeth should be cleaned every night and morning, while if possible an extra brushing after every meal is advisable. Antiseptic powders, paste and mouth-washes are helpful, but it is

the brush that really does the work and removes the impacted particles of food from the crevices thus preventing them from putrefying there. The teeth should be brushed up and down, across, along the top and inside as well as outside, so that every trace of accumulated food is removed. Periodical visits to the dentist for scaling and inspection are advisable ; it is never wise to wait until pain drives you there, for pain and swelling are indications that damage has already been done, as unfortunately decay does not reveal itself outwardly until well advanced. A healthy and efficient set of teeth is therefore important for good digestion. The front ones chop the food up and the back ones grind it into small particles and mix it with the saliva, thus sending it down to the stomach in a readily digestible form.

It is important that the food should be taken slowly—in the words of Macbeth in the famous banquet scene :

Now good digestion wait on appetite,
And health on both !

The common practice of bolting food and swilling down with fluid is foolish for several reasons. In the first place it prevents proper mastication, secondly the fluid dilutes the gastric juices and diminishes their activity, while thirdly the individual is encouraged thereby to eat more than he

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so falls for both causes. While if much headwork and study is being undertaken the blood is shunted back to the brain to the detriment of the digestive organs unless the meal is followed by a period of relaxation. A similar result also occurs if muscular work is attempted too soon after a meal. A brief rest after meals in cheerful, pleasant surroundings is a useful adjunct to a healthy digestion. Nor should a heavy meal be taken immediately before retiring, for sleep slows up the bodily processes. In such circumstances digestion is delayed, consequently sleep is disturbed and rendered unrestful with the result that the individual rises in the morning unrefreshed and unfitted for the ensuing days' work.

Dr. T. F. Fox in his book on *Healthy Living* summarises these rules in the following manner

1. Take your food in a quiet and restful place, if possible with agreeable companions.
2. Don't eat much if you are tired and rest before and after meals if you can.
3. Eat slowly.
4. Find out whether you feel better if you don't drink much fluid just before or during meals.
5. Take small helpings and stop before you feel quite satisfied.
6. Don't eat between meals.

B R E A T H I N G

“Indigestion and acidity” are words which the public as a whole seem to enjoy misusing to their doctors and when these symptoms are accompanied by nausea and a burning feeling in the stomach or belching of gas, then the thought of disease is never far away. Yet quite frequently the trouble is really due to faulty feeding or some disturbance of stomach mechanism and the amount of acid needing neutralisation is negligible. Unfortunately the person with these symptoms often tries to treat himself; laxatives are taken to promote elimination, or large quantities of alkaline powder are swallowed with the result that the condition soon becomes chronic. Too often the tired business man, having polished off a hurried lunch at a snack-bar, returns to his busy office only to be attacked by stomach-ache an hour or so later. Dizziness or flatulence assails him and he complains of distension. Someone suggests that some bicarbonate powder or soda-water will give him relief, and sometimes it does. Thereupon it becomes the panacea for all stomach complaints irrespective of their origin. Yet digestion in the stomach needs a certain amount of acid and if large amounts of bicarbonate of soda are used they either stop digestion or force the lining of the stomach to give off more and more acid to overcome the alkali. Moreover,

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1 of the soda may be taken up by the blood give rise to a condition of alkalosis that puts additional strain upon the kidneys. All when the symptoms complained of are ably due to eating hurriedly, chewing inefficiently and swallowing a great deal of air in process.

There is no need, of course, to swing to the opposite extreme and masticate each mouthful fifty-two times according to the dictates of Fletcher as published thirty years ago—presently once for each tooth! But, at the same time the saliva should be thoroughly mixed with the food, for it has a lubricating action and contains valuable digestive ferments that are particularly helpful in their action on cereals and starchy foods.

Too much, however, must not be expected from diets for all that the food faddists would have us believe. They do *not* grow new hair on bald heads, eliminate corns or renew the vigour of long lost youth. In spite of the recently concocted ideas that certain food combinations are dangerous and that proteins and starches should be taken separately, the normal pancreas pours out the three digestive juices for protein, fat and carbohydrate from one and the same duct, and will probably continue to do so

for several thousands of years to come! And I cannot visualise many people foregoing their taste for strawberries and cream on the assumption that they must separate their fruit acids from their fats or for fear of curdling the cream!

The real point at issue is that moderation in all food is essential and that there is wisdom in rising from the table with room to spare.

BEVERAGES

Water and Milk are the cheapest fluids and milk, of course, has a very high food value.

Tea contains a brain and muscle stimulant called caffein and also a substance called tannin. If taken warm and weak it is very beneficial, but if allowed to infuse too long so that it is always strong and stewed, then it may lead to dyspepsia. Also if taken with a meat meal the tannin may turn the meat leathery and impede digestion. China tea is usually less harmful than Indian because it contains less tannin in proportion to the caffein.

Coffee also contains caffein, usually in a slightly larger proportion than in tea. It is often mixed with chicory which has a similar taste and colour but contains no caffein and is harmless. Coffee has a similar effect to tea in slowing up digestion but is less constipating.

Cocoa contains over one per cent of theobromine which has similar properties to those of caffeine. It has a far greater food value than tea or coffee and this is still further enhanced if made with milk instead of water, while it is less disturbing to the digestion.

Chocolate consists of half cocoa and half cane-sugar made up into a paste. It is highly nutritious, though apt to be indigestible in large quantities.

Aerated Waters are water charged with carbon dioxide under pressure and have a stimulating effect on stomach movements. Certain natural water like Apollinaris or Perrier are soothing by reason of the alkali they contain, while others like Vichy or Contrexville have a laxative or diuretic action on the bowels and kidneys.

The sweetened table waters such as lemonade, orangeade, ginger ale, etc., contain a considerable amount of sugar and flavouring agents, being both nutritive and refreshing. Kola water contains an extract of kola nut similar in action to caffeine.

ALCOHOL AND TOBACCO

No chapter on food and health would be complete without a word or two about alcoholic beverages. First of all we must frankly admit

that alcoholic liquors are not necessary for healthy people. Pure alcohol has a very small food value and only very limited amounts can be utilised by the body. Not more than one-tenth of any moderate quantity taken is excreted by the organs and as it cannot be converted into any other substances the excess circulates round the system using up oxygen needlessly, lowering the blood-sugar, hardening the tissues and causing thirst. As a narcotic drug alcohol has some uses and therefore it is advisable only to take it at the end of the day when the relaxation it produces can be of value, but it is fallacious to speak of it as a stimulant or a health-giving drink. Its immediate action is a dulling effect on the nervous system which reduces tension, relieves worry and banishes anxiety, thus conducing to a spurious cheerfulness, while the blood-pressure and also the body temperature are lowered as a result of the dilatation of the surface blood-vessels. Larger amounts of course blunt perception and impair the performance of skilled movements, so that a person becomes less capable of carrying out actions that call for quick decision and prompt reaction, such as driving a motor-car, playing fast bowling at cricket, taking a cannon-ball service at tennis, etc. In point of fact the greater the dexterity, precision and delicacy of touch

needed the more does alcohol impair the performance. Unfortunately it also dulls the performer's awareness of his defection with the result that he becomes less critical and is self-satisfied with a mediocre achievement whereas to the disinterested observer the lowered standard is obvious.

The action on digestion varies with the way it is taken. The habit of cocktail-drinking is quite defenceless ; cocktails irritate the stomach, cause a fictitious appetite and delay digestion. When taken with food and well diluted the rate of absorption of alcoholic beverages is diminished and the nefarious action somewhat mitigated, but if habitually taken they exert a damaging effect on the lining membrane of the stomach and are apt to produce chronic dyspepsia, thus causing extra work to be thrown upon the kidneys and liver. The interference with the delicate co-ordination between nerve and muscle results in loss of tone ; the capacity for prolonged exertion deteriorates and eventually, of course, the power to resist disease diminishes. From this it will be obvious that alcoholic beverages are worse than useless for the athlete or the healthy minded, but for the tired and harassed business man at the end of the day or for those past middle age, their narcotic effect probably makes them *feel* less tired and helps relaxation.

Regular over indulgence obviously has devastating effects. The functioning of the whole body and mind are retarded, the higher realms of judgment are impaired, the fine control of the muscles is lost, the will power is diminished and eventually the general health suffers deplorably as a result of the cumulative poisoning effect upon the tissues.

While on the question of drugs let us also consider tobacco—for nicotine is also a drug and the victim has first of all to accustom himself to it before he falls for its charm, as witness the distress and discomfort so often produced by the first cigarette or first pipe. Smoking has no beneficial effect on the body and the satisfaction it gives comes from the soothing effect on the brain and nervous system. When indulged in with moderation and without inhaling it probably does little harm, but continued indulgence can have marked effects. It quickens the pulse rate besides increasing the liability to colds and catarrh, and sets up a moist condition of the bronchial tubes known as “smokers’ lung.”

Investigations carried out by Major Stevens and Major Galloway on nearly 2500 cross-country runners showed that “smoking is definitely detrimental to endurance and that this is, to a large extent, due to a reduction in vital capacity

caused by smoking." Therefore it seems obvious that young people who wish to excel at athletic would be well advised not to acquire the habit. Another point to be borne in mind is that the tolerance for tobacco tends to diminish after middle age and the elderly may easily induce insomnia by over-smoking after the evening meal. It is no uncommon practice for some people to smoke several pipes or chains of cigarettes from the moment they have finished dinner till they are ready to retire, thus setting up an irritability of the pulse that takes some time to settle. The quality and strength of the tobacco must also be taken into consideration as well as the quantity, for Sir Clifford Allbut and Dr. Mitchell Bruce quote cases of acute anginal pain in heavy smokers whose symptoms cleared up entirely on cessation of the habit.

CHAPTER III

BREATHING

HAVING dealt at some length with the subject nutrition let us turn next to the consideration of air, the medium in which we live. God gives it to us fairly fresh, but it is constantly being vitiated and rendered palpably noxious by gases of imperfect combustion in our towns. The protective influence of clothing, sheltered dwellings, central heating and conditioned air remove the natural stimulus that fresh moving air has on our skins, and even our amusements are handed out to us in imperfectly ventilated, over-crowded public places, where in addition to the above mentioned defects there is an added risk of infection. Also in most of our towns we are deprived of ultra-violet rays by a canopy of soot and dust, so it is small wonder that the sudden exposure to sunlight during the summer holidays is often too much for our unprepared skins. In addition to the extra dose of ultra-violet light, of course, the traditional bracing

effect of the sea breeze is explained in part by the enhanced cutaneous stimulation by the minute particles of salt and sand that whip the skin. The influence of moving air and its action on the skin is often hardly realised, yet the stimulating effect of increased velocity alone can be of considerable value to the vitality of the whole system.

The nose is an important organ, for beside subserving the sense of smell it prepares the air for entering the lungs. Air does not pass through a healthy nose just as a train rushes through a tunnel, but undergoes certain changes *en route*. It is warmed, it is filtered and it is moistened thus being rendered less harmful to the delicate lining membrane of the lungs. To inhale air directly into the chest through the mouth enhances the danger of bronchitis, pneumonia and lung trouble. Free nasal breathing is also essential for good voice production, as is only too obvious when listening to a speaker or singer who is suffering from a "code in de dose"! The appearance of the typical mouth breather or "Adenoic Annie" with a pinched catarrhal nose, watery unintelligent eyes, gaping mouth and protruding shoulder-blades is only too well known, yet few people seem to realise how often poor posture, lack of concentration and chronic ear trouble are due to faulty nasal breathing. Nor is it

generally realised how frequently "night terrors" in children arise from the discomfort or fear of asphyxia caused by catarrhal obstruction of the nasal passages and interference with the natural mechanism of breathing during sleep. We are all born with an inherent instinct to breathe through the nose, but sometimes mouth-breathing is induced through habitually breathing an atmosphere that is much too dry, particularly where there is central heating or a blazing fire. Sir Leonard Hill has shown that the dark red rays emitted by some fires close up the nostrils and give a feeling of discomfort and stuffiness. Overheated crowded rooms, associated with excessive exercise such as dancing until the small hours of the morning or emotional excitement in confined spaces such as theatres or cinemas, followed by emergence into cold, damp, night air without adequate precautions, is asking for trouble. Hot soup, cocoa or warm milk on leaving, or on arrival home, will do much to decongest the overtaxed lining of the nose and throat, thus staving off the onset of colds and catarrhs that often follow from exposure to such extremes. Also the use of a nasal spray before retiring minimises the danger in susceptible subjects. A few drops of eucalyptus oil mixed with an ounce of liquid paraffin is the simplest thing to use as most of the

proprietary substances on the market are much too irritating.

Now, why is fresh air so important? Well, if we were to take a lump of sugar and burn it in a bell-jar over some water, we should afterwards find that the water had risen $\frac{1}{5}$ th of the distance up the jar. Therefore $\frac{1}{5}$ th of the air had been used up in combustion. And at the same time if we were to test the water with lime we should find it would become milky, thus proving that a substance called carbon dioxide had been formed. If we again attempt to burn some sugar in the $\frac{4}{5}$ ths of air remaining it fails to catch fire, so something vital has been used up, without which no burning can take place—this substance is called oxygen.

Breathing is very like burning, it uses up the oxygen of the air and gives out carbon dioxide in its place. Once the oxygen is used up the remaining $\frac{4}{5}$ ths of the air are quite inert. Also the carbon dioxide given off is poisonous and cannot support human life. All people and animals that breathe give off carbon dioxide, and if this were allowed to accumulate a point might very soon be reached at which life became unsupportable, but it so happens that all plants are constantly absorbing carbon dioxide and giving off oxygen, thus keeping the balance even. Accumulation of carbon

dioxide in stuffy crowded rooms is very unpleasant, but the symptoms of lassitude, headache and faintness so produced are due more to the lack of movement in the air, coupled with an excess of moisture that prevents proper perspiration and allows the body temperature to rise. Sir Leonard Hill calls this phenomenon "heat stagnation" and has shown that atmospheres kept uniformly at a high temperature, as in some centrally heated buildings with inadequate ventilation, tend to diminish the capacity for mental concentration and physical work besides increasing the liability to colds and catarrhs. He maintains that "air should be cool rather than warm; dry rather than damp; diverse in temperature rather than uniform and monotonous; moving rather than still."

The amount of air breathed in and out during normal respiration is about $\frac{1}{2}$ litre (just over 1 pint), but the total amount of air in the lungs is much greater than this for at the end of normal expiration an extra effort can squeeze much more out. In fact the $\frac{1}{2}$ litre of tidal air only represents about $\frac{1}{7}$ of the total in the lungs. This means that in normal quiet breathing, instead of really fresh air reaching the bases of the lungs, the air already present is only diluted by fresh air to the extent of $\frac{1}{7}$ of its volume. With exercise breathing becomes

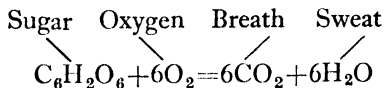
both faster and deeper, more fresh air is drawn into the lungs and consequently the stale air is more favourably diluted, and for this reason it is quite beneficial to get "out of breath" once or twice a day in order to wash the stale air out of the more remote parts of the lung. Deeper breathing clears out some extra carbon dioxide, exercises the diaphragm and also stimulates the circulation.

The air in an ordinary room contains a negligible amount of carbon dioxide (0.03-0.04 per cent), but should this amount rise, as it may do in crowded unventilated rooms, to 0.4 per cent, symptoms of headache and drowsiness are felt. A rise to 3 per cent causes deeper breathing at rest and acute breathlessness on exertion, while at 5 per cent mental confusion and loss of consciousness occur. Thus the importance of freely moving air in public places where many persons are crowded together becomes obvious, even though these figures are never likely to be reached.

In an earlier chapter I compared the body to a motor car, but that comparison must not be carried too far as the body is not a simple combustion engine. It works more like a submarine, which can use an oil-engine for simple cruising on the surface, but for the more strenuous work of diving uses a storage battery. In the same way the body

can undertake sudden effort by utilising a storage reserve that later has to be made good in much the same way as recharging the batteries of an accumulator.

For instance, in sprinting a hundred yards a trained athlete breathes very little, but at the end of the race he puffs and blows. Actually he burns up a quantity of carbohydrate about equivalent to the lump of sugar we mentioned earlier and this requires about 10 pints of oxygen. During the actual race, which lasts just over ten seconds, his consumption of oxygen goes up very little, because he runs on his accumulators, but during the next two minutes it rises rapidly while he is recharging the batteries, and then falls to normal as the "oxygen debt" is repaid.



1 molecule of sugar is burnt up by 6 molecules of oxygen and yields 6 molecules of carbon dioxide and 6 molecules of water.

Moderate degrees of manual labour or exercise cause a slight increase in depth and rate of respiration, but it is only when exercise becomes severe or the need for sudden effort arises that persons become "out of breath" and the fascinating phenomenon of the oxygen debt comes into play. Were this not possible we should be

incapable of sudden or prolonged effort, but would have to get up steam slowly and plod steadily along with considerably lowered efficiency. The capacity for doing work on an oxygen debt consequently increases enormously the efficiency of the body and the safety of the individual and we shall hear more about it in the chapter on exercise.

VENTILATION

The process of maintaining atmospheric conditions in enclosed spaces so that they are comfortable and healthful has been subject to much misconception. For many years the efficiency of ventilation was thought to depend on the amount of carbon dioxide present in the air, and draughts were thought to be the cause of many illnesses. We now know, however, that heat-stagnation is the thing to be avoided, that moderate draughts have no appreciably harmful effect on the healthy and that the chilly feeling that so often ushers in an illness is the first symptom of infection and not the cause of it.

Of the three essentials of life, food, water and air, the last is the cheapest and yet most frequently neglected. Temperature and air movement have a profound effect upon health and upon physical and mental activity, for hot air wastes energy.

BREATHING

It increases the expenditure of nervous energy and gives the heart extra work to do, whereas fresh air causes a greater flow of blood and of the fluids which are the body's natural defences against colds, catarrhs and bronchial germs. Free ventilation also reduces the spread of infection from one individual to another, because diseases are not air-borne, but spread chiefly by contact infection from droplets sprayed by coughing or sneezing ; therefore a reasonable amount of floor space between individuals is essential. For sleeping purposes not less than 40 square feet should be available for each adult and 30 square feet for each child under ten years of age.

There seems to be a general agreement amongst scientific investigators that rooms should be warmed by radiant heat and ventilated with cool outside air. Mechanical ventilating systems and air-conditioning plants fail most frequently because emphasis is wrongly placed upon the velocity flow and rate of change of air, rather than upon temperature and freshness, yet cool surroundings are of utmost value in stimulating people to work. By promoting the natural production of body heat in this way the appetite, the utilisation of food, the vigour of the circulation and the depth of respiration are all stimulated, so that good ventilation

not only reduces respiratory diseases, but also tends to prevent alimentary disorders.

Most private houses, schools, and factories in this country are ventilated by natural means. Windows, if of the sash type, should be kept open top and bottom so that the warm vitiated air can escape above and the cooler air come in below. Hinged windows, however, direct the air-currents more satisfactorily and where practicable these should always be fitted.

The most suitable room temperature for those doing light work ranges from about 62° – 65° Fahrenheit. Hot water heating-systems can be used to assist natural ventilation if the radiators are placed immediately in front of openings in the outside walls or below the windows. In this way the inward passage of air is encouraged, movement of air is maintained and at the same time the temperature of the incoming air is slightly raised.

In warm weather the discomfort of stagnation can be avoided by the use of fans to set the air in motion and keep up a constant convection current.

CHAPTER IV

SUNLIGHT AND CLOTHING

THE skin is a very important organ. Few people realise this, yet it covers a very large area and is studded with millions of minute pores, sweat-glands, oil-glands and hair. Its maintenance in a good state of efficiency is of great value to the general health ; it plays a part in the protection from disease and assists in the heat regulation of the body, therefore its preservation in a resilient elastic condition needs consideration. Far too frequently do we find people so heavily clad that they do not give their skins a chance to breathe let alone function adequately. Sometimes both young and old are swathed from neck to ankle in woollen underwear that is heavy in summer and heavier still in winter, with the consequence that their skins are saturated with a layer of water vapour that renders them a prey to cold and chill as soon as they step out of doors. At the same time this prevents the health-giving rays of the sun reaching those layers of the dermis,

where natural vitamin may be formed. Moreover, such action reduces bodily activity and renders needless the natural combustion that is responsible for internal warmth with the result that the fires of bright and healthy existence are damped down. The stupid habit of overclothing upsets the heat regulation, diminishes the blood supply, numbs the nerve conduction, interferes with the elasticity of the skin, and reduces the power of resistance to disease. Undergarments should consist of light materials capable of ready absorption and easy ventilation. Cotton, linen, and to a less degree, silk are all suitable for this, but wool and flannel are by no means so helpful to the healthy. Open-wove garments are preferable to the close-fitting, long-sleeved and long-legged affairs that cling closely to the body. These only serve to imprison the moisture, gases, and natural emanations that are constantly being given off by the healthy skin which is both an excretory and respiratory organ.

The open blouse worn by most women is an extremely sensible garment, and although when it first appeared it received the name of "pneumonia blouse," time has shown that there is absolutely no evidence of it being in any way detrimental to health. In fact just the reverse is true and we men might well profit by the example of our

wives and daughters, in the sensible lightness of their attire.

The fact that grandmothers nowadays are so gay, and that the matronly shelf is much less heavily populated than in the past, may indeed be partly due to the relaxing effect of discarding neckbands and adopting more rational corsetry. Certainly nowadays good appearance and youthfulness are by no means the prerogative of youth alone, for the matron and the mother can still preserve, by natural means, the streamlined silhouette that is so popular, without losing to the slightest degree the graceful curves of femininity.

The conventional constricting collar for men also needs censure, for if worn too high or too tight it brings a train of troubles in its wake. Tightness of clothing anywhere is objectionable, but having regard to the important structures that pass from the head to the trunk by way of the neck, constriction in this area is a crime. In the first place pressure here obstructs the return flow of blood in the jugular vein causing congestion of the blood-vessels of the brain, with associated headache, irritability, and slow wittedness; and secondly, the friction caused to the hair-roots at the nape of the neck is a common cause of boils. I have frequently helped patients to avoid

recurrences of these painful pests by insisting that they should wear a larger size in collars.

Most people are alive nowadays to the beneficial effects of sunlight, but few perhaps really realise how far-reaching these effects can be. The solar rays contain light and heat waves of very varying intensity and activity, ranging from the ultra-violet through the visible to the infra-red rays. Natural sunlight has a direct killing effect on microbes on the surface of the skin. It assists in the formation of vitamins or vitamin precursors, stimulates skin functions and strengthens the blood. Its stimulating effect on metabolism is shown in improved appetite and better sleep, while the deepening and slowing effect on the rate of breathing, and the improvement in the action of the ductless glands generally increases the bodily resistance to disease. In view of these widespread effects the cult of sun-worship consequently appears justifiable, but naturally a force that has such far-reaching activities needs to be carefully controlled; otherwise there is a risk of over-dosage leading to severe local reaction, depression and fall of blood pressure. When the skin has been covered with heavy clothing for eleven months of the year, the fallacy of suddenly exposing it to the direct rays of unfiltered sunshine during the month of August is obvious,

and the deleterious results are easily seen at most of our seaside resorts. To begin with exposure must be gradual, both with regard to the time and the amount of skin displayed. Another point is that it is the light rays and not the heat rays that are most beneficial, so that heavy pigmentation should be prevented as this pigment forms a barrier that shuts out the most beneficial part of the sunshine. Also the body should be kept cool during exposure and consequently, to begin with, the middle of the day should be avoided.

The sun is an active curative as well as a disease-preventing agent and its value in tuberculosis and rickets has been known for some time. Few people, however, realise that by the aid of sunlight they can manufacture vitamin in their own skin and that this is carried by the blood stream to the deeper organs, yet one has only to see a few basement-dwelling children to realise what poor, pale, etiolated specimens are produced in the absence of sunlight. Poorly lit workrooms, dingy offices and the need for working by artificial light undoubtedly reduce the efficiency of many workers, besides having a depressing effect upon their minds and rendering them peculiarly prone to sickness. The importance of sunlight is gradually becoming recognised as a vital

economic factor in the output of the worker, besides being nature's great purifier.

It is well said that the " finest doctor is the sun ; the only difficulty is to get an appointment with him." In our country this difficulty is intensified not only by the vagaries of the climate, but also by the canopy of soot and dust which in large measure deprives us of the ultra-violet rays.

Sunshine itself is a mixture of three things ; heat by which we are warmed ; light by which we see and ultra-violet rays which we can neither see nor feel, but which have a chemical action on the body. Even at the best of times only a small fraction of these latter rays reaches the earth ; not more than about one per cent. Without them the sun would still be pleasantly warm or oppressively hot ; trees would still look green and roses red ; in fact, conditions would very much resemble the inside of a glasshouse. The deprivation does not at first sound much to worry about, yet the importance of these rays for health is enormous. If human beings were reared in glasshouses, despite the heat and light, they would grow pale and sickly and sallow ; would tend to become anæmic and debilitated and their babies would develop soft bones and bowed legs. Our canopy of soot and dust acts in much the same way ; it lets through the heat and light, but keeps

back the ultra-violet rays and the typical town dweller becomes like the inhabitant of the imaginary greenhouse, partially sun starved. -

No doubt you will think that if sunlight does this we should soak it up steadily, for it is cheap enough in all conscience. Ay, there's the rub! Sudden exposure of an unaccustomed skin may cause days of agony to follow a few hours' indiscretion. Sun-bathing is a most beneficial practice but requires to be practised with caution, for a bad sunburn is as dangerous as any other sort of burn, the toxins liberated in the skin have a very depressing effect. Sun worship is all very well but it is foolish to turn oneself into a burnt offering!

At the beginning of the bathing season much discomfort is caused by undue exposure of the skin, and strong sunburn can give rise to feverishness as a result of the poison absorbed from the damaged skin. Moreover, the hot noonday sun of midsummer has a relaxing effect on even the most hardened sunbather, and therefore may easily produce nervous depression or even prostration on the careless initiate as a result of over-dosage. All doctors are accustomed to seeing several cases with headache, sickness and a rapid running pulse as soon as the first spell of sunshine begins, and many more still during the

month of August, all of whom could have avoided any trouble by exercising a little care and forethought.

Never expose the body to begin with for more than five minutes at a time to the direct rays, and move into the shade occasionally. Fair-skinned people would be well advised to expose only a small area, say one limb at a time, and keep the rest of the body covered by a *peignoir* or a towel. In this way harmful over-stimulation will be avoided, and the time can gradually be increased by an extra five minutes each day until a healthful coat of tan is achieved. A wise person also shades the eyes or wears some form of dark or tinted glasses to prevent irritation of the sensitive retina. Continual glare can be most uncomfortable and often leads to unpleasant headache.

Once you have become acclimatised, the process is much more straightforward, but remember that sky-shine is just as helpful as direct sunlight and that the early morning sun contains more active rays than in the afternoon. This you can prove for yourself by observing the blood-red ball that sinks in the westerly sky. The longer column of air that the rays have to penetrate filters off much of the ultra-violet end of the spectrum, leaving only the less powerful red rays to reach the earth. Conversely at higher altitudes the ultra-

violet rays are more plentiful, and consequently even in winter sunburn is common in Switzerland. The added reflection from the snow also intensifies the action of the rays that have suffered less filtration than usual owing to the shorter column of air traversed.

Sir Henry Gauvain, one of the pioneers of sunlight treatment, insists that being a very powerful agent in the prevention and arrest of disease its indiscriminate use is naturally fraught with danger. The most obvious dangers are sunstroke, heatstroke, and sunburn. Fair-skinned people and those who freckle easily require to be meticulously careful in the method of exposure, while albinos are definitely unsuitable for sun-treatment. Those who respond suitably are extraordinarily immune to colds and catarrh, not only during the period of exposure, but also for a considerable time afterwards. Our short summer, however, gives us little chance of making adequate storage to last throughout the whole winter, with the result that in the early months of the new year epidemics are likely to become rampant. By this time most of us have used up what small store of sunshine we managed to secure during the previous summer, and consequently soon after the Christmas holidays the doctors' trade increases. Luckily nowadays we have a

useful adjuvant to summer sunshine in the form of Artificial Sunlight (Ultra-Violet Light) which in moderate doses is a helpful and beneficial tonic. Particularly does it prove of value to the asthmatic and bronchitic, while for the rickety under-nourished children of our towns and cities it is a veritable godsend. Clinics are established in various areas at which treatment is available for diseases that respond to sunlight, while during the winter months they provide an opportunity for compensating for previous sun starvation.

Medical treatment of this kind of course involves correct diagnosis and skilled application. But there are hosts of people who are much more concerned with preventing these things than with getting them cured. Health is everyone's concern, and this book is written for those people who will give some time and thought to keeping well. The townsman and indoor worker, compelled to spend most of the sunlight hours indoors, can prevent sun-starvation and its consequences by investing in a sun-lamp. The lamps employed in medical practice are powerful and costly, but smaller models are designed for laymen's use which are quite effective for tonic sunbaths. Certain precautions should be observed and it may be helpful to go over these quite briefly. Most good things in life, from hot baths to

motor-cars, are attended by some degree of risk ; sun-lamps are no exception. First of all, common sense is necessary. Most people know how much roast beef or brown bread they can eat at a meal, and realise that double the amount means something very different from double the benefit. It is much the same with sunshine or a sun-lamp. As may be judged from their action on the skin, ultra-violet rays carry very high energy, and a sudden overdose may cause sunburn on the skin and give a shock to the unacclimatised system. It is better to take too little than too much. Furthermore, a sun-lamp is not a panacea for every disease ; in the hands of a layman, it would be unwise to use it for any disease except under medical advice. In particular, it is unsafe to take a sunbath, either outdoors or indoors, at any time when the temperature is raised. Again, whilst few people in Britain have any experience of snow-blindness, most will know that it causes severe pain and temporary incapacity. It is a swelling of the eyelids caused by the ultra-violet rays of the sun, especially when they reach the eye at an unaccustomed angle by being reflected upwards from snow, or from bright sand as T. E. Lawrence narrates in *The Seven Pillars of Wisdom*. An efficient sun-lamp can cause the same unpleasant results unless the eyes are

covered by goggles, or kept tightly closed during exposure.

Having hedged this round with due precautions, let us consider why the use of a home sun-lamp is beneficial. Chiefly, because the body thus regains a form of natural energy of which modern conditions have deprived it. It thus becomes "normalised" in its working; and the effects are seen not only on the skin but in better appetite, sounder sleep, steadier nerves, and greater endurance. In particular, resistance to disease is raised: it is a common experience with cold-susceptible subjects that they do not succumb to this common infection whilst using a sun-lamp. (This is entirely a matter of prevention; the sun-lamp will not cure a cold once it has developed.) The skin acquires a firm glossy texture and a good colour; its vessels are well filled with revitalised blood and it can tolerate exposure to cold far better than a flabby white skin. A deep tan should not be acquired, and will not occur if the lamp is used rightly.

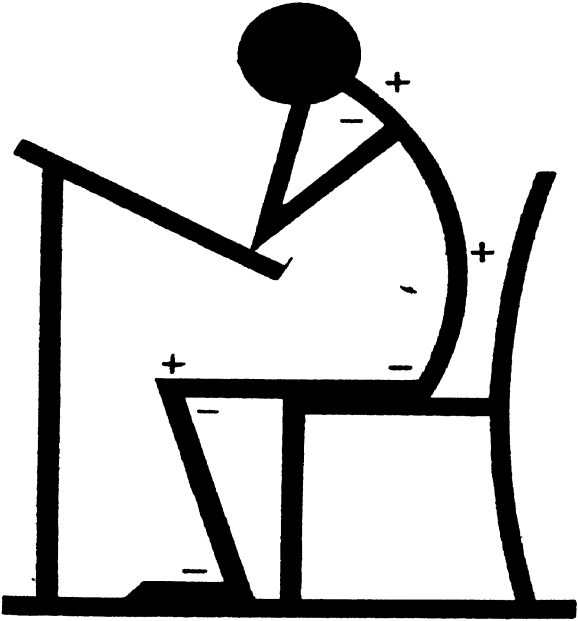
Using a sun-lamp is fairly simple. Just as with natural sunlight, different people will vary in their reaction to a sun-lamp. A blonde may require half or less of the dose which is beneficial to a brunette. Subjects of adipose tendency and lethargic disposition will benefit from doses heavier

than the average, whereas those of spare frame and excitable nervous temperaments will find that doses somewhat below the average will suit them best. The question of what is an "average" dose can only be determined from the lamp itself. Three types are available for home use : the mercury arc in quartz tube, the mercury arc in glass bulb, and the open carbon arc. The last is not recommended ; its fumes and sparks make it unpleasant and alarming to use, and it requires a great deal of current to be effective. Whichever type be used, it is probably best to sunbathe standing, or at least sitting up, and with a clock in sight so that the exposure is correct for time. Start with a few minutes only and gradually increase up to the optimum. Distance is also an important factor ; the lamp should be used about a yard from the body (so as to cover a good part of the trunk evenly), and the distance should be kept uniform. The best exposure is that which gives no more than a faint flush to the skin, coupled with a definite feeling of invigoration and freshness, some 4 to 6 hours afterwards. The time of day varies for individuals ; some sleep better after using the sun-lamp whilst undressing for bed ; others find it makes them wakeful, and use it on rising. It is, of course, advisable to sunbathe in a room which is well warmed.

CHAPTER V

POSTURE AND CARRIAGE

LITTLE children move gracefully and naturally. If you want to prove this just watch a child getting up from the floor, and see how it places its legs under its body and rises from a crouching position by straightening the knees and hips before extending the spine. Unfortunately the natural resting positions of the muscles are interfered with during the school life as so much time is spent sitting down. For instance, when sitting at a desk the ankle muscles, hamstrings, hip, and trunk muscles, and muscles at the front of the neck are shortened while the thigh muscles, the back muscles, and those at the back of the neck are stretched. For this reason it is essential that all children should stretch their bodies occasionally by putting their feet well out, hollowing the back and stretching the neck backwards, thus compensating for the cramped posture and relieving the congestion in the blood vessels. In fact a few stretching exercises on



POSTURE AND CARRIAGE

similar lines, accompanied by deep breathing, indulged in occasionally throughout the day, would be helpful to us all.

Very few people walk really well and at adolescence faulty postures of sitting and walking are far too common. The young man is apt to slouch with drooping shoulders, hands in pockets and perhaps a pendulous cigarette hanging from slack lips, indicating a lack of backbone. Young women often sag or sway with their hips thrust forward and a sunken chest instead of stepping out briskly with a walking technique that expresses the vivacity of their personality. Good carriage can indicate good character and is therefore well worth cultivating.

First of all it is important to achieve a good standing position, with the weight well balanced on both feet, the knees braced back, the hips firm, the tummy in, ribs up, shoulders back and head level. Then from this standing position swing the right leg forward about 6-8 inches off the ground, keeping the knee straight and pointing the toe downwards, then swing the leg back to a corresponding position behind and point the heel downwards. Do this three or four times and repeat with the left leg. Now repeat with the right leg, but as it goes forward let the weight of the body fall forward with it until the foot comes

in contact with the ground. Keep the weight directly on the line from the ball of the foot to the heel and bring the left heel up as the right goes down. Then swing the left leg forward by bending the knee as it passes the perpendicular. In this way you will move the body along on an even keel and "toe the line." Practise later with a book or a bowl balanced on your head and eventually fill the bowl with water, by which time any failure from perfection will bring its just retribution.

Good walking postulates good poise, for if you have learnt muscle control you will be light on your feet and not suffer from self-consciousness or awkwardness on entering a room. Nor will you sit awkwardly and cramp your organs, for the comfort of good posture will have become as second nature.

Physical culture should teach people how to sit properly, stand correctly and breathe rhythmically. The person who sits huddled up with a curved spine and caved-in chest and who walks in a drooping, dejected attitude, is cramping his or her lungs and depriving them of fresh air. These points affect, far more than many people realise, the health, the looks, the vitality, the energy, and even the happiness of each individual concerned. Moreover, those who stand correctly and easily.

put no undue strain on any particular set of muscles and consequently suffer far less from fatigue.

Flat-foot sometimes begins in infancy, being seen in the fat, flabby overweight child reared on a starchy diet. In adolescence through inadequate rest or over-pressure at school the feet flatten because the muscles are constantly overtired, and the same thing happens in adults who try to get about too soon after convalescence from illness.

In all cases the tone of the muscles must be improved by a series of graduated exercises performed regularly. In the first place practise heel-raising and standing on tiptoe, then sink back on to the heels and raise the toes. Next roll the feet outwards and stand on the outer borders, then try walking round the room with the feet in this position. Lastly attempt to pick up pencils and penholders from the floor by curling the toes round them in a prehensile manner.

All these exercises strengthen the small muscles of the foot and help them to hold up the arch, while the effect can be hastened by building up the heels of shoes on the inner side with a wedge of leather $\frac{1}{8}$ of an inch thick tapering down to nothing on the outer side. Supports should not be used as these do nothing to encourage the

restoration of natural muscle tone, which is, of course, the ultimate aim of treatment.

For round shoulders and spinal curvature crawling exercises are best. Each arm should be stretched forward alternately to the fullest extent, and the opposite leg drawn up before advancing the other arm. In this way the spinal column is alternately coiled up and uncoiled as progress is made along the floor.

Faulty posture in children is usually an indication of a condition of diminished muscle tone, and attention to the general health is nearly always needed in addition to local treatment.

CHAPTER VI

BATHING

CLEANLINESS may not be considered as next to godliness in every strata of society, but all the same there is a considerable amount of truth in the dictum of the Health and Cleanliness Council that "Where there's dirt, there's danger." Scrupulous bodily cleanliness therefore should not be looked upon as unnecessary fastidiousness, but as a useful contribution toward bodily health. A word of warning, however, is perhaps not out of place here regarding the use of strong antiseptic soaps. These are usually quite unnecessary besides being liable to produce irritating rashes on fair delicately-skinned people. Moreover, a consideration of the nature and number of baths to be employed may also be helpful.

For ordinary personal cleanliness a daily bath is advisable, though not always essential. Some authorities regard even two baths a week as ample, but much depends of course upon economic

conditions and facilities. What is certain is that an excessive number of *hot* baths impair rather than improve health, for prolonged soaking in hot water enervates the system and eventually produces a fall in the number of corpuscles circulating in the blood. Heat also has a detrimental effect on the sexual organs, so it is important to limit the heat of baths and always finish up with a cold douche when practicable. Probably one of the reasons why women can usually tolerate hotter baths than men is because their sexual organs are more adequately protected.

For the young and healthy, an early morning cold douche or shower-bath is very stimulating, but for those of more mature years or in cases where the heat-regulating mechanism does not function actively, a tepid sponge or warm bath is better. If bathing is done regularly there seems no need for women to abstain from doing so during the menstrual period, in fact the warmth to the pelvic organs is sometimes advantageous in relieving congestion, besides considerably aiding the elimination of body odours.

A bath of water is good, a bath of air is better, but a bath of sunshine is best. In sea bathing as indulged in nowadays all these three are available together. Firstly sea-water is a natural salt solution similar in composition to human blood,

and consequently immersion in this solution is not grossly at variance with the natural salines in the circulation. Shore bathing as opposed to deep-sea bathing has additional factors in its favour owing to the mechanical effect produced by the impact of the waves and surf upon the skin. Provided the surf is not too strong, the buffeting of the waves acts as a tonic douche, stimulates the breathing, keeps the circulation active, and has a bracing effect on the nerve-endings of the skin. In fact, by reason of its effect on the nervous system, bathing when judiciously employed acts as a tonic and dynamic agent, but its whole success depends upon the ability of the individual to re-act satisfactorily. In healthy persons the preliminary disturbances of circulation and respiration due to immersion, soon set up a primary re-action, and by means of muscular movement or shivering the blood is brought back to the skin, so that a healthy glow and feeling of well-being soon supervenes. It is imprudent even for robust individuals to remain in the water for an hour or so—short frequent immersions are much more beneficial than a prolonged bathe. There is a tendency, unfortunately, on the part of many people whose approach to the sea is only obtained in a short annual visit, to overdo their bathing and start

with long stretches and frequent immersions from the very first day. In such cases lassitude, headache, and loss of appetite occur, and without understanding the cause of their fatigue the persons thus affected often blame the climate as "too relaxing."

As a rule, the best time of the day to commence bathing is between the hours of 10 a.m. and 5 p.m., preferably about two to three hours after a meal and when the tide is high. The duration of the bathe must of necessity vary with the temperature of the water, the age of the person, the amount of active exercise taken, and the time of the day; but at first the bathe should be short and measured merely in minutes, while in children, old people, and invalids it should remain short. Those of more robust physique may lengthen the time and increase the frequency, but this should only be done gradually. In calm water on sunny days the time may be advantageously prolonged, but rough water, though often warm, is exhausting. Swimmers, as a rule, can stay in longer than the mere bather because the active exercise stimulates the circulation, warms the muscles, and increases metabolism, thus delaying the onset of shivering. At the same time muscular fatigue must be avoided, otherwise the pulse pressure falls and unpleasant consequences are likely to ensue. The

early morning bathe on an empty stomach, immediately on rising and before the body has regained its natural warmth, can only be undertaken with benefit by the most robust or by those who have become acclimatised by long practise. But even then a few biscuits or a warm drink should be taken some while before entering the water. Again, the evening bathe in the night air is to be deprecated.

Sir Henry Gauvain considers the cool, fresh English seas more beneficial and stimulating than the warmer waters of the Mediterranean or tropical seas, and finds the psychological effect of sea bathing on his little tubercular patients increases their happiness, vivacity and joy of life.

Those with catarrh and ear trouble should be very chary of bathing without adequate precautions. A sudden inrush of water into the mouth, accompanied by gasping or spluttering may carry back septic material from the throat and nose into the ear or nasal passages of those suffering from catarrh, sore throats or colds. In this connection of course polluted baths or swimming-pools are more likely to be a source of danger than river water or the open sea.

CHAPTER VII

FOOD AND EXERCISE

ABOUT four-fifths of the food we eat consists of starchy and sugary substances (carbohydrates) and these form the predominant fuel for the muscles. The digestive juices break down the composite foods we eat into simpler products that can be easily absorbed. Protein is split up into substances called amino-acids which can pass directly into the blood stream and are carried to the liver. They are then used for building up worn-out tissues or for replacing "wear and tear." Animal proteins contain these amino-acids in higher amount than do vegetable proteins and therefore are more economical for the system; also some of the essential amino-acids are lacking in vegetable proteins, so they are useless as the sole source of protein supply. For this reason vegetarianism is inadvisable for growing children and excessive bulk becomes essential to make up for the absence of first-class quality if people attempt to live on vegetable food alone.

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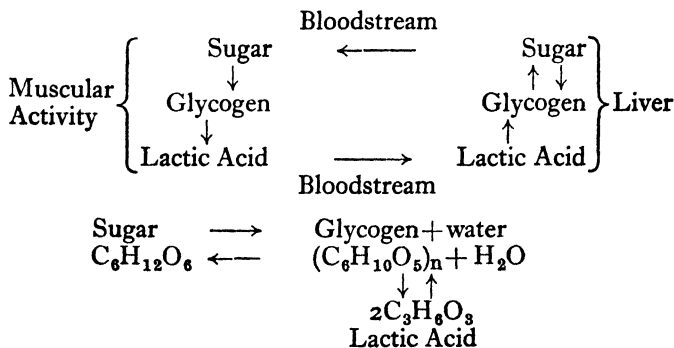
The fat in the diet is broken down into soaps and glycerine in order to pass through the intestinal wall and is then reformed. Some is stored in the liver, some is used directly for heat and warmth and the excess is deposited as fat in various parts of the body.

The carbohydrate and starchy food is broken down into simple sugars before it can be absorbed. It passes into the blood as glucose and is taken up by the liver and stored as glycogen, only a small proportion remaining as sugar in the circulation.

The muscles use sugar as their fuel in preference to the other foodstuffs, and the liver appears to find no difficulty in producing it sufficiently rapidly for their needs provided its store of glycogen has not been depleted. It is advisable, therefore, that the glycogen stores should be well filled when prolonged exercise or arduous work is undertaken; to take sugar before a race is therefore physiologically sound and infinitely preferable to beefsteak or beer, the first of which overtaxes the digestion, while the second lowers the blood sugar instead of augmenting it. Under ordinary conditions the sugar in the blood is kept at a constant level by a reversible change whereby sugar is converted into glycogen and vice versa; glycogen is formed and stored in the liver as the blood sugar rises after a meal, then

sugar is formed from glycogen as the level begins to fall as a result of muscular breakdown.

Muscles in burning up sugar produce lactic acid and if this is not washed out by the blood it causes stiffness. With a good blood flow through the tissues, most of it is removed as it is formed, and any excess oxidised in the recovery stages following muscular exertion and carried to the liver. Here it is converted back into glycogen and becomes available once more for the production of sugar. Thus the muscles and liver work for each others' mutual benefit in carrying out what may be called a "carbohydrate cycle."



During exercise oxygen is required in greater quantity and waste products are formed more rapidly than at rest and consequently breathing becomes faster and deeper. We have already learnt how the accumulation of carbon dioxide

brings this about, for the ultimate control of breathing lies in a small nerve centre at the base of the brain which is peculiarly sensitive to an excess of carbon dioxide in the blood, and sends out a rhythmic series of messages to the nerves controlling the chest muscles and the diaphragm. As the amount of carbon dioxide increases the messages sent out become more frequent and more forceful, the chest wall expands more violently and more air is sucked into the lungs. This suction also sucks more blood back along the veins to the heart and encourages an increased output by that organ, while the circulation is probably also augmented by contraction of the spleen. Thereby the blood-pressure is slightly raised and the force of the heart-beat automatically increased. All this stimulates the circulation and means a better blood supply for the brain and muscles. To the athlete this is a great asset, but even for the purposes of ordinary life the ability to respond quickly to a call for increased effort has decided advantages, even if for nothing more than catching a train or sprinting for a bus.

There is little doubt that the average individual, unless mentally lazy, takes for granted the importance of active exercise. We have already learnt that the increased circulatory flow and improved aeration of the blood, consequent upon

the higher pulse-rate and deeper breathing produced by effort, bring a better blood flow to the brain. This gives the individual an improved feeling of well-being and ensures a better functioning of the vital organs, while the development of co-ordination between mind and muscle has a definitely stimulating effect. To obtain the maximum effect from exercise, of course, it should be undertaken out of doors in good sunlight with the minimum of clothing, but for the majority of people this is impossible owing to the difficulties of time and environment. The nearest approach to this optimum should be attempted by exercising as near as possible to an open window, either before dressing or before retiring.

We must be careful, however, to distinguish between physical exercise and physical exhaustion. To prolong exercise to the stage of exhaustion, whereby excessive products of muscular breakdown clog the circulation, is fallacious, and only results in the production of "physiological fatigue," manifest the next day in stiff muscles and aching limbs.

What sort of individual do we wish to produce as a result of physical training? Is our aim a heavily muscled individual, powerful but ponderous, or a lithe, active, agile person whose muscles are trained to obey the dictates of his

mind at a moment's notice? It is of no avail to have the muscular development of a Sandow and then die at fifty-five of a fatty heart! Bulging biceps and over-developed deltoids so soon become interspersed with layers of useless fat, and resemble streaky bacon in their fatty degeneration.

Those who fondly believe that by carrying out a prolonged series of resistance exercises with exercisers and heavy dumb-bells they will improve their strength, or that by steady plodding runs they increase their stamina and "wind," would do well to review the situation. They should consider whether in place of developing a "second wind" (which is really the re-adjustment of the respiration and pulse-rate balance at a higher ratio), they are not gradually producing a condition known as emphysema, that will only leave them "broken winded" in the end. Prolonged straining effort, working against resistance and the insistent demand to "hold it," impairs natural breathing, causes a strain on the delicate lining membrane of the lungs, and raises the intra-abdominal pressure. Thus it is possible that over-development of the chest and shoulder muscles may lessen, rather than increase, the vital capacity of the lungs, although externally the cubic capacity appears greater.

I think I have said enough to emphasise the

fallacy of building up excessive muscle. Health and fitness have little or nothing to do with muscular bulk, the only thing that really counts is functional activity and adaptability. Few people probably realise what an important factor rhythm is in life. In the world at large we see it in the alternation of day and night, in the waxing and waning of the moon, in the variation of the seasons ; light, heat, and sound, are all the product of rhythmic waves. In our bodily functions rhythm is just as important and fundamental and consequently the jerky, staccato movements of the old-time drill-sergeant are being superseded by rhythmic exercises that preserve the regularity of breathing and avoid interfering with the natural rhythm of the involuntary muscles. Military precision must be sacrificed and made subservient to functional needs.

The best sort of physical exercise serves some useful purpose. Even housework for the hometied woman can be relieved of drudgery and turned to good effect if done in the right way. The trivial round and common task can furnish even more than we need if organised and arranged methodically. The daily duties of sweeping and dusting can be quite beneficial if carried out briskly and energetically without strain or hurry, and if the maintenance of one position for too

long a time without change and relaxation is avoided. Also, by opening wide the windows the rooms are ventilated and fresh air obtained at the same time. I know some women who carry a swimming-costume in their shopping-basket and have a daily dip after the round of shopping has been completed, thus obtaining walking and swimming exercise as they go about their regular task. Thus, by a little thoughtful planning, the need for extra time for physical culture and exercise becomes unnecessary.

Some men also obtain a certain amount of exercise in their daily work, but the majority of sedentary workers who spend many hours daily indoors in sitting positions require some sort of exercise to correct the consequent stagnation. Much, of course, can be done by including a daily walk too and from the office, by using the stairs in preference to the lift or by devoting ten minutes morning and night to the practice of simple exercises in the open air.

CHAPTER VIII

CONSTIPATION

CONSTIPATION is one of the curses of civilisation. The bowels will function regularly and automatically as a rule if left to themselves, but interference naturally throws them out of gear. Most frequently the trouble is due to a neglect of the natural stimulus to these organs.

One of the most important points to remember is the necessity for regularity and with the right habits of living, the right diet, and the right amount of exercise regularity will follow. It is foolish for people to rush their morning toilet and expect to have time to attend to the needs of nature later in the day. The primary impulse is thereby suppressed and by constant suppression sooner or later comes to be neglected altogether. How many of us stay in bed till the last possible minute, hurriedly wash and dress, race through breakfast, and rush off to the station to catch a train, or board a bus without giving our stomach or our bowels

half a chance of working smoothly and normally? We think, there will be time to attend to the evacuation later on, but the impulse passes, work presses, extra details crop up, and the seeds of chronic constipation are already sown. A leisurely glass of cold water taken while shaving or dressing will in most cases produce a very satisfactory result after breakfast, if not before. Re-educating oneself into regular habits is by far the best cure for such trouble and infinitely superior to any patent medicines or pills.

On the question of diet we must consider the question of bulk and roughage. A certain amount of residue is essential to distend the bowel and cause the muscles to contract. Vegetables, starchy foods, and fruits are helpful in this respect, e.g. spinach, peas, beans, cauliflower, cabbage, asparagus, onions, celery, tomatoes, prunes, figs, and baked apples; coffee and honey are preferable to tea and marmalade for the breakfast menu, while stewed fruit and wholemeal bread are both advantageous. Not everyone, however, can tolerate roughage and those with defective mechanism, ulcers of the stomach or old scars, would be ill-advised to resort to such methods to increase roughage. Persons with irritable digestive organs will promptly get into trouble by eating indigestible substances with a bulky residue. For them a

smooth low-residue diet without roughage is essential. They must eschew skins, pips, gristle, or fibre. Their salads should contain no cucumber, tomato, or celery; they must avoid the stalk of vegetables and the seeds of fruit and jams. If flatulence is a feature of their trouble, cabbage, beans, onions, sauces, and spices must be cut out. The diet must consist mainly of those substances that are almost entirely absorbed and leave little or no residue such as meat, fish, fowl, cream soups, milk, eggs, custard, ice-cream, fruit juices, and stewed fruit such as pears and peaches. Small eaters, of course, cannot expect to function as freely as those with generous appetites, nor should those on a low-residue diet expect to do so either. In their case the problem may be eased by an increase in their fluid consumption. Hard dry stools hamper evacuation and this difficulty can be overcome by taking a larger quantity of water during the day. As mentioned earlier, at least 3-4 pints should be consumed daily. In some districts, particularly at spas, the water has a definitely laxative quality, but hard water such as found in London, with its excess of lime salts, must be taken freely to produce anything like a good result.

Sedentary workers suffer as a rule from a further drawback, in that the nature of their work pre-

disposes to laxness of the abdominal wall and the very nature of their posture cramps the natural rhythm of intestinal flow. Furthermore there is an absence of regular exercise in their mode of life and of the type of movement that causes natural massage of the bowels by the muscles of the abdominal wall. Mild daily exercise therefore, and particularly anything that encourages the use of the abdominal muscles such as walking, handball, cycling, rowing, or gardening, is helpful to this type of individual.

Highly-strung emotionally-sensitive people are apt to live in a state of tension, and just as worry ties their minds in knots and gives them headaches, so is it apt to tie their bowels in knots and give them constipation. Cultivating the art of relaxation is just as important for overcoming this, as for the other disabilities of the chronic worrier. The use of harsh purgatives will only increase the trouble in most cases, so if you are not getting a satisfactory result from regulating your regime and diet, go and see your doctor so that he can find out the real underlying cause.

CHAPTER IX

GAMES

THE cult of games should not be undertaken with the idea of building up animal strength, nor is it concerned merely with the question of obesity. The main function of open-air games is the general stimulation of bodily activities ; the circulation is speeded up, the blood supply to the various parts is increased and the elimination of waste products takes place more rapidly, consequently any risk of clogging the system is minimised. All this is to the good, but apart from this there is the psychological factor that also produces a decided stimulus. The person who takes his exercise regularly feels better afterwards because he knows he has done something from which he has derived benefit. Williams points out that exercise is most scientific when it “ produces increasing amount of fatigue substances causing increased resistance to fatigue, but at no time resulting in soreness or stiffness.”

The fundamental exercise of walking requires

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deliberate effort to turn it into a beneficial "constitutional," unless there is some additional mental stimulus engaging the attention or calling for the exhibition of some particular skill. The benefit to be derived from rambling through the countryside beset by green fields, with the blue sky overhead and the sunshine glinting on the pathway, is incalculable, and when to the beauties of the landscape we add some scrap of nature-study gleaned by the wayside, we are gaining both mental and physical profit. A walk planned geographically or historically also gives an added zest to what might otherwise develop into a leisurely stroll. Shooting, skating, croquet, etc., all add an amusement factor to the simple project of walking, and many other games are similar, but the pre-eminent walking game is, of course, golf.

Golf requires special consideration as it is an ideal game for those seeking mental relaxation and relief from introspection. The harassed city worker hies himself to the local links and pursues a gutta-percha pellet about with a stick. In the process he obtains muscular activity, improves his co-ordination and is encouraged to walk over most unsuitable surfaces, but under ideal surroundings as far as fresh air is concerned. At the same time the mind is taken off his business

worries, for it is impossible to sink a long putt if the mind is still engrossed on a business deal. Admittedly many tempers are lost in the bottom of bunkers, but the next good drive or pretty approach shot seems to make the world smile again.

Certainly while the whole organism is more physically awake the higher centres of the brain have an opportunity to relax and this is the main advantage to be derived from playing games wisely. As with every other sport, golf will not be satisfactory if the player is fatigued in body or mind. When very tired most of us become irritable and lack concentration, so it is useless to attempt to pack another form of tiredness on top of one that is already there. Do not rush off to the golf course and cram in a couple of rounds as soon as the gong goes for "down-tools." Remember that relaxation is what the body needs before re-adjusting itself to another set of values, and if this change-over period is slurred the machine becomes strained and refuses to respond successfully.

The elderly should remember that for them strenuous exercise in the heat of the sun should be avoided and that a gentle round in the late afternoon is best.

When you have finished your round you will

find that you have probably perspired more than you thought, so remember the need for a bath and a change of clothes, but forget the "nineteenth hole" till this is done. You can do all the chatting you like and hold a whole series of post-mortems, if necessary, provided that you avoid sitting about in damp clothes.

The younger generation will probably prefer something more active and energetic than golf, and for them rugby or association football, hockey, and lacrosse are available in the winter with rowing, cricket, and tennis in the summer, but these are team games where individual effort must be subjugated to the needs of the mass. The main point to remember is that active participation is infinitely preferable to watching the efforts of others no matter how skilled they may be, so cultivate some sort of game.

Horse-riding. Returning to the question of individual occupations, that of horse-riding has been popular for many centuries, being recommended by Hippocrates as long ago as four centuries B.C. The old adage that "the outside of a horse is the best thing for the inside of a man," is still as true as when it was first coined. The vibratory action with its consequent massage of the liver by the diaphragm and abdominal muscles soon relieves any sluggishness or con-

gestion, while the rapid motion through the air without excessive personal exertion is stimulating to both the skin and circulation.

Cycling. For those whose pockets will not run to the purchase or hire of horses, similar benefit may be obtained from cycling. Admittedly the dust and overcrowding of the roads have removed much of the pleasure for the pedal cyclist, but there are still many by-roads and pleasant country lanes where this admirable and hygienic exercise may be pursued with pleasure. Body posture and the "fit" of the bicycle are important, as too long a crank or too low a handlebar may mitigate many of the otherwise beneficial effects, but as a means of covering the ground and seeing the countryside it has many advantages, besides providing muscular exercise and a means of reaching pleasure resorts in a healthful manner.

Dancing. In its more modern forms dancing has very little to recommend it as an exercise, and even as a relaxation the stuffy atmospheres and late hours that it entails spoil much of its merits. Yet folk dances and Morris dancing performed in the open air provide a test of memory and skilful exertion besides having an aesthetic appeal.

Indoor Games. Although it is always preferable to take exercise out of doors, the inclemency of our weather makes this impossible throughout

the whole of the year. In order to overcome this drawback, local authorities may eventually be persuaded to provide large buildings, consisting of a roof supported on skeleton girders with sliding panel walls that can be used to screen off wind, thus enabling them to remain open to the air despite wind and rain.

In such places physical-training classes could be held and various games such as badminton, basket-ball, and deck-tennis could be played without losing the psychological stimulus that is so often reduced by the dull monotony of a restricted space. If, in addition, warmth and artificial sunlight could be provided at the same time the benefits would be infinitely greater. How long will it be, I wonder, before the country as a whole becomes alive to the possibilities of providing such solaria on a large scale ?

Games such as fives and squash, which are now on the crest of a wave of popularity, must of necessity take place indoors ; badminton also needs still air, and loses in accuracy if played out of doors, but the cost of balls and shuttle-cocks prevents the appeal of these games from becoming universal. Basket-ball and deck-tennis, however, are likely to become increasingly popular as they both provide active concentrated exercise for a fairly large number of players in a reasonably

small space. Deck-tennis in particular calls into play many muscles, can be played either out or indoors, needs very cheap equipment, only requires a small amount of space and can keep many people occupied in a given time. I feel sure that Sir Kaye le Fleming's suggestion of popularising it among the masses is a very sensible one and should be followed out without delay by all interested in the recreative side of training.

Sculling machines, cycling-machines, and electric-horses installed in gymnasia afford an opportunity for obtaining violent exercise in a restricted space. Yet they cannot replace the actual sports themselves because the stimulus of moving air and changing scenery is lacking, which means that the all important psychological factors are absent. Weight-lifting, the use of chest-expanders, and resistance exercises are definitely ~~to~~ be deprecated inasmuch as working against resistance produces the wrong effect—such exercises may build big muscles, but the fallacy of this has already been explained and unless they have functional efficiency and great resilience big muscles may be more of a handicap than a help, for they put an extra strain on the circulation, without contributing in any way to improved health.

CHAPTER X

RECREATION AND LEISURE

THERE are three categories of those who profess and call themselves "sportsmen"—(1) the active participant; (2) the inactive onlooker; (3) the gambler on the result.

Only the first can really lay any claim to the title and he is the only one who derives any lasting benefit from sport, because he alone obtains the thrill of personal effort. The second category, who watch others disport themselves, sooner or later find the second-hand thrills so obtained are unsatisfying, and instead of finding solace in something in which they can participate themselves are apt to attempt to bolster them up by having a flutter on the result, thus turning a second-hand thrill into a third-hand one. This of course puts a premium on winning at the expense of the standard of play or the nature of the performance. In fact, someone once described gambling as the "salt whereby the foolish attempt to savour the rather thin porridge of second-hand thrills."

It would be much better and more beneficial if a far greater number of people could be induced to take part in games rather than watch them. There are too many watchers and too few active participants in the world already. Fond as the average Englishman is of a ball game we cannot expect him to chase a lump of leather around a green field for much beyond his first thirty years. After this period his wind becomes poorer and his joints less supple, so he takes a smaller ball and hits it with a stick and calls it golf ; as age increases and sight grows dimmer the size of the ball is increased and it is rolled along the ground in slower tempo and called bowls. It matters little, however, what the game is, as long as the individual is an active participant in it ; only in that way can he obtain real joy and satisfaction from it. But whatever is done must not be overdone and above all no attempt should be made to pile a whole week's exercise into a week-end. " Little and often " is a useful motto to remember when considering recreation.

The time set aside for recreation should be devoted to a RE-CREATION of energy for our life's work, and not spent in a strenuous outburst of energy that leaves us more exhausted at the end than at the beginning. The habit of tearing about the countryside, cramming in extra rounds

of golf, or finishing a further set at tennis must be avoided. There is no point in making hard work of play—improve your style, get your mind to work on details of technique if you wish, as that will add to the enjoyment, but don't tire the body out in the process. Unless this is borne in mind there is every chance of returning to work on Monday with none of the relaxation of mind or refreshment of body that should have been obtained.

Remember too that there is an opportunity for evolutional development in recreation. Walking may encourage you to hike, but do not be content with mere hiking; the same applies to motoring, which although it saves shoe-leather may encourage the muscles to waste; these things should not be regarded as ends in themselves but as means to an end. Hiking and motoring take us out into the country, but the country itself is one of the avenues through which the mind and spirit may gain access to a new world of values. To them may be added the interest of collections of wild flowers, birds-eggs, or butterflies and of fishing or photography. A hobby of some sort is advisable for every boy or girl or man and woman. It provides an interest and an outlet that may not be available in the daily work, besides being a useful stand-by when the hour of retirement arrives. Moreover at the present juncture an

abundance of leisure or spare time (more often called unemployment if there is no money available) is one of the things with which the world finds difficulty in coping. Consequently a culture which encourages us to use that time for stabilising ourselves and learning the art of living is bound to be a wise one. Enforced leisure introduces us to a new form of slavery, and Dean Inge has told us that "Nothing is so deadening as a fruitless endeavour to kill time." Man is a creative being and as such his goal of happiness is only satisfied by some creative outlet. Many of us are apt to forget this and wonder why our leisure hours bring us no satisfaction. There are two causes for this, firstly, the belief that enjoyment can be obtained without effort and, secondly, on discovering that this is fallacious thinking that effort on a physical plane is all that is needed. Whereas of course the true solution lies in the ultimate satisfaction of CREATIVE needs. The occupations of our leisure hours should aid the development of personality and character, teach self-reliance, add to our sense of responsibility, and yield an enrichment of our social culture. In fact the fellow who said: "Tell me how he spends his spare time and I'll tell you what manner of man he is," was not far wrong.

CHAPTER XI

EXERCISES

SOME people look upon an exercise as an unpleasant task, but this should not be so, for once included in the daily routine it gradually becomes part and parcel of existence. It becomes just as much an integral part of the toilet as brushing the teeth or washing, and should be just as automatic. If some of our lady friends would spend less time over their dressing-table cosmetics and a little more on the "daily dozen," the improvement in their appearance and also in their tempers would no doubt surprise their friends.

There is no need to make rigid rules with regard to the time of doing exercises, for although the morning hours are most suitable, many people find their programme too rigid to allow this. The mother of a family may find the early afternoon more suitable or the business man be able to fit it in just before bathing and changing for dinner. Working men may prefer to do their exercises just before retiring and more often

than not will find th
 and satisfactory sleep.
 a few at a time, the exerci^s
 automatic, fatigue will not occ
 muscles will improve, so that pr
 more complicated series can be ca
 comfort and profit.

After all the heart is a muscle and
 muscles requires exercise to keep it in con
 Inactivity invariably leads to deterioration,
 disuse leads to wasting. Flabby muscles and a
 slack circulation are a poor preparation for the
 struggle of life.

It is well to remember, however, that violent
 exercise should never be undertaken with a
 "temperature," in the vain hope of "sweating
 it out." Such action only tends to spread the
 infection and may easily cause undue strain on
 the heart.

The first thing to bear in mind about physical
 jerks is to start slowly. Don't overdo them to
 begin with. In fact a very good rule for beginners
 to remember, and also, incidentally, for those of
 middle age, is "take them lying down." It is
 unwise to attempt much in the way of body
 swinging and body bending until the circulation
 and the organs of balance have become adjusted.

Start by lying lightly clad on the bed with the

freely and easily and
 open.
 the breath be held, and
 the whole course breathing must be
 unrestricted.

on the back with the head level, arms
 side and palms of the hands downwards,
S blow all the air out of the lungs that you
 can; exhale completely in order to remove as
 much stale air from the bases of the lungs as
 possible. Then inhale freely and evenly through
 the nose, meanwhile raising the arms sideways
 to a point level with the shoulders and turning
 the palms of the hands upwards. Breathe in
 evenly and steadily, raising the chest and depress-
 ing the abdomen, but avoid lifting the shoulders
 or arching the back. Hold the breath with the
 lungs fully expanded for about six seconds and
 then breathe out steadily and completely, bringing
 the arms down to the sides again to the position
 of relaxation as you do so.

Repeat half a dozen times.

EXERCISE 2

Still lying on the back with the arms at the
 sides, proceed to bend the knees and draw up
 the legs over the abdomen, so that the knees are

drawn into the chest. Keep the toes pointed meanwhile.

Repeat half a dozen times and rest.

After the first two or three weeks this exercise may be done with the hands clasped behind the head. Later the head and shoulders may be raised also and the knees approximated to the chin ; the complete movement, however, should only be attempted when the tone of the abdominal muscles has become good.

EXERCISE 3

Lying flat on the back, stretch the arms above the head with the palms together. Raise the left leg to the perpendicular position (or as near to it as you can manage), keeping the knee straight. Repeat with the right leg and then continue alternately each leg six times.

After the first week raise the right arm as the left leg is raised and grip it behind the knee, then rhythmically draw the knee and leg down towards the body for a few inches and release. Do this six times and then change to the right leg and left arm.

Learn to develop a definite swing and rhythm with the movements, starting slowly at first and gradually increasing the speed as flexibility improves.

EXERCISE 4

Still lying flat on the back with the arms stretched above the head, raise both legs together to the perpendicular position; meanwhile swing the arms upwards outside the legs and bring them down to the sides with the palms downwards.

Then return to the rest position.

Repeat half a dozen times.

For the first week the heels should be allowed to touch the ground between each effort. In the second week the feet should only touch at the end of each half-dozen. In the third week the legs should be raised to the perpendicular position and with the arms at the sides should be rotated in a circular motion from left to right for six circles, then after coming back to the rest position, should be raised again and circled in the opposite direction, i.e. from right to left for six circles.

These exercises in the prone position should be sufficient for a month's course, but those who wish to proceed further or who happen to be athletically minded may follow out a more strenuous table as below :

ADVANCED SERIES

EXERCISE A

The exercise detailed as number 1 should be done standing upright in front of an open

window or in the open air and doubled in length.

EXERCISE B

Now place the feet astride with an interval of about 18 inches between the heels, and raise the arms above the head. Swing the arms and body forwards and downwards between the legs, breathing out as you do so. The arms should pass backwards between the legs and return in the same rhythm to the starting position, meanwhile breathing in. From there bend the arms to the shoulder, stretch up again and repeat the body swing downwards, with breathing accompaniment.

This should be done half a dozen times at first, counting to the rhythm 1, 2, 3, 4, and repeat, being careful to breathe out when bending forwards and breathe in while straightening up. The speed and number of swings can be increased later, and the exercise improved by holding a book or small weight in each hand.

EXERCISE C

With the body in the position for exercise 4, i.e. lying on the back with the legs in the air and the hands by the side, roll up the spine still more so that the weight is taken mainly on the shoulders, and put the hands up to support the waist. Then begin a cycling movement with

the legs working alternately—small circles at first, gradually increasing until the knee almost touches the ear!

The foregoing series of simple exercises could, of course, be easily increased and extended, but these will prove sufficient to add considerably to everyone's feeling of well-being if indulged in regularly for from five to fifteen minutes daily.

Skipping. In addition to the actual "jerks," much value may be obtained from skipping, which is an extremely cheap and healthful form of exercise. For the modest sum of sixpence, or less if mother's clothes-line may be borrowed, five minutes' concentrated exercise may be obtained daily in any backyard! Do not, however, skip monotonously off both feet, but as soon as you have mastered the co-ordination of hand, rope, and eye start to vary the movements. Jump off each foot alternately; then skip on one foot; then try it forwards or do crossovers and so on, until you become quite adept at variations. All the time remember to keep well up on your toes and land lightly with as little noise as possible. Avoid at all costs coming down flat-footed, as it is likely to be both painful and dangerous; the spring in the legs should be trained to overcome the body's weight. In this way skipping can do much to improve the lightness of your gait and

improve the spring in your stride. Moreover, if the rope is swung from front to back rather than from behind forwards, the chest is encouraged to expand more adequately and the erect posture more easily maintained.

CHAPTER XII

TRAINING AND ATHLETICS

SO far we have dealt mainly with moderate forms of exercise, but when we consider more violent activities fresh factors have to be taken into consideration. Professor A. V. Hill tells us : “What happens in the body of an athlete is ‘chemistry’,” and then goes on to say : “The machinery of the body is all of a chemical or physical kind. It will all be expressed some day in physical and chemical terms. With this machine intelligent human beings have to work, aided by the moral qualities of courage and resolution. Some will work their machinery better than others. Some will fail by lack of the necessary mental qualities, by lack of the necessary skill ; some will neglect to keep their machinery in order. Others will fail by lack of resolution. The machine itself, however, has certain definite physical and chemical characters, and if we neglect these we obviously cannot appreciate or understand the whole.” The need for some

slight knowledge of the working of the body thus becomes obvious. The efficiency of the human body looked upon merely as a machine for producing work is about 20-23 per cent; under special conditions of training this may be raised to 25-30 per cent, that is to say from just under to just over $\frac{1}{4}$. This shows that the prevailing idea in certain quarters that training enables a man to achieve infinitely more than he would be capable of without it, is not necessarily true. Where the trained athlete has the big pull is that his body works more economically, fatigue is produced less rapidly, and the recovery period is more easily achieved. As a result of athletic training, he not only learns to use his muscles to the best advantage, but also improves the co-ordination and efficiency of his heart, his circulation, and his breathing so that he can absorb more oxygen per minute from the air and deliver it to his muscles. Physiologists are agreed that the occurrence of fatigue is bound up with production of lactic acid and its accumulation in the muscles. The trained athlete differs from the untrained man in that by more economical effort this accumulation is reduced, by improved circulation he ensures a better oxygen supply to his muscles, and he becomes tolerant of a higher lactic acid concentration. A sprinter going all out produces

about 1 gm. of lactic acid per stride that has to be oxidised.

The amount of oxygen consumed by a trained and an untrained man is the same for small exertion at low speeds. At higher speeds and stronger effort, the trained man takes in much more oxygen and his lactic acid consequently remains at a lower level. To become a good athlete it therefore appears essential to have a good blood-supply, and to develop rapid oxygen-utilisation by the tissues. Thus training accustoms the body to wash out more lactic acid than in the resting state, and calls into action certain muscle-proteins and salts to neutralise the lactic acid as soon as it forms, thereby preventing excess accumulating. In this way the trained athlete can recover rapidly from the result of effort, whereas the untrained individual remains "laid out."

Another interesting point is that athletes undergoing prolonged exertion usually develop a slower pulse rate than normal and that this does not reach its optimum before 25 years of age.

As I have said previously, muscle may be likened to a storage battery, and for short-distance sprinting the athlete depends almost entirely on his accumulators, he is thereby able to build up an oxygen-debt that must be paid off in the recovery stage. For long-distance efforts or for games like

football there is a greater economy of energy, partly due to a more accurate co-ordination between mind and muscle, which effects a considerable saving in oxygen expenditure and diminishes the likelihood of lactic acid accumulation. Violent exercise always entails the accumulation of waste products in the tissues, and unless these are removed by oxygenation and are washed out by the circulation, they clog the machine and give rise to stiffness and soreness. Ordinarily the heart pumps about $5\frac{1}{2}$ pints of blood round the body per minute, but this will go up to as much as 36 pints per minute during a game of football, while figures as high as 45 pints have been recorded in runners doing 9 m.p.h. for 3 minutes; and whereas the normal individual utilises about $\frac{1}{2}$ pint of oxygen per minute at rest and can rise to about 5 pints during exercise, the trained athlete can utilise 6–8 pints. The actual quantity varies somewhat with the size and strength of the individual, but it is hardly likely that anyone could much exceed 10–12 pints per minute. The celebrated American miler, Lash, when running at the rate of $10\frac{1}{2}$ m.p.h. for 5 minutes, consumed an average of 10 pints of oxygen for the last three minutes, and finished with a blood lactic acid concentration of only 47.5 mg. per cent (Max.= 90 per cent) thus showing that his body had

learnt to oxidise it almost as quickly as it was produced.

People often ask for information as to the best way in which a race should be run. As a rule sprint races over short distances can be dealt with by the storage battery system—that is to say, the sprinter can go all out and trade on his oxygen debt. For longer efforts, however, this does not prove satisfactory, as the gradual piling up of the debt hampers efficiency. In a quarter-mile, for instance, it is wasteful to use up the accumulators in the first 100 yards, and then have to slow down to a steady pace limited by the oxygen intake alone. It is far more economical to spread the energy from the storage batteries over the whole race, and maintain a constant speed by means of the oxygen intake and the accumulators working together. By practice it is possible to find the maximum speed at which these two reinforce each other to the best advantage without undue waste.

As distance increases, of course, the average speed gradually falls, and the deciding factor in such a case seems to be the fatigue of the heart muscle. Like all machines, it cannot work at top speed indefinitely, and the longer it is required to work the steadier must be its output.

After violent exhausting effort, half the oxygen debt is usually “paid off” in about five minutes,

but the process gradually slows down, and by twenty minutes about three-quarters is accounted for, while at the end of forty-five minutes about 95 per cent has been dealt with. The implication of this, of course, is that about one hour should be allowed to elapse between heats if track athletes wish to give of their best in succeeding races. Rowing men as a rule have a smaller oxygen intake than runners, as their bodies are more static and their movements slower. This naturally means that the return flow of blood to the heart is less effectively carried out, and so there is more strain on the heart. From experiments carried out at Cornell University, Professor A. V. Hill has come to the conclusion that running allows a considerably greater circulation rate of the blood to occur than in the case of rowing, and so presumably is less strain on the heart muscle.

Diet is important to the athlete, but the time and quality of the meal are as, if not more, important than the quantity. The value of readily available glucose has already been mentioned, as well as the detrimental effect of a large meal immediately before an event. This cuts both ways, for besides the inhibiting effect of the exercise on the gastric juices, the subsequent indigestion and discomfort impair the perfection of the performance.

Food is a matter that seems to worry many athletes and, as a result, faddists are rather apt to make capital out of "special diets," and be misled by purveyors of concentrated foods. The truth of the matter is that good plain wholesome food is by far the best for all athletes, and provided twice-cooked food, strong sauces, highly-concentrated foods, and made-up dishes are avoided, little harm is done by eating in moderation what seems pleasant. New bread, however, is best avoided altogether, and raw celery is bad before an event. Restriction of fluid in the form of water is unnecessary, but soups should not be taken, and a reasonable gap should be allowed between meals and the commencement of athletic effort. A suitable daily menu during the training period would be as follows. This has been modified from the book on *Training for Athletes*, by Abrahams.

A glass of water on rising.

Breakfast.

Porridge or cereal (if usual) with milk and sugar to taste.

Fresh fish or eggs and bacon.

Toast or stale bread.

Cup of tea or coffee with milk.

Fresh or stewed fruit (e.g. orange or grapefruit may replace cereal.)

Lunch.

Cold meat and salad, or grilled chop and potato, with toast or bread.

Fresh fruit.

Water to drink.

Tea.

One to three cups of tea with bread and butter or cake, extra sugar in tea if exercise is to follow.

Dinner.

Avoid soups.

Fish or joint with vegetables.

Sweets : stewed fruits and milk puddings are best.

Dessert : fruit or raisins.

A glass of water on going to bed.

The problem is much more than merely one of supplying an adequate amount of food, and is concerned with the relative amount of the essential constituents rather than the total quantity. Above all, the athlete requires foods that are rich in mineral salts and vitamins, in addition to his energy suppliers and hunger satisfiers.

In prolonged exercise and endurance tests,

some form of food is obviously necessary, as the body stores are unlikely to last out. Chocolate is, of course, the great stand-by for this purpose, but small quantities of well-sweetened coffee, malted-milk tablets, or even meat cubes can be very helpful. The detrimental effects of alcohol and tobacco have already been mentioned, but the former is occasionally used for "breaking" training into short periods and avoiding the staleness due to prolonged monotony in such cases as the university boat-race, where many months of preparation are needed.

Ultra-violet light in small repeated doses is also a useful adjuvant to training, as it appears to act as an oxygen sparer and at the same time delays the onset of fatigue.

Some athletes have brilliant meteoric careers, but do not last; others, although full of promise, burn themselves out early and never seem to reach maturity, whereas many are able to maintain their peak period for a considerable time. Much, of course, depends on temperament, age, and mode of life. As the years increase there is naturally some loss of elasticity and adaptability, but as the need for skill becomes more important than sheer muscular force, so does the championship age advance. Sprinters seem to be at their best in the early twenties, half-milers and milers at

25-26 years, and distance runners from 25-30 years. Footballers lose their resilience soon after thirty, but cricketers and golfers seem to be most masterly about half-way to the three-score years and ten. Tennis players can carry on for even a few years longer, though the increasing speed of the modern game makes guile less profitable than of yore. Horse-polo and water-polo are both games where the older player can compensate for lessened powers of endurance by means of increased skill. Yet, at the same time, youth will be served, and with increasing age the recovery stage becomes a little longer and sometimes a trifle more painful !

One point that seems to call for special mention is the question of strain. As a rule it is almost impossible for the properly trained individual to strain his heart, as the margin of efficiency of the heart muscle is greater than that of the body as a whole. Trouble is only likely to occur from over-fatigue or ill-health. The fallacy of taking exercise with a temperature in the vain hope of "sweating it out" has already been mentioned, for such action is very likely to disseminate the poisons of infection round the body more rapidly, besides lowering the tissue resistance as a result of fatigue. On this point Eggleton mentions a suggestive experience from a boys' school. Over

a period of three years, boys with colds and catarrhs were allowed to take the usual violent exercise of "games," and during that period one in every twenty developed pneumonia. During the following five years all boys with similar infections were prevented from playing, and no cases of pneumonia occurred. Although this experiment is too small to be conclusive, it does point to the importance of avoiding violent exercise if unfit.

The methods of training employed by different individuals will, of necessity, vary according to the nature of the event with which they are concerned. In this era of specialisation the all-round athlete is becoming rather rare; more frequently do we come across people who excel in one or two forms of sport, because they possess some particular capacity or interest in them and perforce must exclude the others. Owing to wide differences in technique, it is not always feasible for the same individual to develop a high standard of proficiency in several different branches of athletics. Some sports are definitely antagonistic to each other, owing to the different sets of muscles employed. For instance, increased weight is often of considerable value to the rowing man, but for the sprinter and jumper it becomes a handicap by increasing the load to be carried by the muscles.

The rowing man in training must concentrate upon improving his staying power and the flexibility of his joints, for the more efficiently he can coil himself up, the greater is his leg drive and power of propulsion ; whereas the sprinter requires quickness off the mark, an ability to develop an easy stride and a capacity for building up a good oxygen-debt without undue distress. The long-distance runner, on the other hand, need pay little attention to oxygen-debt, for what he requires is staying power and the ability to take in oxygen rapidly. Middle-distance men have to find what speed gives them the best possible blend of oxygen-debt and oxygen-consumption, and must run more or less to schedule over a prescribed course, in order to produce their best time. It would appear that there is a fixed optimum gear for each individual, and training should enable him to find this out for himself. As a result of the stimulus of competition, and the excitement of an athletic meeting, a little extra improvement can usually be expected provided the training has been suitable.

Weight again is an advantage in boxing, but excessive or superfluous fat must be avoided ; a good reach is of far greater value than a few extra pounds, and during training attention should be paid to quickness of muscle co-ordination, and

speed of footwork. Ability to move about the ring smoothly and speedily is of immense value, a point much too frequently neglected by heavy-weight boxers. Hard muscles are of little help to swimmers, and are likely to lead to cramp, whereas fat is definitely useful in that it increases the resistance to cold without appreciably impairing efficiency ; smoothness and rhythm of movement are the things to be aimed at here. The footballer, on the other hand, needs hard muscles and must perforce sacrifice a certain degree of agility for the sake of stability and strength, otherwise crocking becomes too common. Yet at the same time the risk of becoming muscle-bound must be avoided.

A reasonable degree of physical fitness should be the natural outcome of normal healthy life and habits, but a certain amount of preliminary training is essential before undertaking special indulgence in sports, if the best value is to be obtained from them. Provided individuals do not abuse the natural laws of health, and keep themselves in a reasonably fit condition during the "off season," the amount of general training needed will be reduced to a minimum.

In all cases limbering-up exercises are very essential and should form an integral part of every training scheme. Quick-starting is the

keynote of speed on the football field, just as on the sprint-track ; while flexibility is as important for the " rigger " player as for the rowing man.

It is advisable to begin with a few lively agility exercises, such as toe-touching, arm-swinging, high-kicking, and astride-jumping, in order to stretch the muscles and warm up the circulation. Skipping is also of immense value for both preliminary and later use. Short sprints should be practised, for rapid mobility is of great value, particularly for heavy-muscled individuals.

Long slogging runs are rarely of much use and often even detrimental in the early stages of training, as they slow up muscular movement and may lead to a muscle-bound condition. General preliminary training should tone up the muscles of the whole body, and prevent undue stiffness developing. It should also aim at diminishing the risk of pulled muscles and sprains, for these are nearly always due to sudden contraction of a cold or unprepared muscle. Moreover there is much less risk of heart strain if the circulation has been gradually encouraged towards increased work, without sudden undue demand being made upon it.

A slight loss of weight frequently takes place in the early stages of training as some of the superfluous fat is removed, and more often than not this is followed by a slight rise as muscle

replaces it. When the training period is properly established the weight should remain more or less steady; any subsequent loss calls for a consideration of factors such as insufficient sleep, faulty diet, or the onset of staleness. This latter danger is more of mental than physical origin, and is bound up with monotony of habit, of food, and thought all concentrated upon a single aim. Singleness of aim may be a good thing for championship purposes, but nevertheless the body revolts against restrictions that have no variation. For this reason mental occupation and the maintenance of interest is of great value during this time, while the habit of breaking the training up into crescendo periods with short intervals for relaxation is to be commended.

Few people, perhaps, realise the attention to detail that is required of a first-class athlete—starting action, body-posture, style, speed, length of stride, and rapidity of action all require the utmost concentration, for the margin of error allowable in a championship contest is extremely small. An error of half per cent may mean the difference between victory and defeat, yet in 100 yards that is a mistake of less than one inch per stride. Training must therefore aim at producing the most perfect machine with the material available. Harold Abrahams tells us

that when training for the Olympic Games in 1924, he increased his speed by deliberately shortening his stride by one inch. In 10 seconds he now took 46 strides to cover 100 yards instead of the previous 45 ; but in order to achieve this, each of the strides was one inch shorter than before. Forty-five inches were lost on the forty-five strides, but the extra stride itself measured about 87 inches, so there was a net gain of 42 inches. In other words he now covered 101 yards 6 inches in 10 seconds and the 100 yards itself was run $\frac{1}{10}$ second faster. By such means are champions made !

Personality plays a big part in athletic success. Winning races on the track, or on the river, or gaining supremacy on the football field is not just a matter of ability to do a faster time or neater movement than the other fellow, it is a question of tactics, resolution, and confidence as well. These, of course, are personal and individual attributes that can be learnt and improved upon as time goes on, but the problem of maintaining peak conditions for a considerable period is the one that troubles trainers most. The capacity for maintaining a high standard of physical fitness over a prolonged period is one much to be envied. Such ability adds considerably to the individual's self-confidence and his feeling of well-being,

besides rendering him a much more satisfactory citizen. With keen eye, clean limbs, and clear brain, untrammelled by the weariness of the flesh, he has every chance of becoming better equipped for the battle of life, while his physical reserve may frequently support him where weaker fellows would fail.

There is little doubt that a healthy body breeds confidence, just as a healthy mind breeds content.

CHAPTER XIII

REST AND SLEEP

AS I have previously mentioned, rhythm is one of the fundamentals of life, and just as night succeeds day so should exercise and activity be followed by rest and sleep. Sleep is important, but not so important that you should have to worry about it; it should come easily and effortlessly, as the natural corollary of healthy activity and not need special wooing.

Shakespeare refers to sleep as :

“ Sore labour’s bath
Balm of hurt minds, great nature’s second course
Chief nourisher at life’s feast.” (*Macbeth.*)

It is a natural physiological process essential for recuperation and repair that comes when the mind has nothing to distract it. Habit plays a big part in the process and consequently the cultivation of a regular hour for retiring is of paramount importance, as is also the need for a quiet and restful bedroom. In fact the habit of withdrawal to a special room, the extinguishing of the light,

and the relaxation of a soft bed are all part of the ritual for diminishing our sensitivity to distractions and external noises.

An old proverb concerning sleep says: "Six hours for a man, seven for a woman and eight for a fool," but the amount of sleep needed by different individuals varies enormously as does the quality and depth of sleep. My old tutor at Cambridge could easily manage on three to four hours' sleep and still display amazing vitality, whereas I have always felt a need for twice that amount. Girls, during the growth period, seem to require more sleep than boys; up to about 7 years of age, twelve hours should be spent in sleep with an extra nap in the afternoon from 2-4 years; from 12-14 about ten hours is usually enough; while from 14-18, eight or nine hours will suffice.

Various hygienic points require attention if sleep is to be thoroughly satisfactory. In the first place the bedroom should be light and airy, the windows should be open top and bottom, a feather bed should be avoided, the fewer pillows the better, and the bed-clothes should be light, though warm. Cold feet are certainly not conducive to good sleep and in the elderly or in those with a sluggish circulation the use of a hot water bottle or electric heating-pad is advisable, though

it is always best to have it put into the bed beforehand and remove it on retiring.

Warm feet and a cool head are just as important for good sleep as for good work.

Insomnia is the plague of those who have never learnt to relax, but it never does any harm provided it does not lead to additional worry. To worry over lack of sleep is to add an extra factor to its prevention, whereas the cure for tiredness is rest and relaxation, not necessarily sleep—once the art of relaxation has been acquired and rest achieved, sleep will automatically follow.

The main causes of sleeplessness are strain, worry, and anxiety, all of which act as mental irritants; indigestion, which diverts the blood from the brain and causes a temporary cerebral anaemia; too much tea, coffee, or tobacco before bedtime; pain, cough, itching, and disturbances of circulation.

There are three types of inadequate sleep: (1) in which sleep is delayed, (2) in which sleep comes normally but does not last and the sleeper awakes after a short spell, failing to get off to sleep again, (3) in which there are disturbing dreams and lack of depth.

Once insomnia has become established how are we to set about dealing with it? Well, in the

first place any condition of ill-health must be dealt with and heavy meals or stimulating drinks avoided immediately before retiring. Secondly, see that the ventilation of the room and the weight of the bed-clothes are satisfactory, as stuffiness alone can spoil the night's rest. Thirdly, cultivate the art of relaxation, and if the mind is over-active switch it off on to some pleasant but not too stimulating topic. Reading a light book or a biography for a short while may be helpful, but exciting novels or detective stories should be tabooed. A warm (not hot) bath beforehand may help to soothe the brain and relax the muscles. Deep breathing, associated with complete relaxation of the body and closure of the eyes, will sometimes help, and in doing this the limbs should be allowed to lie heavily on the bed while long, deep breaths are taken and counted.

Even if you do not sleep after all this it does not really matter, as long as you are mentally and physically relaxed. There is no need to worry or become excited and work yourself up into a state of tension merely because sleep has slipped away from you for a season. It will return.

Those who have any tendency to asthma or respiratory trouble would be well advised to avoid hair mattresses and feather pillows, and to replace

them by rubber and kapok respectively. Rheumatically inclined persons as a rule are better sleeping between blankets than sheets.

Thin, under-nourished children can often be helped and started along the road to gaining weight by taking an extra rest at midday. They often prove to be over-active types and by making them lie down with their boots and coats or frocks removed for $\frac{1}{2}$ hr. to $\frac{3}{4}$ hr. after the midday meal before they return to school, the balance of their energy expenditure becomes better adjusted.

LADIES ONLY

FROM the health point of view, there is little doubt that the modern out-of-doors girl is a superior product, when compared with her Victorian predecessor. Her health, her physique, and her powers of endurance have all improved, she is more companionable, less dependent, and in many walks of life we must admit that woman is the equal—if not the superior—of man. Sex equality, however, is a theoretical shibboleth that has no true practical application. Any attempt to compare women with male standards is fraught with failure, for psychologically, socially, and physically the female of the species is complementary to the male and should never be regarded as in competition with him.

A woman's body has been designed for special functions, and as a preparation for the needs of childbirth and motherhood she sacrifices certain physical attributes that men possess. Her trunk

is larger, her legs shorter, her hips wider, her centre of gravity lower, and her vital capacity smaller ; in compensation for this she has a natural grace, a sense of rhythm and a capacity for endurance that few men possess. It is desirable therefore to remember these things ; to realise that her bones are lighter, her ligaments more pliable and her muscles more slender. Thus it becomes apparent that the type of exercise and training indulged in by woman should not be at the expense of her femininity, but rather aim at enhancing it. It is wasteful for woman to ape the male or even accentuate the masculine traits in her make-up, rather should she endeavour to conserve her capacity for motherhood, and consider how she can best serve the future generations by contributing to the improvement of the human stock.

As I have said elsewhere, the ordinary domestic occupations of many women provide them with a modicum of exercise that might be thought sufficient to serve for the maintenance of mere bodily health, but our aim is something more than mere existence, we want to see radiant healthy life for everyone. Charwomen, domestic servants, and nurses are continually bringing into play many sets of muscles in the course of their daily work, but their environment may not

always be conducive to good health. Office workers and factory hands, however, usually lack this muscular interplay associated with their regular occupation, and therefore their leisure time requires a proportion of active exercise to balance up their systems.

Luckily, women's physical training organisations are, on the whole, better equipped, better staffed, and more rationally planned than those for men. They are better served with competent instructors who understand how best to exploit the natural sense of rhythm to good ends. When considering the types of exercise suitable for women we must not only consider bodily strength but also the effect on the nervous energy, for they are more delicately and more emotionally sensitive than man. Highly intensive competitive games, tournament tennis, track athletics, etc., should not be pursued too vigorously, or for too long a time, as the competitive atmosphere is bound to bring out aggressiveness and lead to nervous tension which sooner or later saps the essential charm of womanhood.

Now that the day of the constricting corset has gone and women rely on their own abdominal muscles to keep their viscera in place there are many fewer cases of sagging organs. Two special exercises, however, are helpful in strengthening

LADIES ONLY

the pelvic floor, which by reason of its special construction is liable to extra strain. Both can be carried out while lying on the back in bed.

Exercise 1. Without moving the rest of the body, brace the buttocks and endeavour to bring the "tail" through to the front. This may sound difficult to do, but a little practice will soon give control of the movement and it can be repeated easily without much effort.

Exercise 2. Try to straighten out the spine by pressing the lumbar curve into the bed and rotating the pelvis and hips slightly forward.

Both these exercises require a little will-power and muscle control, but if at first repeated half a dozen times each can be increased in strength and range of movement later.

While on the question of exercise, perhaps it would be advisable to mention that, although moderate exercise should be taken regularly, it is unwise to attempt strenuous exercise during the period. Such action tends to increase the menstrual flow, while subjects who suffer from pain may find it increases. I have already spoken elsewhere of the benefit of baths, so there is no need to mention that further here, but I would call attention to the need for proper support of the breasts. When worn, brassieres should really support the weight of these organs and not merely compress them

HEALTH FOR EVERYMAN

against the chest wall, as this is liable to dam up the ducts and constrict the blood supply.

One of the weaknesses of modern woman is her anxiety to reduce weight and, unfortunately, this is often carried to extreme. Women naturally have rounder limbs and more subcutaneous fat than men, but such is the slavery to fashion that the slim silhouette has to be cultivated at all costs, and unfortunately the costs are often far too great, with the result that bodily resistance is lowered and illness soon follows. Feminine curves after all are related to feminine function, but whereas men are inclined to neglect exercise and diet until some symptom recalls them to attention, women are seldom satisfied with their looks until they have lost them! Few women are satisfied with slow results and always seem anxious that the adjustment should be made with all possible speed. Not only is weight reduced, but if the loss is too rapid the body is unable to adjust itself in time, and with it go functional efficiency and resistance to disease. Thus the liability to colds and catarrhs becomes increased, and the possibility of tuberculosis hovers in the offing. Moderation in all things is often the best rule of all.

CHAPTER XV

YOUTH AND SEX

GROWING up is sometimes rather a painful process and apt to be beset by various emotional changes that, to the untrained observer, appear somewhat strange and inexplicable, but growing up is not a simple matter of getting bigger and more muscular, nor even of acquiring greater knowledge, it is really a preparation for adult life whereby we become mature men and women. We have been given bodies and bodily powers whereby we can pass on to others the life we have received from our parents. We are, in fact, creators in our own right, and have been given minds so that we can intelligently co-operate in the process with the powers that be. Life is a very wonderful thing, and the reproduction or passing on of that life is still more wonderful ; yet even in these days of comparative enlightenment there are still too few people who fully realise the significance of the sex-instinct, or take any pains about their preparation for parenthood.

HEALTH FOR EVERYMAN

The whole wealth of powers with which the body is endowed has significance and worth, but these forces must be used rightly and cultivated intelligently, for if neglected the spirit is hampered and depressed. Spiritual and bodily activities cannot be separated or repressed without impoverishment of one or the other. Bodily activities divorced from spiritual control become beastly, animal-like, and are productive of degeneration and disgust. The essential glory of human beings lies in the fact that in them the body and spirit, by the training, knowledge, and right thinking of the mind, can be woven into one harmonious whole.

We are gradually getting away from the habit of looking upon sex as a shameful thing, and are beginning to realise that it is one of the great driving forces of life. Instead of suppressing it we are learning to direct its latent energy along legitimate channels, and sublimate it in creative work such as Art, Science, Invention, and Discovery. Repression leads to jangled nerves, hysteria, and nervous breakdown, whereas the cultivation of arts and athletics forms a beneficial outlet for superfluous energy that might otherwise run to seed and lead us into mischief. Merely to repress the sex instincts and drive them underground is asking for trouble, while to give

them a wrong and unwholesome expression is degrading to our humanity and destructive to our happiness. The history of man's material progress is the history of his increasing control and direction of the physical forces of the universe—the use of wind for his ships, the combustion of coal for his engines, the harnessing of electricity for the production of heat, light, and power. So too the history of the moral and spiritual advances of man is mainly the history of his control and direction of the natural instinctive energies of his own being. Control does not mean a “bottling up,” but direction and sublimation along a right channel. Think of the control exercised in the perfectly timed stroke of a cricketer, in the rhythm of a golf swing, in the poise of a danseuse, or in the delicate touch of a master pianist. Brute force and blatant ignorance are ugly and unlovely, but controlled effort produces a beautiful and impressive result.

Man is essentially a creative individual. In making and fashioning things for art and utility, he exercises those aptitudes which, more than anything else, differentiate him from the lower creatures, and bring him into line with the Divine Architect of the Universe. This urge to creativeness belongs to the very depths of our nature and the sublimation of the creative instincts,

which lie behind sex, will give many outlets—painting, sculpture, music, literature, exploration, invention, discovery—limitless in their scope and application, if only properly directed. The adolescent age throws a great strain upon the individual, it is a time when the mind, morals, and whole personality receive a tremendous impetus, when love, hate, desire, and ideals are being built up. If the young have been taught to THINK aright in early years, and look upon sex as a clean and simple thing to be treated with reverence, they will DO aright in later years, and there will be no fear of them failing to withstand the strain. The man of soft muscles cannot achieve the laurels of the track or the palm of the game; neither can the man of soft morals or soft will achieve success in the greater game of life. Surely the least we can do is to set our children on the right way and give them wise directions for the route, instead of preserving a conspiracy of guilty silence, then, and only then, will the rising generation grow up pure and adequately equipped for happy marriage.

Dr. Elizabeth Sloan Chesser tells us: "It is in youth that the foundations of moral stability and upright character are permanently laid. The life takes definite shape and meaning, the physical changes of the body are associated with mental

changes, and strong emotional impulses emerge. By wise guidance, sympathetic counsel, patience, understanding, and knowledge, the boy or girl can be helped through a difficult stage and encouraged to lay the foundation of a useful, honourable, clean, and self-respecting life. For lack of such counsel splendid human material runs to waste, habits of laziness and self-indulgence are quickly established, and the sowing of wild-oats has disastrous physical, as well as moral, consequences."

In knowledge lies safety !

CHAPTER XVI

THE PROBLEMS OF MIDDLE AGE

OBESITY and dyspepsia are the main bugbears of the middle-aged, and both are mainly dependent upon diet. In the former case, however, additional factors such as the waning powers of the ductless glands call for consideration, so we will deal with dyspepsia first.

The products of digestion are absorbed directly into the blood, and consequently the composition of the blood depends to a great extent on what we eat. When we consider that middle age limits our activity and energy-expenditure, but that few people correspondingly cut down their food intake, we begin to realise how it is that the human machine gradually becomes clogged. By taking unsuitable or excessive food over long periods an undue strain is put upon the detoxicating action of the liver, stagnation of the intestinal tract leads to added putrefaction, and the poisons absorbed ultimately reach the vital organs, only

to accelerate the downhill speed of the declining years. How is this to be avoided? Well, we cannot insist on violent muscular exercise in the open air to burn up the excess, as in the case of the young, but we can emphasise the importance of limiting the food intake, ensuring adequate evacuation, and advising sufficient exercise to keep the abdominal muscles in trim.

Habits are difficult things to upset, and unfortunately bad habits always seem more difficult to eradicate than good ones, yet, a change in the deplorable dietetic habits of the majority of the middle-aged would give them added comfort and a happier outlook. An overloaded bowel can colour the whole outlook in much the same way, although to a lesser degree, as stagnation of bile engenders a jaundiced view of life. The egocentricity of the chronic dyspeptic prevents him from being a really useful citizen in the widest sense of the word. His heritage of pains, headaches, depression, irritability, and lack of energy are too ever-present to allow him to view the far horizon with hope and idealism. His resilience is lost, his standards harden and he becomes prematurely old. How can it be otherwise if the nutritive fluids which bathe the brain and nerves are allowed to be charged with an excess of toxic material? Purgatives are no panacea for such

cases. We must go back to first principles of diet, remembering that prevention is more important than cure. Lubricants are helpful and salines sometimes needed in later life, but roughage is essential for the proper functioning of the bowels, while in cases where the abdominal muscles have lost their tone and can no longer be re-educated, abdominal supporting belts may be advisable. Belts, however, like crutches are only for emergency use or for final support as a last resource.

Louis Berman in his book on "The Glands of Personality" states that: "Personality embraces much more than merely psychic attributes. It is not the least important of the lessons of endocrine analysis that there is no soul and no body either. Rather a soul-body or a body-soul or the patterns of a living flame." As age advances, however, there is a tendency for that flame to diminish somewhat in intensity, there is a gradual decline in vitality and the velocity curve of life descends more steeply. This is because the endocrine or ductless glands begin to show signs of fatigue. In women the reproductive capacity comes to a close with the onset of the menopause, and a re-adjustment of the balance between the thyroid gland and the ovary takes place, sometimes with a severe constitutional disturb-

ance. In men the change is more gradual, but at the same time quite obvious. As the dynamic driving force of the suprarenal gland declines, ambition is less insistent, content more easily achieved, and mediocrity more satisfying, but apart from accidents the progress of senescence in healthy men is gradual and uneventful. The rate at which these changes take place depends to a great extent on the individual's early life, and his ability to repel the cumulative effects of body poisons.

As the flame of life dies down, so does the rate of combustion, and consequently, so does the need for such frequent replenishment of fuel. When food is supplied to the body it is digested, absorbed, and stored for future use, but if use declines then the store accumulates day by day, and slowly but surely the "middle-aged spread" is acquired. This distressing acquisition is unfortunately far too common and puts an undue strain upon those vital organs, the heart and liver, embarrassing their activity and impairing their functional efficiency. Most writers on old age agree that as persons approach sixty it is well for them to lose weight slightly, and failure to do so should be regarded as a bad sign. Beer drinkers, particularly, have trouble with this type of obesity, owing to the interference with tissue oxidation caused by

alcoholic saturation. General intake of food should be restricted, red meats, sugars, and starches cut down, and fresh fruit substituted for puddings. In addition, by means of graduated exercise, massage, fresh air, and sun-baths, the general tone of the muscles must be maintained.

Irregularity of sleep is another of the worries that seem to beset the middle-aged. Here again the factors are frequently manifold; anxiety, worry, and indigestion all probably playing their part. The usual story is that the individual goes to sleep but wakes early and then dozes fitfully for the rest of the night, only to rise unrefreshed in the morning. The condition tends to become habitual, leads to apprehension, and as the hour of bedtime approaches, fear of insomnia increases. This only tends to emphasise the trouble and, unless checked early, *sleeplessness* becomes a habit. Such cases are usually digestive in origin and due to unsuitable, excessive, or untimely feeding. A light evening meal should be taken some hours before bed-time with a warm drink containing bicarbonate of soda or similar alkali on retiring. The sedative effect of a warm bath immediately before going to bed is often of immense value to the middle-aged, while warm bed-clothes and fresh circulating air in the bedroom are essential.

Insomnia due to worry, anxiety, or pain usually prevents the individual from going to sleep at all until the early hours of the morning, by which time sheer exhaustion supervenes and a morning "hangover" results. This sort of insomnia has a very different origin from the simple digestive type, and calls for a careful revision of the mode of life and outlook, often requiring the more skilled co-operation of the family physician before the trouble is eradicated.

High blood-pressure is a danger of which the general public is only too well aware—perhaps, one might say, a trifle over-anxious about. Here the wear and tear of modern life undoubtedly plays its part by adding a condition of chronic tension to one of chronic toxæmia. Being very insidious in its onset a raised blood-pressure often goes unsuspected. Its presence may be surmised when sudden attacks of giddiness occur for no apparent reason, or if there is difficulty in regaining balance after rising from a stooping position. Occasionally it is made manifest by recurrent nose-bleeding or persistent breathlessness on slight exertion. Any or all of these symptoms should lead a person to consult his doctor, but the onset of such trouble could be considerably delayed by more rational modes of life.

Modern civilised man too often focuses upon

the wrong ideals. He frets and fusses over position, power, prestige, precedence, pounds, and pence. His standards harden through his middle age and he becomes nervy and prematurely old chasing them, forgetting that incessant, feverish movement is as exhausting to the mind as to the body and that the irritability thus set up is communicated to the nerves, to the feelings and eventually to society as a whole. It is very important for the middle-aged to cultivate the art of growing old gracefully. Unless they seek occupation during their leisure hours with something higher than mere matter, they will only find life unsatisfying. In the words of Sir Josiah Stamp, a few years ago: "Economic content is all relative and comparative in the most limited way. . . . I see no satisfying conclusion to economic and scientific progress without a moral and religious background. Love, beauty, goodness, even vitality, the facts of consciousness, and the data of psychology must be included in any scheme of thinking that is to be satisfactory."

Nevertheless, one of the most significant features of modern life is the increasing span to which every individual nowadays can hopefully look forward. The expectation of life in the last hundred years has increased by figures that are comparatively astounding.

In 1838-54 the figure stood at 40 yrs.

1871-80 „ „ „ „ 41 yrs.

1881-90 „ „ „ „ 44 yrs.

1901-10 „ „ „ „ 48 yrs.

1920-32 „ „ „ „ 56 yrs.

It is a good thing to be able to promise 12-15 more years of life to each individual, but the aim should be to achieve something more than mere survival. The object before us should be health, not as an end in itself, but as a means whereby our lives may be of better use to the community and greater joy to ourselves.

This remarkable increase in the length of life is not merely the fortuitous effect of vague chance, but is due in great part to purposeful public health efforts, and certain social tendencies, which may be grouped together under the term of personal hygiene.

CHAPTER XVII

THE DECLINING YEARS

SHAKESPEARE'S lean and slippered pantaloons need not necessarily have finished up "sans teeth, sans hair, sans everything," had he not shown in middle age a full, round belly with good capon lined. Greater opportunities for dietetic indulgence naturally make it as difficult, perhaps, for the rich to reach the haven of longevity, as it is for them to enter the kingdom of heaven, but a reasonable intelligence will warn them early to forgo the fleshpots, and save fuel as the fires of life burn down.

Statistics appear to show that those whose work tends to keep them in the open air have a greater expectation of life than those who spend most of their time cloistered in offices. Employment in the open air where an adequate supply of oxygen is available, combined with vigorous use of the muscles, brings the individual into contact with natural surroundings, and nearer to the animal he was meant to be. All countries have their

elder statesmen, their bearded scientists, and their ancient men of letters, but it is amongst the business men that the greatest death roll seems to occur. Particularly is this true of those who have been recently forced into retirement, and have neither an occupation to keep them busy, nor a hobby to employ their leisure hours. The real solution of the problem would, therefore, seem to lie in occupation. The man who is actively employing his mind and his body is the man who functions longest, consequently it is doubly important for the elderly to have some hobby on which to fall back when their actual working days are over. The possession of this secret has saved many a man from premature disintegration and decay.

As long as life is satisfactory and healthy there is every reason for prolonging it, but there are certain elements of personal hygiene that require extra attention as age advances. The need of warmth is one of the things for which most elderly people display a very proper feeling, but unfortunately warmth is often used as a symptom or excuse for stuffiness and stagnation. This should not be allowed, for pleasant as external warmth certainly is, it is also definitely devitalising, as it does nothing to stimulate a circulation that is already inclined to be sluggish. Before retiring,

a few minutes spent in body massage and friction to the skin are particularly to be recommended, for in this way the circulation can be toned up. On getting into bed some steady abdominal massage starting from the right groin, working up towards the liver, then across the stomach to the opposite side, and thus down to the left groin, will stimulate the bowel and prevent the accumulation of that flatulent distension that so often troubles those people with lax abdominal walls. It is this laxness that leads to the chronic constipation of the elderly and in such cases aperient treatment is quite justifiable. Lubricants such as liquid paraffin and olive oil are very helpful, but usually insufficient in themselves. The best results seem to be obtained by giving one or other of these in combination with an aperient such as rhubarb, aloes, senna, or cascara, but the choice should be changed from time to time in order to avoid tolerance.

Reasonable attention to the rules of healthy living, realisation of the importance of fresh air, full exercise of the faculties and ingestion of natural foods will go far towards prolonging the happiness of mankind.

EPILOGUE

HEALTHIER housing, more hygienic food, and improved sanitation present a promising picture of the public health of the future. Mankind owes much to the doctor, scientist, and plumber.

The increased span of life expected nowadays is mainly due to the control of infectious diseases in the early years of life. Typhus has already been eradicated as an epidemic, smallpox we have under control, diabetes and tuberculosis are no longer the dread diseases of a generation ago. Diphtheria is now being dealt with so that since 1893 the mortality figures have fallen from 40 per cent to 4 per cent, and successful immunisation schemes already seem to be lowering even the latter figure. Scarlet fever and whooping cough are being dealt with in a similar manner, and in a few more years may be on the immunity list as well.

It is, indeed, lucky for us that whereas the artificial civilisation that engenders our more

luxurious life would tend to make us less resistant to disease, science has discovered the manner whereby that resistance is built up within the body. Although the mechanisms are intricate and technical, and involve many subsidiary branches of science in the problem, the facts are simple and the results clear.

A longer span of life naturally means a greater extent of wear and tear to the body, and consequently the degenerative diseases such as cancer, heart trouble, and arterial degeneration are on the increase. It is to combat this tendency that we must develop a saner and more sensible physical conscience during middle age.

As mentioned before, our senses are not as alert as those of our forefathers, although no doubt our brains are more fertile. The big-boned, muscular hunter has given place to the bald-headed, bespectacled director. Artificial aids are so universal that one wonders which sense will atrophy next, for disuse always leads to degeneration, yet much can be done to combat this by the intelligent application of brain power. In spite of our intelligence we are not yet sufficiently advanced to have obtained a reasoning type of mind that will overcome the stupidity, superstition, and delusion that clogs the development of our social organisation? I fear the time has not

yet come for us to be able to house the denizens of the slums in healthful habitations, to let light into the grim crevasses of our city streets, and allow the full utilisation of the Health Services for the improvement of the general standard of life, but let us visualise for a moment the possibilities ahead of us. Probably the man of the future will be much the same type as to-day with, we hope, a mental power that will impinge far more constructively on his multifarious relationships; taking proper care to avoid poverty and ignorance; attacking his epidemics wisely; learning and profiting by the facts of scientific breeding; and housing his progeny in healthful surroundings. In short, treating himself and his kind as wisely and well as he now treats the animals he keeps for his own profit; controlling propagation as well as survival, so that the nature of the populace will be eventually determined as well as the physical factors of environment. The public is already aware that prevention is far more important than patching the ravages of disease and defective environment, and as the trend of thought swings more and more towards higher ideals, the physician will perhaps develop into a social adviser with a constructive programme of right living, rather than an emergency healer with a curative armamentarium.

When all is said and done there can be little happiness without health as a background. According to Dr. J. C. Mirriam of the Carnegie Institute, the advancement of society depends on six important factors :

- “(1) Securing new knowledge by discovery, invention, and research.
- (2) Unification of knowledge, and the understanding of the inter-relation of its parts.
- (3) The development of adequate means for establishing continuity in knowledge.
- (4) Improving the physical and mental effectiveness of the individual.
- (5) Continued betterment of economic and social organisation.
- (6) Enlargement of the fundamental or basic capacity of the individual.”

All these are indeed essential, and in them each of us is called to play some part, but knowledge alone does not make men either great or good, they also need understanding and wisdom and moreover the wherewithal to profit from it.

