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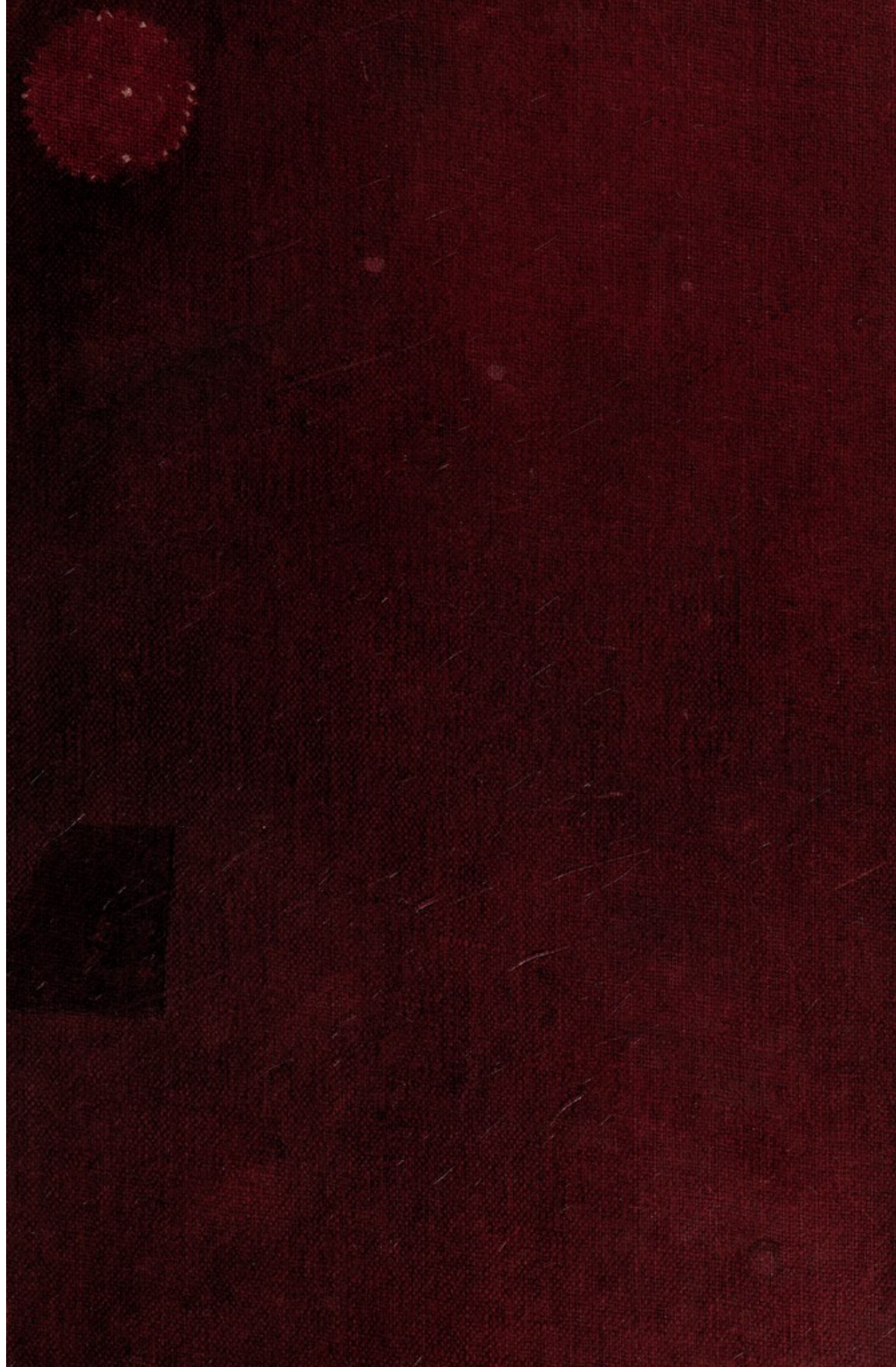
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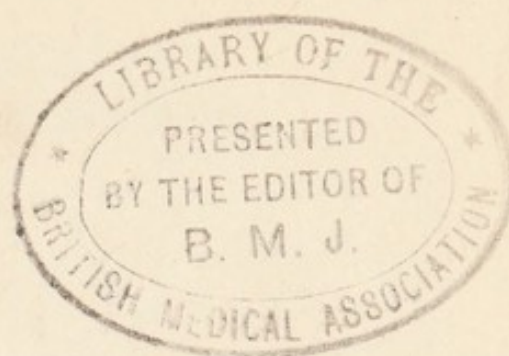



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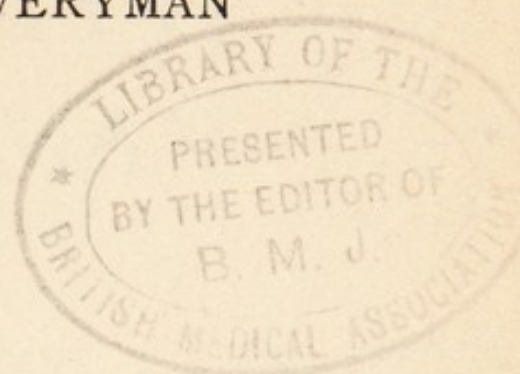




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NEW HEALTH
FOR EVERYMAN

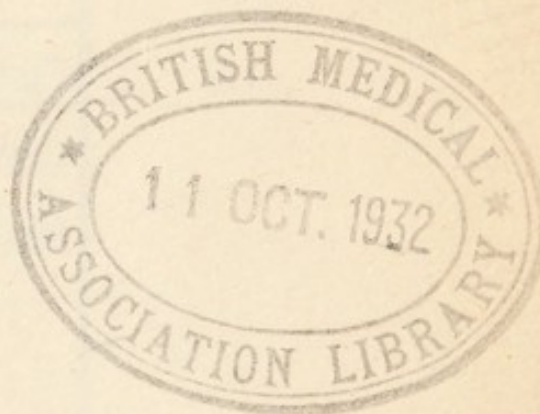
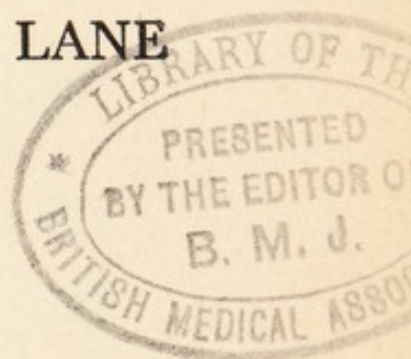


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NEW HEALTH FOR EVERYMAN

By
SIR WILLIAM ARBUTHNOT LANE
Bt., C.B.

President of the New Health Society



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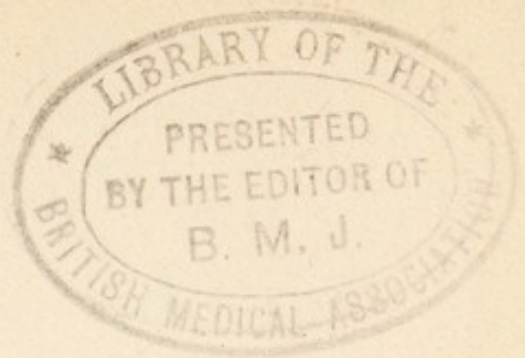
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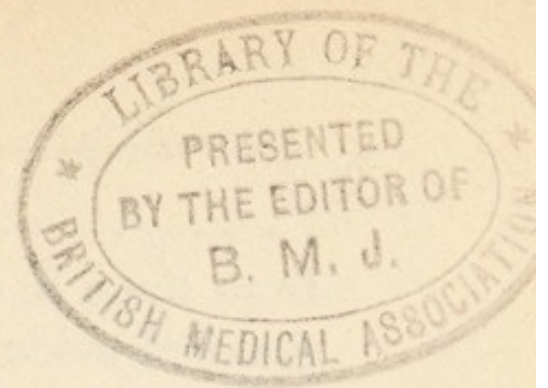
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FOREWORD

A SURVEY of modern health problems necessarily covers so much ground, and embraces so many subsidiary problems, that in the following pages I cannot hope to do more than touch upon some of the vital issues which confront not only the medical profession, but every member of the public.

During the last few years, the New Health Society has succeeded in awakening a health conscience among a very large number of people, who are anxious to learn as much as possible of the principles of healthy living. In this book I attempt to summarise opinions based on my personal experience and observation over a professional life of more than half a century. This has enabled me to reach very definite conclusions regarding the fundamental causes of the diseases of civilisation, and in putting them before the public, as briefly and simply as I can, I hope that they may lead to a true conception of health and efficient functioning in every class of the community. The researches of able men of medicine and science have confirmed me in my views, and whenever possible I have endeavoured to quote freely

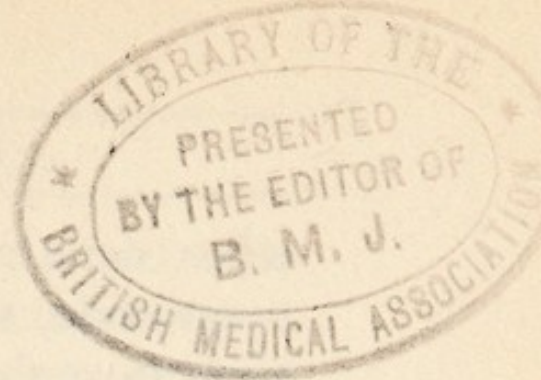
Foreword

from them in order to indicate the trend of the detailed evidence which is available.

To my mind the researches of Colonel Robert McCarrison in particular adduce overwhelming proof of the evils following upon the devitalised diet so common in Western civilization. The data furnished by his clinical and laboratory experiments should be grasped and taken to heart even by those laymen who are apt to dismiss as mere "fussiness" a sensible regard for food values and regularised habits of life.

In conclusion I should like to express my gratitude to Mr. C. M. Kohan, General Secretary of the New Health Society, whose knowledge of Public Health problems and literary abilities have been of the greatest value to me in the compilation of this book.

W. ARBUTHNOT LANE.



CHAPTER I

The Medical Outlook To-day

A MEDICAL training does not perhaps predispose one to an optimistic view of human nature. There is need for the corrective influence of faith or philosophy before the mind can throw off the bad habits of the laboratory and the dissecting room. While one is constantly impressed and touched by the simplicity and confidence of the thousands of patients, especially poor patients, with whom one's life is spent, one feels that the medical profession as a whole has not done all that it might to prevent at least some of the suffering which it is called upon to alleviate. A training that gives to the student and the practitioner as full and detailed a knowledge of the mechanism of the human body and its functions as the science and research of centuries has established, should have been able by now to inspire in the medical profession the conviction that the true function of medicine is to prevent rather than to heal. Even to-day we are only beginning to recognise hesitatingly and falteringly our supreme duty to humanity. We have learnt to handle efficiently many pathological conditions; but

when we are faced with a problem of tragic magnitude, such as cancer, we fail to concentrate as we should upon cause rather than effect. Taking the average physician upon his own ground and regarding his function as curative rather than preventive, the trained eye of the medical man is appalled by what it cannot help seeing day by day in every class of the community. To go abroad in our great cities and to see in their thousands and tens of thousands the human products of our civilisation, is to encounter a living commentary on the failure of medicine to give us the health which should be our birthright. A popular novelist not many years ago said:—

“At the beginning of the world it is only decently reasonable to suppose human beings were made with healthy bodies and healthy minds. That of course was the original scheme of the race. It would not have been worth while to create a lot of things aimlessly ill made. A journeyman carpenter would not waste his time in doing it, if he knew any better. Given the power to make a man, even an amateur would make him as straight as he could, inside and out. Decent vanity would compel him to do it. He would be ashamed to show the thing and admit he

had done it, much less people the world with millions of like proofs of incompetence. Logically considered, the race was built straight and clean and healthy and happy. . . . There are human beings who are not beautiful, there are those who are not healthy, there are those who hate people and things with much waste of physical and mental energy."

Contrast our physical aspect to-day with that revealed in the art and sculpture of ancient times, or with the almost perfect physical attainment of native races untouched by civilisation. On every hand we see deficiencies, deformities, wastage, underdevelopment, perversion; the medical man notes as he mixes with his fellow creatures *sequelæ* resulting from known causes. It is perhaps morbid, but it is certainly inevitable, that he should note in function, in colouring, in form, in a thousand and one details, data which the diagnostician must assess in the consulting room. Out of such characteristics, consciously or sub-consciously, the doctor makes a composite picture of the society in which he moves. I have heard it said of a King's Counsel, distinguished in Parliamentary Committee Rooms and on Rating Appeals, that were he to visit Venice, his first

thought would be to assess the rateable value of the canals. So the first thoughts of a surgeon or physician tend towards estimating the physical value of those he meets. It is sometimes a depressing frame of mind, but at least it does inspire one to urge upon the medical profession the obvious duty of arresting the wastage and degeneracy which we have accepted hitherto as the natural concomitant of civilised societies.

To say this is not necessarily to detract from the fine achievements of medicine and surgery, especially during the last few generations.

These triumphs, however, have been achieved not so much in the consulting rooms of Harley Street as in laboratories of specialised research. The empirical methods of the old-time general practitioner are being squeezed out between the scientific research worker on the one hand and the medical specialist on the other. Moreover, the actual practice of curative medicine is not keeping pace with the results of laboratory and clinical research. As for the application of those results to the vastly important work of preventive medicine in the consulting room—one might almost say that it was non-existent. Gradually, and perhaps indirectly, the medical profession cannot help reaping the harvest that has been sown in many fields of laborious and brilliant research; but it is a process which

is being forced upon them by the pressure of lay public opinion and the dissemination of knowledge among the more intelligent sections of the community. The ordinary man and woman, the schoolboy and schoolgirl of lively mind, are following in the press and in the libraries the progress of science in many fields. Sooner or later these inquiring minds demand to know why it is that Dr. A. or Dr. B. is unaware of what has been done in relation to the prevention of such and such pathological factors which are painfully apparent in his practice. As a result of unavoidable limitations imposed upon general practice, and especially panel practice, by the pace of modern scientific research, those in need of treatment are more and more driven as a last resort into the expensive purlieus of the Harley Street specialist. Yet had the knowledge gained in the laboratory and the experimental clinic been wisely used in good time, the treatment of end results, the expense, the suffering, and the wastage could have been avoided. With the difficulties of the general practitioner one can truly sympathise. He is handicapped not only by the overwhelming urgency of a busy practice, but also by the fact that his medical training in the school has not touched, or only very scantily, upon the science of preventive

medicine. With the best will in the world, the busy practitioner is unable to make up the leeway he has lost or to keep himself abreast of the strongly flowing stream of knowledge. If the general practitioner, as so often happens, is compelled by training, by tradition, by the circumstances of his professional activities, to use empirical methods which were adequate fifty years ago, the fault lies not in himself, but with the leading minds in the profession and those who direct its training and ethics. Every profession tends to be conservative; but that of medicine and surgery, which deals with life in its most intimate and profound relations, and is capable of making or marring in a physical and a social and intellectual sense the potentialities of those who look to its practitioners for guidance and help, has not the right which may be claimed by the Law or the Church to perpetuate its own prejudices.

The doctor's first duty is to deal with health rather than with disease. Such a conception, now gradually influencing the minds of the more progressive members of the profession, would have been inexplicable a generation or two ago. In a similar way the conception of Public Health was puzzling, even to acute minds, one hundred years ago, when the juxtaposition of the words "Public" and "Health"

was regarded as incongruous. Health was surely a personal matter; my health or your health was something private concerning me or you. Nothing in fact could be more personal and individual. But between the early decades of the nineteenth century and the passing of the Public Health Act in 1875, there was built up the modern conception of Public Health, as something permeating individual health in its numerous relations and reactions. A community composed of unhealthy units is obviously an unhealthy community; a community composed of healthy units is obviously a healthy community. Between these two extremes, the machinery of the Local Government Board, and later the Ministry of Health, has found an extending field of useful activity. That activity is of enormous value, but it has also been enormously costly. Many millions of our money have been spent, and rightly spent, in providing for the community an environment which will predispose millions of its human units to a healthy and useful physical existence. In spite of conditions in our big cities which are still appalling, in spite of stupidity and conservatism in our villages (and not only among simple and uneducated people) we have attained in this country an extremely high level of sanitation and Public Health service. Almost every-

body can get ample and clean water, tolerably clean food stuffs, tolerably good houses, tolerable efficiency in the primary amenities of modern life. By no means is our achievement complete; but we have reached, or we are reaching, the limit of what can be done by public expenditure in perfecting the framework of our physical lives. What is the next step? In spite of all that has been done, and is being done to-day, the general physique of our people compares unfavourably with that of other peoples living under simpler and more natural conditions. We lose many thousands of lives yearly from causes which are unknown in more primitive communities. We find not only disease, but a muted tone in the harmony of life which indicates that we are falling far short of what is our intended portion of physical efficiency and the joy of living. Our conception of health has become negative; and the medical profession itself must be held responsible to a large extent for the idea so prevalent in every walk of life, that health is merely freedom from obvious pain or disease. To countenance such a conception of health is to accept a second-rate standard in the interpretation of life. It is, indeed, a compromise with a 100 per cent. ideal of physical efficiency, which it should be the doctor's first duty to stamp out of the minds of

the people. Those of us who were in intimate relationship with the true facts of the recruiting problem during the War, know full well how far below the standard, even of that compromise with 100 per cent. physical efficiency, was the average physique of those who presented themselves for enlistment.

The facts upon which these observations are based have been dormant for many years in the minds of men and women who have been brought into close contact with the life of the people in their various activities—I mean not only medical men, but statesmen, economists, leaders of industry and commerce and those eminent in other walks of life. The experience of the war and the combing of our male population for the purposes of military service, served to accentuate the conviction that all was not well. It is true that, apart from the machinery of the Ministry of Health and local government in the sphere of preventive medicine, encouragement has been given in official quarters to a number of voluntary organisations dealing with such specialised aspects of Public Health as maternity and child welfare, tuberculosis, dental hygiene, venereal disease, dairy production and so forth. Nevertheless, the work of these organisations and such national bodies as the British Red Cross Society, has

tended to lose in effectiveness by reason of rivalries and the overlapping of activities. It was felt too by many that, admirable as this work has been, and still is, it does no more than touch upon the fringes of national life. The contact of the community with central and local authorities is not intimate. Of necessity, official pronouncements are coldly and cautiously phrased, the presentation of data is rigidly impersonal and often expressed in language beyond the comprehension of ordinary people. The activities of philanthropic and social welfare organisations, on the other hand, while often human enough in their appeal, do not in fact reach more than a very small percentage of those whom it is hoped to benefit. It must be obvious that for most people, medicine, whether curative or preventive, is associated in one way or another with the personalities of those members of the medical profession with whom they come into personal contact as patients. Unless, therefore, the tasks of preventive medicine are implemented by practitioners who have access not only to the bodies, but to the minds of their patients, the efforts of the authorities fail to reach a wide public effectively and fruitfully.

It was in order to approach this dilemma in a new spirit and with a new ideal that the

New Health Society was founded in 1925; and it was for this reason especially that among its founders were medical practitioners of eminence and distinction. Hitherto there had been little attempt to establish between the leading members of the profession and the vast reading public real contact upon problems of health and life common both to the profession and the community. The writing of a popular article in the press by a distinguished member of the profession for the enlightenment of a public to whom he was only a name (and perhaps an enigma) was an unheard-of enormity. Such a departure from tradition was attributed either to inordinate vanity or to a desire for self-advancement and financial gain. That attitude has been changed in the last few years. Many well-known members of the profession, of sufficient character and standing to be given the benefit of the doubt in regard to both the suspected motives, have spoken to the nation through the press and on the platform in simple language on problems of health, rightly leaving problems of disease to be dealt with in the consulting room or the operating theatre. This change of attitude is significant, and has fully justified the existence of the New Health Society and the principles which underlie its activities. Let me recall that among its

founders were the Earl of Oxford and Asquith, Lord Melchett, Sir Robert A. Hadfield, Sir John Y. W. MacAlister, Sir William Willcox, Sir Bruce Bruce-Porter, Sir John Ferguson, Sir Harry Baldwin, Mr. J. St. Loe Strachey, and other men and women of first-rate attainment. The primary object of the Society was to reach the mass of the people, mainly through the popular press, with simple teaching of the rules of healthy living, and thus to cut down at the root much of the wastage of life, health, happiness and usefulness which is a standing reproach to our public men and women. A second object, of equal importance, was to render accessible and cheap the right types of natural foodstuffs, through the lack of which our physical and national efficiency suffered. A third object was that the Society should do all in its power through persistent advocacy in the right quarters, to encourage the redistribution of our urban population on the land, and to urge in season and out of season the revival and restoration of our agricultural industries. In all of these directions the New Health Society has made astonishing headway during the short time of its existence. Even the third object, in regard to which one had begun to despair, is now being recognised by those in political power as essential, not only to the health of the

nation, but to its very survival. There can be no doubt, that, as a result of the New Health Society's example and lead, there is a changed attitude towards the whole problem of health and disease in the lay mind. It is beginning to take root here, there and everywhere. At first such an attitude of mind was confined to the more educated classes of the community, or to those who had acquired habits of analysis and reflection, of probing into theories and precepts. Now the position is very different. The correspondence files of the New Health Society indicate day by day that working people whose knowledge has been limited by lack of opportunity and whose cultural impulses have been crushed by conservative influences, are approaching health problems in a spirit of open-minded inquiry. They are literally athirst for information. That has been brought home to me time and again, especially in the North of England, when night after night large halls and theatres have been filled to overflowing with working men and women anxious to acquire all that lay within their reach of knowledge and guidance in problems of health. The New Health Society endeavours to meet this need, but the time surely must come when the pioneer efforts of the Society will be supplemented by the organised co-operation and

support, not only of other organisations concerned with health education, but of the Ministry of Health and those local authorities who are willing to undertake the expenditure sanctioned by Parliament for public health education. The example of the "Buy British" campaign so successfully initiated for the purpose of adjusting economic ills, should be followed by the Ministry of Health for the combating of physical ills which are at least equally urgent and pervasive. We shall not be able to deal with the health problem satisfactorily until it is handled as one of the first national importance—with vigour, vision, and the same large-scale dimension as a big commercial interest is accustomed to devote to a publicity campaign for a specific object. To the fundamental problem of healthy living, no Government has yet applied modern methods of publicity and propaganda such as are known from experience to prove effectual in commerce and industry. What could be done in the interests of recruitment during the War, what is being attempted in the interests of England's trade, can and inevitably must be attempted in regard to the problem of national health and physical efficiency. Such a national campaign the New Health Society, with its limited resources, cannot sponsor by itself for

the present; but it is convinced that the time is ripe for a Minister of Health of courage and resource to raise health propaganda from a sectional sphere into a position of effectiveness which shall be truly far reaching and national in its character. The admirable organisations which already exist for the purposes of *education* are hampered and limited because the preliminary work of *propaganda* has never been attempted on a comprehensive scale. We are not yet Health Conscious in the sense in which Germany has become Sport Conscious, or Soviet Russia has become Industry Conscious, or Italy has adopted the ideals of Fascismo. Yet this is the only sense for which Health Consciousness can become worthy of the name and all that it implies.

CHAPTER II

How Far Can We Prevent?

"THE ideal of medicine," writes Sir Humphrey Rolleston, "is the prevention rather than the cure of disease, and for this end the detection of the earliest stages, and better of the disposing causes of disease, is essential. Timely warning about diet, exercise and manner of life may do much to prevent disease from getting a firm seat on a man's back, and it is not without significance that life assurance companies in America have found it pay to provide periodic medical overhauls for their clients."* To the question of periodic medical overhauls I will return later. For the moment I desire no more than to invoke so great an authority on the side of prevention as the practitioner's first duty. What has been attempted in the United States in the early detection of disease and deficiency for the purposes of life insurance, has not yet been followed in Great Britain; except in one interesting and important experiment. I am referring to the

*"Aspects of Age, Life and Disease," by Sir Humphrey Rolleston, Bt., Regius Professor of Physic in the University of Cambridge. (Kegan Paul, Trench, Trubner & Co., Ltd.)

practical and systematic application at the Pioneer Health Centre in Peckham, of principles consistently advocated by the New Health Society. In this notable experiment the initiative and energy of its creators, Doctors Innes H. Pearce and J. Scott Williamson, have laid a foundation upon which, I am convinced, sooner or later will be built a national organisation in which vital social and medical elements will be closely inter-related.* In 1926 in a small house in Peckham, subsequently known as the Pioneer Health Centre, situated in the middle of a densely populated artisan district, these two doctors and their lay supporters installed a resident medical officer, a social secretary and a housekeeper, and proceeded to invite families living in the neighbourhood to join a Family Club for a small weekly sum per family. In return for this they offered a periodic medical and dental overhaul for each individual of the family, a parents' clinic served by both men and women doctors, pre-natal, post-natal, and infant welfare clinics. To these were added an orthopædic clinic and a children's afternoon nursery.

This organisation was established primarily for the purpose of affording data in an attempt

*See "The Case for Action," by Innes H. Pearce, M.D., B.S., and J. Scott Williamson, M.C., M.D. (Faber & Faber.)

to find the true answer to a number of insistent problems of social life and physical welfare. Is it true that the working adult population is suffering from disease? Is it true that the youth of the nation is largely of a C standard of fitness? If it is true, how is it that disease and devitalization have occurred? Can disease and devitalization be prevented? At what point in the life of the individual can they be prevented? What should be the nature of the preventive measures? Could the individual be induced to take his part in prevention if the opportunity were available? Is there any source of power in man still untapped which could be utilized in the cause of health?

In answering these questions, the investigators realised that returns from the Navy, the Army and the police force showed that 90 per cent. of recruits offering themselves for service were refused at the first medical examination as not having attained the necessary standard of fitness; that over 1,000,000 children in this country are too unfit to take advantage of the education offered to them by the State; that in spite of a record drop in infant mortality and the incidence of infectious diseases, disease and devitalization are making ravages even among the very young—that is to say, at the heart of the nation. “Never,” they say, “has

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the country been so fully provided with hospitals, charitable endowments, special clinics, sanatoria, convalescent homes, country holiday homes, provision of free food, drugs, lectures, health propaganda, etc., all directed to the cure or to the prevention of the effects of disease. . . . More people live longer than formerly. . . . It is unfortunate, however, that advances in medicine often make it possible to prevent death without being able to give health. Mutilation may be the result of an operation without which the patient must surely have died. Insulin may prevent death from diabetes, but it cannot remove the disease; still less can it give the sufferer health. Thus, in lengthening life, it is possible that we are merely adding years of ill-health to the expectation of life. The relative percentage of unfit must surely rise from such a procedure." From such postulates the Pioneer Health Centre proceeded to develop its experiment over a period of several years. Certain conclusions were reached, among the most important being the following:

(a) That the individual and his environment are inseparable.

(b) That parents, *i.e.* the adult members of the artisan populace, are fully prepared to submit to periodic medical overhaul, and

eagerly avail themselves of any advice given through this means.

(c) That the periodic medical overhaul of individuals over twenty-five years of age brings to light the fact that a very large proportion of individuals (over 90 per cent.) are suffering from frank disease.

(d) That in the normal course of events this disease at present remains untreated. It gradually and imperceptibly (over a period of years) lowers the vitality of the individual who, besides finally being incapacitated, becomes irrevocably injured by the results of the protracted illness.

(e) That such disease is usually amenable to adjustment when discovered at the periodic medical overhaul.

(f) That up to 25 years of age, although disease is not present to the same degree, the individuals are largely the victims of devitalization both physical and mental.

(g) That in youth there is present a latent source of power, lying idle for want of opportunity to emerge. This power can be used in the cause of health. If it is not so used, it is liable to become the source of disease, both in the individual and in society.

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(h) That whereas the old-established practice of curative medicine demands therapeutic measures, the practice of personal hygiene demands the power to prescribe exercise for the development of latent potentialities.

(i) That given the opportunity, the artisan is prepared to spend his spare money in taking responsibility for the maintenance of his own health and that of his family. He is eager for responsibility, but does not find a satisfactory field in which to exercise it.

With the above conclusions I find myself in full and sympathetic agreement, as the result of my own experience, and one can only look forward to the extension of the Pioneer Health Centre experiment on more comprehensive lines—a purpose for which a site has been acquired and a fully equipped and staffed building is to be erected.

“In one way and another,” writes Mr. C. M. Kohan, General Secretary of the New Health Society, “we are spending on health measures £300,000,000 a year. On mental defectives alone we spend twice as much as we did ten years ago. It is probable that about 70 per cent. of our population is C 3. Our mothers die in childbirth at a distressing rate. We claim rickets as the ‘English’ disease. Diseases like

tuberculosis breed in the dark places of our tragic slums. Diseases of dirt are not yet stamped out by higher standards of sanitation, while beneath the bright places of our towns and cities the social diseases insidiously take their toll." These words were written in describing what is a rare phenomenon in the world of medicine—a dream of the future. This dream has come to a distinguished colleague, Professor Sheen, who envisages a *School of Health* divorced from the art of healing and wedded to the science of prevention. Let every doctor, he says, become a medical officer of health, not of healing. He contends that scientifically there is no such thing as real health. From the moment of his birth the individual has to maintain a precarious balance between toxins and anti-toxins. What is far more important than disease is "disorder"—that is, wrong structure and wrong functioning. It is to the prevention of disorder that he dedicates his imagined school. This he would build in some great health park in the sunny uplands of Hampshire or Sussex. He would collect around him a staff not only of medical men, but a host of others—geneticists, eugenists, sociologists, anthropologists, agriculturists, chemists, physicists, geologists, engineers, lawyers, experts in child study and in education. Other

consultants would be called in from outside. Into this entourage would come the patients, but they would be patients of a new kind. The school would have little use for the chronic and advanced cases which fill our hospitals and institutions. It would study those in the early stages of disease—in other words, those who were the out-patients at an ordinary hospital would be in-patients at the School of Health. The primary question asked would be not "*What* is it and *what* shall I do?" but "*Why* is it and *how* can it be prevented?" And just as there would be doctors to anticipate the necessity for cure, so there would be (to quote Lord Moynihan) a surgery to prevent surgery. One department of the School of Health is to devote itself to furthering eugenic marriage, another would care for the expectant mother and for the infant. The school would be a clinic for health, not one for disease; above all, it would be a forcing ground for public opinion.

A good half-way house to this ideal School of Health would be the general acceptance of the periodic medical overhaul as a requisite of healthy living and an insurance against avoidable illness. It is instructive to follow the experience of the Pioneer Health Centre in this respect. The periodic medical overhaul was obligatory for every member of a family joining

the Centre. It afforded a means of extending to the whole adult population the practice of preventive medicine at present in function only in infant welfare work and to some smaller degree in inspection of school children. In the case of all the parents over 25 years of age examined it was found that without exception there was something to be done and that in many there was frank disease.

The sort of conditions discovered can be classified as (1) manifest disease; (2) cryptic disease; and (3) precursors of disease. The investigators were immediately faced with the problem as to why, in the face of the very full provision of therapeutic agencies, conditions of manifest disease should have remained untreated. A twofold reason is given. First, the disease was just bearable and the individuals just able to carry on their work; secondly, they had adjusted their lives to the disorders and become content to live at a lower level of existence than was necessary. The investigators were then compelled to ask what had brought about this attitude towards disease in the people. The answer is illuminating. It goes to the root of social and industrial circumstances which impede the adoption of preventive measures among working-class people, and is worth quoting in full :—

“The difficulties under which the working-man labours, where the treatment of disease is concerned, are not fully appreciated. It is true that the level of his existence may be such that he can barely provide for the present, in which case any looking ahead is out of the question; but there are many men and women, having a more or less steady wage, who are in a position to attend to their personal health and who would like to do so.

“The loss of time consequent upon attendance at any of the established therapeutic agencies is such that on the part of the man fear of loss of work, and on the part of the woman the difficulty of finding anyone to look after the children and the home, prevent action being taken. Circumstances are such that they feel that they must go on till they drop. This idea is in some way bound up with a vague and misplaced sense of duty. The importance of keeping fit is dimly visualized by all, but the significance of the insidious onset of incapacity due to disease is nowhere understood. Yet the working-man, perhaps more than any other member of the community, is alive to the menace of disease. His well-being is intimately linked with his wages. He is not the apathetic indi-

vidual we are generally led to believe, careless and lazy. He understands the necessity of keeping his working tools in order, and he is prepared to give equal attention to his person if only he knew how. He would readily have something done for his varicose veins, for his flat feet that are causing him fatigue, or try to get rid of his indigestion which makes him so irritable at home, if there were some means of ensuring that in so doing he would not be involved in a disastrous loss of time and in a fruitless enterprise. Although agencies exist which should make treatment possible, these people have great difficulty in approaching them without material loss.

“The foremost among the therapeutic agencies for the working-man are, of course, the great hospitals. Surely in their extensive out-patient departments served by every sort of specialist he could find the help he seeks? Let us consider for a moment the history of the great hospitals. For the most part they were founded as charities for the relief of the poor, the sick and the dying. They have grown up where they stood, overburdened with the heavy responsibility of tending acute illness and established disease, and perhaps for this very reason, they are

overshadowed for the working-man by a vague but ominous portent. Many a man suspecting serious illness will not go of his own accord to the hospital until he drops and is carried there. At such a moment there is urgency, and the best that can be done for him is done in the emergency. By this time the man is suffering from several secondary conditions, the inevitable retribution following upon his first trouble. Even though his primary lesion be removed, these secondary conditions, consequent upon his first long untreated malady, may render him a chronic invalid. Delay has cost him dearly.

“Perhaps another man is younger and wiser. He decides to go to the hospital for advice *before his illness becomes chronic and established*, or before he is driven there by an acute emergency. He pays, perhaps, three visits to the hospital out-patient department, losing three half-day’s work, before he succeeds in seeing the right specialist. There are so many patients so very much more seriously ill than he, that he gets but a perfunctory examination. He is despatched with a bottle of medicine and is told to come again *if he is worse*. He comes away with the idea that the doctor and his attendant retinue of students somewhat

resent having their time taken up with what appears to them to be a trivial case of illness. This experience does not encourage him to go again. He tries the busy panel doctor with similar results, for with the panel doctor also, serious illness must take conspicuous precedence of early and non-incapacitating disease. Finally the young man gives up the attempt, and lapses into the habits of his elders, and does not bother any more until he is actually incapacitated by his trouble.

“In the Pioneer Health Centre cases of manifest disease disclosed by the periodic medical overhaul were referred to a suitable source for treatment directly they were found by the doctor conducting the overhaul. Owing to the provision of a periodic medical overhaul disease was discovered and brought to treatment perhaps, on an average, six to ten years before in the ordinary course of events it would have reached a doctor’s consulting-room.”

Equally serious, is the position arising from lack of after-care after acute incapacitating illness. This is well illustrated by the case of a railway ganger of 39, quoted in “The Case for Action” :—

“During his convalescence he fell ill with an attack of acute double pneumonia. This prolonged his illness over a period of months, during which time the family resources were sorely reduced. On his return, the railway company sought to give him lighter work for a time. All that could be offered him was a post of ‘flagging.’ This entailed standing idle with a flag all day, wet or fine, and during fog duty. Pneumonia is prone to recur. Damp clothes coupled with idle limbs and idle lungs are predisposing factors to relapse. To this, fog was added. Any occupation more unsuitable for that particular case could not have been conceived. Yet even that was a concession. The man could not but accept it gratefully, for his gastric condition rendered him unfit for lifting weights and swinging heavy hammers.

“The hospital almoner had done her best in approaching the railway company. For the moment she can do nothing further, and the next case, probably one of even greater distress, is immediately upon her. She must inevitably lose sight of the man; even the distance of his home from her office makes this inevitable. From that time onwards, till he is carried into the hospital for the next time, the man is lost to medical care.”

It is clear that an organisation such as the Pioneer Health Centre provides the only possible remedy for this "deplorable yet inevitable state of affairs."

In dealing with cryptic disease and its precursors, it becomes equally obvious that periodic medical examination is the only true safeguard. Propaganda and health education, admirable in many respects, still leave the diagnosis of ill-health to the patient: this cannot shift the burden from the patient to the doctor, who alone can carry it. If the popular newspapers which proclaim their insurance schemes so dazzlingly to their readers were to devise some system under which the working classes could be given a yearly overhaul rather than disproportionate benefit on accident, they would be serving a truly patriotic end. But the gifts of the Press, like those of tobacco manufacturers, only bear out the lawyer's caution *caveat emptor*; for positive altruism we must look in other quarters.

In the United States, for example, and latterly in Canada, the application of periodic health examinations to life insurance is proceeding with excellent results; both for the insurance companies, which are adding an aggregate of many years to the lives of policyholders and many thousands of dollars to their

revenue, and for the policy-holders who gain in health and longevity under this arrangement. Let me add, however, that it was an English physician who, over 70 years ago, first urged periodic health examination. In a treatise published in London in 1861, Dr. Horace Dobell said :—

“I am perfectly convinced, from my own observation and experience in practice, that patients never think of consulting their doctors till these conditions of impaired general health have advanced far enough to have been developed into some form of disease; that thousands and thousands of people, believing themselves to be in health, are nevertheless undergoing these early, occult, and evasive stages of defect in the physiological state; and that such persons may be considered to be in health, not only by themselves, but by anyone accustomed to associate with them, even though it be a physician, and that even if they submit to a medical examination, as ordinarily conducted, they may be declared to be in health.

“I wish, then, to propose as the only means by which to reach the evil and to obtain the good, *that there should be instituted, as a custom, a system of periodical examination,*

to which all persons should submit themselves, and to which they should submit their children.

“Such an examination must include an inquiry into the family history, to learn the hereditary constitution; into the personal history, to learn all the previous diseases that have been passed through, and the habits and vicissitudes of life; into the condition of the organs and functions of the body; into the state of the secretions and fluids of the body by analyses and microscopical examinations, and so forth.

“The examination should be reported in writing; and, after due consideration, such advice must be given as a careful judgment may dictate, for the future conduct, pursuits, and habits of the patient, with a view to correcting any defects or tendency to defects in the organism. Advice must also be given as to the means of removing any vestiges of disease that have been detected, or if they are not removable, advice as to the best way of overcoming their influence or of averting their increase. To this must be added precautions to be adopted in certain contingencies which, according to the judgment of the case, appear probable.

“If such a plan as I have here proposed were to be faithfully and conscientiously

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carried out by the present and rising generation of well-educated studious medical men, I think no one can doubt, after a careful consideration of the subject, that immense benefit would be conferred upon the public."

The Life Extension Institute of New York, organised at first on a semi-philanthropic but self-supporting basis, is an adaptation of the principles advocated by Dobell. In conjunction with the Metropolitan Life Insurance Company it initiated its activities nearly twenty years ago and has shown steady growth and elaboration. It has gradually developed various types of intensive and comprehensive health examinations that include elaborate laboratory and X-ray research. The Institute offers nothing in substitution of ordinary clinical supervision and clinical contact. The work is wholly in the pre-clinical field, where the individual can receive an impartial, unbiased, critical examination made from no standpoint other than a desire to protect his future. With the report assembling the data contributed by such a study the individual seeks his own physician or surgeon for final treatment and correction of his disabilities. As the work proceeded, certain basic principles were revealed and emphasized. It was made evident that the dis-

abilities which showed with increasing frequency with advancing age were not due to time, and that age itself was not a matter of years but of physical state. Old age, disease, and death were shown to be due to definite causes, which can be grouped under the following categories:—

Heredity.

Infections.

Poisons.

Food deficiency (or excess).

Air deficiencies (or excess).

Physical trauma (or strain).

Physical apathy (or disuse).

Psychic trauma (or strain).

Psychic apathy (or disuse).

Most scientific men believe that so-called "normal" life cycles are the product of a long chain of causative factors and that, knowing all the facts, science could profoundly modify the life cycles of living organisms, including that of man. Thus, experiments in lower organisms have clearly established the soundness of this basic principle. In the well-known experiments of Dr. Alexis Carrel, of the Rockefeller Institute of New York, the tissue cells of the heart of a chicken embryo are being kept alive for an indefinite number of years, and multiply. The

late Dr. Haley Fiske, Medical Director of the Life Extension Institute, pointed out that the thesis that life cycles characteristic of the species are fixed by heredity, was just as acceptable one hundred years ago as it is to-day; yet since that time the life cycle of man has pretty nearly doubled, and we can no longer accept without reserve the conception of the fixity of the human life cycle. "The latest insurance tables" wrote Dr. Fiske "show a marked difference from those constructed forty or fifty years ago, which were supposed to be as inevitable as the laws of the Medes and Persians. In fact, there is nothing in nature quite so variable as the human life cycle, depending upon the environment of the individual—the way he lives, works, plays, feeds, and exposes himself to, or protects himself from, the attacks of micro-organisms and pests."

The work of the Life Extension Institute shows that there is no such thing as a perfect human being. It is significant too that reports speak of "silent sickness"—so named because it is sickness that does not speak in terms of disability. In contact with industrial workers the question was raised as to whether a man is tired because he is ill or ill because he is tired. In the majority of instances it was found that the man is tired because he is, from the standpoint

of high ideals of health, actually ill; that is, he has disabilities or infections or disturbed functions of the body that are not in any way related to his work. It is a condition of masked illness, of "silent sickness."

The results of periodic health examinations in the life insurance field were remarkable. A reduction in the death rate is reported of from 18 to 25 per cent. among life insurance policy-holders. Furthermore, the increase in the resistance to disease has been equally striking, statistics showing that 60 per cent. of the defects found on the first examination had been corrected when the third examination was made.

Enough has been said to indicate on what territory the ideal of Professor Sheen's dream could take material shape. The reluctance of English insurance companies to follow the example of American houses will be broken down by the pressure of public opinion and a real demand for periodic medical examination once their true need and value are grasped by the mass of the people. There is evidence that the creation of a Pioneer Health Centre, properly organised and equipped on an entirely self-supporting basis, is a practicable proposition the development of which both the State and the medical profession must watch with

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the closest attention. The pioneer work done in the United States and in this country is leading us away, socially as well as medically, from a vicious circle of end-results and palliatives to the logical sequence of cause and effect—in other words towards the *prevention* of social and physical ills.

CHAPTER III

Nature as Mechanic

WHAT is disease? The question is not a new one, nor has it ever been completely and satisfactorily answered, except in so far as there is general agreement in the definition that disease arises from the interplay of dynamic forces inherent in the individual and present in the world about him. Dr. George Draper, Professor of Clinical Medicine in Columbia University, remarks that it would almost seem that nature had purposely turned this game of life into a difficult and fascinating sporting event, by ceaselessly introducing certain unexpected or entirely novel hazards into the environmental conditions:—*

“One might visualise, for example, an earthworm at a roadside. From the soft soil beneath the marginal sod this worm emerges upon the hard unyielding surface of the drive. At once the worm’s advancing tip is arrested, then recoils. A difference in the consistency of its environment has been

*“Disease and the Man,” by George Draper, M.D. (Kegan Paul, Trench, Trubner & Co., Ltd.), p. 5.

appreciated by that primitive sensory apparatus, capable only, let us say, of such limited discrimination. Now imagine that instead of a hard paved driveway the worm had chanced to move out upon the surface of a soft, perhaps slightly moist country road. In this instance the creature's advancing tip would note no material change in consistency from the marginal soil, and would continue its progress until it reached the ruts where wagon wheels had run. At this moment let us suppose that a horse-drawn vehicle approaches. The horse's hoofs strike the ground and there is friction between stones, earth and the revolving wheels. But the worm, lacking the necessary special perceptive sense, remains unaware of the physical sound phenomena produced by these new elements in its environment, and is crushed. A rabbit, on the other hand, which had been crouching in the wayside grass at the same place, might have ventured simultaneously out upon the road. Ears pricked forward, eyes bright at each quick turn of the head, nostrils quivering, the tense alert animal occupies in the same place and at the same moment an infinitely more vast and complicated environment than the worm. The rabbit's world, in addition to

physical impacts, would hold sounds, sights, tastes and smells. For this more elaborately endowed creature, then, the approaching hoof beats, crunching tyre and spectacle of horse and wagon, would form warnings of peril. And the responsive leap, swift as a shadow, would remove the rabbit in ample time from that danger point. It would appear, furthermore, from this illustration, not only that the rabbit's environment had been enlarged by his greater sensibilities, but also that his action capacity had developed commensurately to meet the more varied problems which thereby confronted him."

And again:—

"We might suppose that the rabbit, leaping to escape the approaching horse and wagon, comes down upon the erect quills of a hedgehog, defensively crouching beneath the leaves at the roadside. The injuries to the rabbit would be severe and painful, perhaps fatal. But the episode seems to fall properly under the dictates of chance. The other class of hazards embraces situations in which peculiar and previously unexperienced elements are introduced into the animal's environment. No better illustra-

tion of these unique, unknown and unexpected difficulties in the game of life can be found than is set forth in the story of bacteriology. The sportsmanlike address of the human race to this type of obstacle, and its thrilling passage under the keen leadership of Pasteur, Koch, Lister, Bordet, Theobald Smith and a host of others is a tribute to nature's skill and justice as a balancer of forces. The achievements of these pioneers clearly proclaim anew that the key to Man's ability in the art of *adaption* to his amazingly elaborate and extended universe was long since held out to him by King Solomon, when that intelligent monarch extolled understanding and wisdom in his Apocryphal pronouncements."

Draper points out that it is a subtly moving, changing set of reactions between man and his environment which cause him discomfort, or exactly what the word says, dis-ease. These discomforts, which have come to be called subjective symptoms, he adds, have so often been associated with certain outwardly visible or objective signs, that groupings of these observed phenomena have been described:—

"The constance of recurrence of such symptom combinations has gradually

through the centuries resulted in the crystallisation of mental concepts of this or that disease, named, for example, meningitis, pernicious anæmia, or gastric ulcer. These imponderable concepts, vivified by fear and rendered organic by science, have become almost as fixed and solid as the physical entity of Man himself or one of his chemical or bacterial enemies. In such definite form a disease seems almost to assume concrete personality which with evil intent attacks the human being. Yet it is clear that a meningococcus is not in itself meningitis, that fell spectre which in epidemic times is said to 'stalk through the land.' Nor is it possible to have meningitis except within the person of a human being. Viewed from this aspect it is easy to understand how strongly entrenched has become the tenet of the individuality of disease. . . . But there are other very practical reasons why disease should have emerged in the medical consciousness as an entity in itself. Not the least of these is the obvious demand of suffering mortals for immediate relief from the enemy which holds them in its powerful grip. 'What devil has got me, doctor?' cry the patients down the ages. And the doctor must gird his loins and grapple with that

which has 'got' him. . . . Yet disease is not an entity in itself, a monstrous affliction from without, but is rather the inevitable expression of conflict between unique individuality and an adverse specific environmental force."

Professor J. Arthur Thomson speaks of disease as disturbed metabolism, implying the occurrence of vital processes out of place, out of time, and out of tune; and especially of modificational diseases as due to some deteriorative peculiarity in surroundings, food or function, as may be illustrated by lead-poisoning, beri-beri, and rickets. "These modificational diseases are almost unknown in Wild Nature, for organisms will rarely tolerate conditions of life that are positively deteriorative. They cannot be coerced, either by fear or ambition, into submission to abnormal conditions of life."

The functioning of nature as mechanic is relentless, but at least it is pursued with a strict logicality that gives us the power to anticipate its operation in adverse directions or to guide it into advantageous ones. My first interest in mechanics started when I was demonstrator of anatomy. What struck one was the frequency of fractures which escaped recognition; also the

remarkably unsatisfactory result of treatment. The study of the numerous fractures led me to formulate the following law, viz., that the skeleton represents the crystallisation of lines of force and that any alteration in the form of a portion by fracture resulted in an attempt to restore the bone to its original form by a process of crystallisation. This process took place with the greatest activity in the first few weeks of life. In the case of fracture of a long bone, such as the femur, in childbirth, in which the fragments overlapped, within a very short period of time a new shaft was developed, the length of which corresponded to the overlap, the form and outline of the old shaft having completely disappeared.

The changes which take place in the body in the first few weeks of life are extremely rapid. As life goes on the process of crystallisation becomes more and more limited to the seat of fracture, where it is described as callus, but even in advanced life it is possible to recognise this effort of crystallisation to re-establish the form of the bone. One was very much surprised by the frequency of changes in the skeleton which were regarded by the pathologists and anatomists as instances of a disease called rheumatoid or osteo-arthritis, tubercle or congenital abnormalities.

After a careful investigation of the several skeletons, no portions of which left the dissecting-room without being thoroughly examined, I was able to formulate the following laws :—

1. Pressure exerted habitually over a period of years results in an alteration in the form and texture of bones, cartilages and joints, old joints being modified or destroyed and new ones being developed.

2. Strain exerted over a period of years produces similar changes in bones, cartilage and joints.

3. Apart from the exercise of pressure or strain, when it is to the advantage of the individual in an altered relationship to surroundings, an old mechanism is altered or an entirely new one developed.

Every labourer represented the fixation of attitudes of activity peculiar to his particular form of occupation, since each represented the fixation and, later, the exaggeration of all the tendencies to change which exist when his attitude of activity was assumed on any single occasion. The study of the fixation and exaggeration of attitudes of rest in such cases as those of flat-foot, knock-knee, bow-legs, lateral curvature, etc., enabled me to observe the functions of joints as illustrated by the fixation and ex-

aggragation of attitudes of activity and of rest and to demonstrate the functions of joints much more clearly than had been done previously. Take one example: flexion of the hip joint was described at that time as being limited by the impact of the thigh against the abdomen, whereas I was able to show that it was limited by the impact of the front of the neck of the femur against the margin of the acetabulum. This fact alone threw a clear light on the causation of dislocation of the hip and fracture of the neck of the femur. The study of the resting portions enabled me to formulate another law, viz., that the rate of bone-formation in the several portions of the growing line varies indirectly as the pressure transmitted through them.

The application of these laws to the bones of the face showed that the three factors determining their form are, first, the pressure exerted by air in its passage through the naso-pharynx; secondly, the force exerted by the tongue in the development of the lower jaw; thirdly, the force exerted by the teeth in occupying space and in the transmission of pressure through them. This led me to start breathing exercises to develop the face and to prevent, and often cure, adenoids, which were at that time being operated on very generally. The opposition to

breathing exercises by the laryngologists was very bitter, and the most eminent of these specialists attacked me in public, since it was considered absurd in his opinion that the passage of air could exercise any influence whatever. However, breathing exercises were slowly but gradually recognised as efficient means of dealing with imperfect development and infections of the naso-pharynx, and are now in common use everywhere. This knowledge led me to alter the treatment of cleft palate. At that time it was not considered correct to operate on these clefts till the child was four years old, so that during those four years the child was deprived of the beneficial action of those factors which determine the form of the face. On the assumption that everything that is supposed to be undoubtedly true is usually wrong, I devised special instruments which enabled me to operate on the child at birth. This I did with complete success, and for many years I was engaged in operating on cleft palates, since the mothers were delighted to have their children treated at once, while the surgical profession, with its usual attitude of inactivity and opposition, left these cases to me for many years, till time gradually educated them.

The study of fractures convinced me of the

hopeless state of their treatment. While it was taught that the fragments of a broken bone should be placed in accurate apposition, such was practically never done in certain classes of fractures. To meet this I operated on suitable cases of simple fractures, restoring the fragments to their normal relationship and retaining them by means of steel plates and screws. The indignation which this method aroused in the profession was intense, and even my colleagues who were most friendly to me urged me to discard a procedure which would not only ruin my reputation but would seriously damage the prestige of Guy's Hospital. There was much talk of putting me out of the profession for performing that heinous crime of converting a simple fracture into what was called a compound one. No student who presented himself for examination dared for a moment to mention such a proceeding without fear of immediate dismissal. Thanks, however, to the skill and care of my house-surgeons and dressers, we were able to perform innumerable operations without a single accident. While my surgical friends in England attacked me bitterly and furiously, surgeons from all parts of the world came to Guy's to learn the procedure, and I was asked to go to Berlin and to the United States to demonstrate the methods we employed.

After years of opposition, at a meeting of a Congress in London my opponents insisted on a Committee being appointed to investigate the truth of my statements, and for the first and, indeed, I think the only, time the British Medical Association provided the means for such an investigation and published the results of the investigation in a special form. The Committee verified my facts in every particular, so that the method came slowly into general use.

As a result of these investigations into the changes which the skeleton undergoes, I formulated the law that "We bear a simple mechanical relationship to our surroundings, any change in that relationship being followed by a corresponding change in our anatomy," with the corollary that "Anything that Nature does to meet the altered mechanical relationship to surroundings tends to shorten life."

I will give an illustration of the truth of this last statement, though innumerable instances are afforded by the short life of men engaged in laborious pursuits. The coal-heaver, whose function is to carry two hundred-weights of coal in a sack upon his back till he empties it into the hole in the pavement, undergoes many changes. The spine becomes a rigid rod, his costal cartilages ossify, and the joints of his ribs become fixed. Consequently, owing to the

fixation of his spine and chest, he has to depend on his diaphragm and abdominal muscles for the aeration of his blood. On this account he readily succumbs to such a degree of pulmonary inflammation as one with a normal anatomy would readily survive. (See Figures 1, 2 and 3.)

Having demonstrated the truth of this law as regards the skeleton, I started to apply it to the soft parts of the body. Here I found it worked out as simply as in the case of the skeleton, but I experienced much more difficulty in demonstrating the changes which ensued, as they did not lend themselves so readily to photography as in the case of the bones and joints. To my surprise I was led far beyond my expectations, since I was enabled to demonstrate that in the several changes which develop in the gastro-intestinal tract (the digestive system), because of its altered mechanical relationship to its surroundings, lay the cause of all the diseases of civilization.

Looking at the gastro-intestinal tract (See Figure 4) one is struck by its close similarity to the drainage scheme of the house. The stomach corresponds to the pan of the closet, the duodenum to the syphon trap, the small intestine to the long drain leading from the syphon trap to the cesspool, and the colon to the cesspool. When the plug of the closet is pulled material passes from

the pan through the syphon trap, small drain and cesspool, a corresponding amount of material being evacuated into the drain in the street.

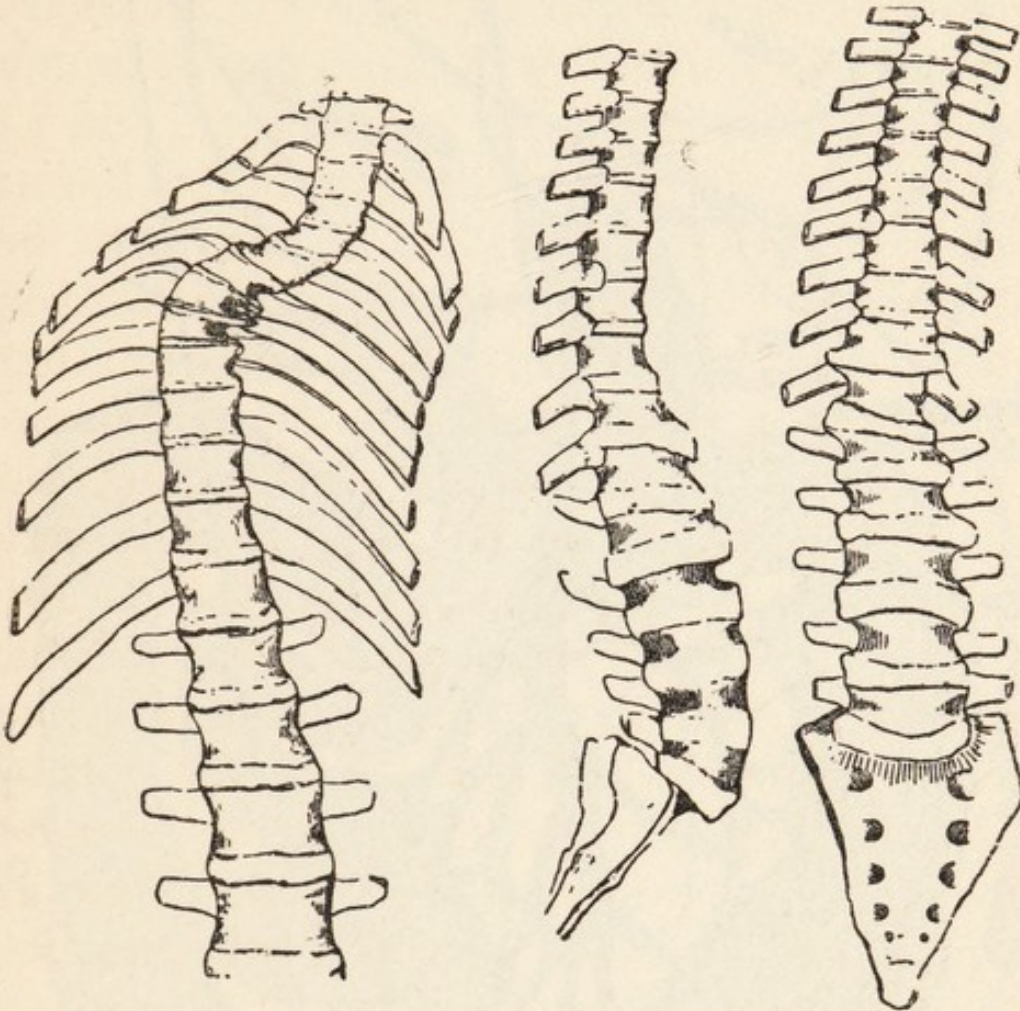


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 1.—*Spine and ribs of a brewer's drayman.*

FIGS. 2 and 3.—*Spine of a coal heaver.*

Any obstruction to the effluent from the cesspool is followed by an accumulation of material in the cesspool, then in the small drain, the syphon trap, and finally in the pan of the closet. If material capable of decomposition remains

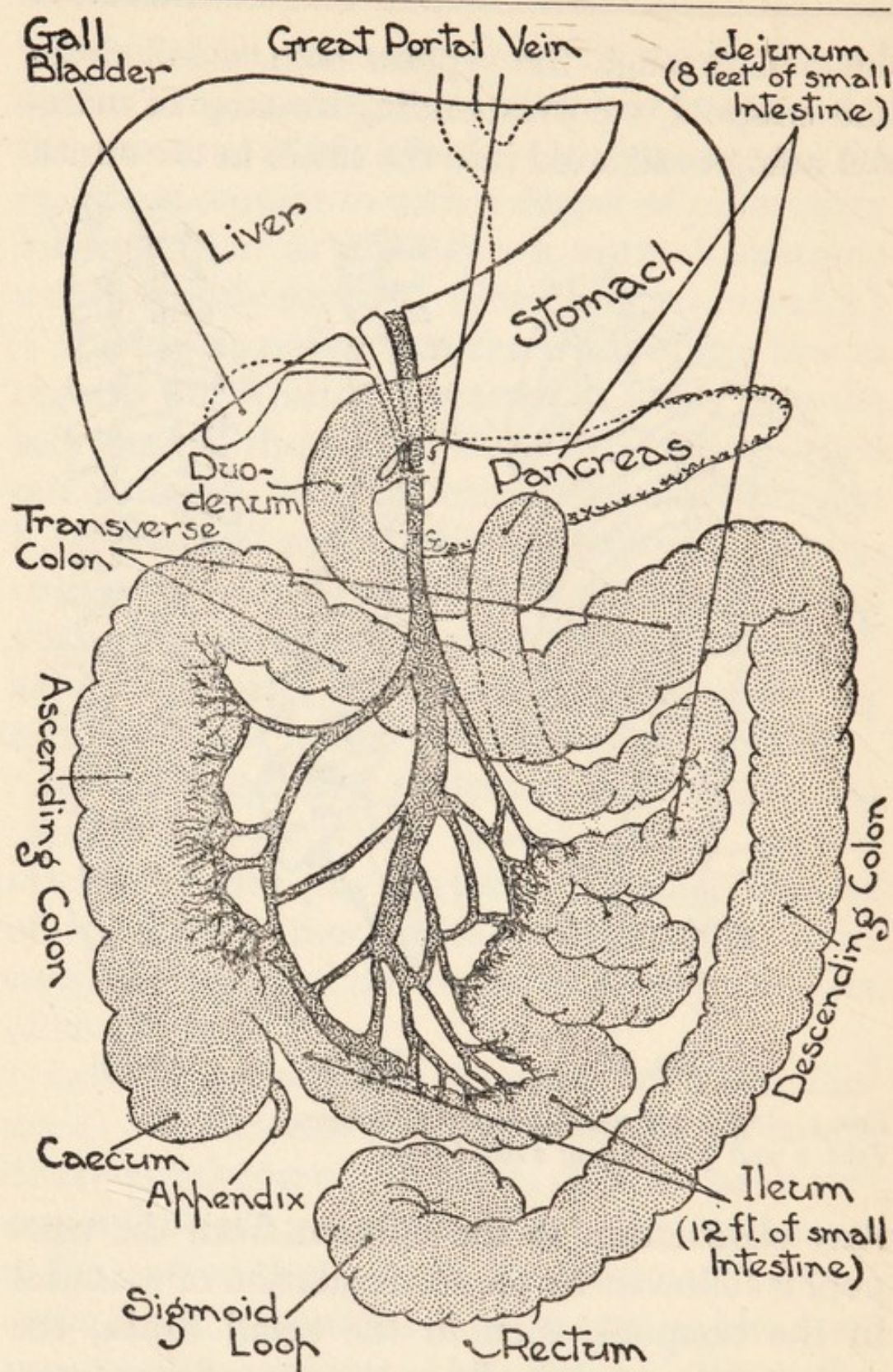


FIG. 4. THE NORMAL DIGESTIVE TRACT.—By courtesy of Messrs. Williams & Norgate, Ltd.

there for a long period gases are evolved. In the stomach the food materials are broken up and organisms are destroyed by the action of

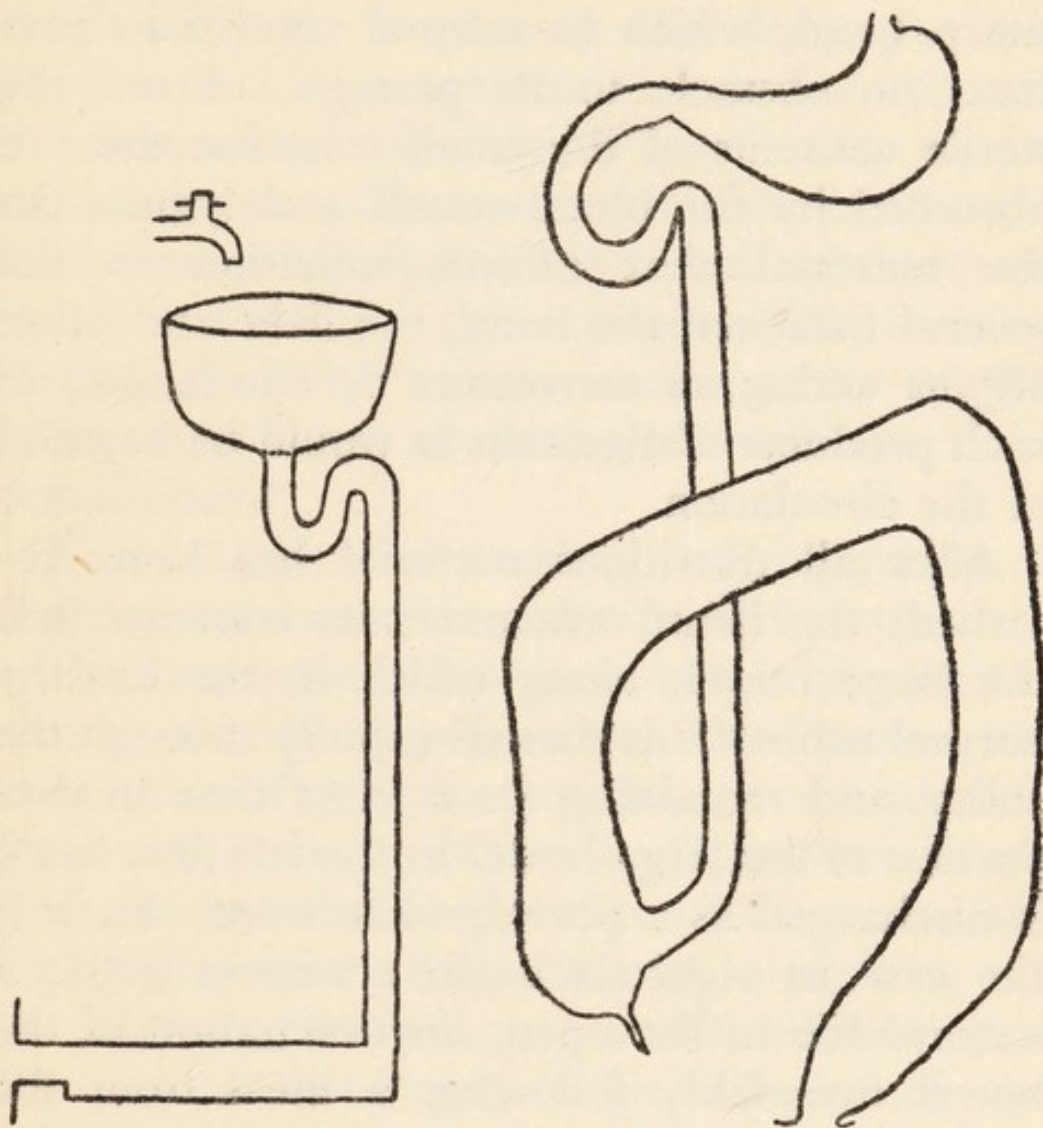


FIG. 5.—Represents diagrammatically the drainage scheme of a house.

FIG. 6.—Represents the scheme of the gastro-intestinal tract.

the gastric juices. These sterile products are driven from the stomach into the human syphon trap or duodenum, which exists so as to give

its contents time to mix freely with the secretion of the pancreas and with the bile. From the duodenum the already partly digested material passes into the small intestine over rather a sharp bend, which in normal conditions presents no obstacle to its passage. From the sterile contents of the small intestine there is absorbed by the blood-vessels and lymphatics the material that affords nutrition to the several tissues of the body, the liver and other organs acting as converters or eliminators of such products of digestion as would be harmful in the circulation.

After all nutritious material has been absorbed, the ileum evacuates its contents into the large bowel, along which in the healthy normal subject it is carried rapidly through the colon, and remaining for a short time in that portion of the large bowel in the left iliac fossa, is discharged as a porridge-like mass. Such is the case in vigorous healthy natives living a natural life in the open, an evacuation of the bowel invariably following a meal from the earliest infancy. Such people existing under these conditions live to a vigorous old age, and are quite free from all the diseases which may reasonably be called diseases of civilization. There are, of course, many races of natives who are badly fed and who suffer in consequence.

Realizing that constipation—or, in other words, the excessive delay of the contents of the large bowel—exists normally in civilization, such mechanical changes as must necessarily result from the stagnation and decomposition of the fæcal matter constitute an altered mechanical relationship of the colon to its surroundings. To my surprise these changes follow on precisely the same lines as do those in the skeleton, their remarkable activity during the early weeks and months of life being even more obvious and rapid in their development.

To obviate the distension and elongation of the iliac section of the colon by the products of several meals, membranes or bands of crystallization are developed, which first secure the mesentery of this piece of the bowel and then later attach the bowel itself. How these bands had escaped the observation of the anatomist and pathologist is very difficult to explain. As an example of this fact, I would mention that Sir James Goodhart, a pathologist of the greatest repute, was present at an abdominal operation. During the process I turned up the iliac colon and pointed out to him a well-developed acquired band which was obviously obstructing the lumen of this section of the bowel. He was very much impressed, and said

it must be an extraordinarily rare condition, as he had never seen it in any of the vast number of post-mortems he had made at Guy's. Those who are familiar with the methods of investigation of the intestines at post-mortem examinations will readily understand the ease with which such bands may escape notice. The immediate result of the anchoring of this segment of the colon is to prevent the free passage of fæcal matter through it. This accumulates in the colon proximal to it, and loading it up, exerts a strain upon its attachments in the erect posture, in consequence of which lines of crystallization—or, in other words, membranes—develop which secure the bowel at the splenic and hepatic flexures, at which points this loop of bowel is suspended in the abdomen. Its commencement, the cæcum, is supported by an acquired membrane on its outer aspect and very frequently on its inner aspect by a membrane which fixes the end of the ileum or small intestine and frequently the appendix, these structures forming acquired internal lateral ligaments to this portion of the large bowel.

The small intestine, becoming overloaded with the accumulation of material dammed back in it, exerts a strain upon the junction of the duodenum and small bowel, and as the tube is a soft one, unlike the analogous condi-

tion in the drain of the house, the junction readily angulates, and the passage of material from the duodenum into the small intestine is thereby obstructed, especially in the erect posture. This process of obstruction and consequent dilatation I was able to demonstrate by means of X-rays on the screen many years ago, thanks to Dr. A. C. Jordan's help, and I called it the "writhing duodenum"—in other words, a syphon trap whose muscular walls were endeavouring to overcome an obstruction to its outlet.

The obstruction to the duodenal effluent results in a dilatation, especially of its first portion or commencement, since material driven forcibly from the stomach cannot regurgitate into that organ because of a spasm of the muscle controlling its exit, called the pylorus. Such distension is the source of the epigastric pain so commonly complained of in constipation and indigestion. The excessive duration of this distension results in an inflammation of the mucous lining, in hæmorrhage, and, later, in its ulceration.

This condition of over-distension of the obstructed duodenum or syphon trap is met by the diminution of the pumping action of the stomach, which dilates in association with a spasm of the pylorus. For this reason cancer of

the duodenum is of great rarity, the ulcer not remaining for a sufficient length of time to permit of its affording a foothold to the "cancer virus."

The stomach dilating, its mucous membrane is exposed to the impact of its contents about the pylorus, while the mucous lining of the lesser curve suffers from strain. If a rubber bag, shaped like the stomach, is secured in a similar manner and overloaded, the rubber material forming the lesser or upper curve tears, while the lower convex margin drops freely.

The impact of the food contents upon the pyloric area and the strain along the lesser curvature are responsible for the changes in the mucous membrane which vary from engorgement to hæmorrhage, ulceration and cancer. Unless dealt with by efficient medical or surgical measures, these ulcers of the stomach remain and form a suitable nidus for the invasion by the cancer germ.

So much for the simple mechanical changes which take place in this tract consequent on its altered mechanical relationship to its surroundings.

The obstruction afforded by the anchoring of the section of colon in the left iliac fossa results in irritation of its mucous lining, the

setting up of a septic inflammatory process, with the consequent spasm of the muscle coat. This last factor diminishes still further the lumen of this segment of bowel. It is in this area of the large bowel that ulceration, at first septic and later cancerous, develops. The septic process extends back along the bowel producing a condition called colitis. As it extends it causes a progressive spasmodic contraction of the muscle coats, and gradually material is forced back and collects in the cæcum. This accumulation in the cæcum produces discomfort and, later, pain in the right groin, often the chief symptom complained of by the sufferer. The infective process in the mucous lining of the bowel readily extends into the appendix, and inflammation of this tube ensues, varying in intensity, and often calling for surgical interference. This inflammation of the appendix is never a primary condition, but is merely a stage in the constipation sequence.

Sooner or later septic organisms extend from the contents of the cæcum into the dammed back material which is delayed and accumulates in the ileum. This was demonstrated very clearly by Dr. N. Mutch by means of cultures obtained from the small intestine at various levels during operations for the removal of the large bowel. The amount and extent of the

ascent of these organisms vary greatly, but in proportion as they invade and thrive in what ought to be the sterile food supply of the individual, so there are absorbed into the circulation more organisms and toxins than the liver can deal with. Consequently there is an overflow into the general circulation of micro-organisms and toxic matter which is distributed to every cell in the body. The thyroid and other ductless glands become actively engaged in attempting to meet this abnormal condition, but these organs sooner or later undergo degenerative processes consequent on the excessive strain to which they are exposed, and goitre, Addison's disease and many other conditions ensue.

Every organ and tissue supplied with the poisonous blood undergoes degenerative process, all of which we speak of as diseases, *e.g.* kidney disease, brain diseases, diseases of the heart, blood-vessels, diseases of the liver, etc. Again, the resisting power of tissues to their invasion by micro-organisms becomes diminished, and many diseases, such as tubercle and rheumatoid arthritis and other changes, the result of the presence of these organisms in the tissues, develop. Finally, when the tissues of the body are sufficiently reduced in vitality, they form a soil in which the virus of cancer

can develop and thrive. Cancer has never been known to affect a healthy tissue. It is well that unhealthy persons past middle life should not expose themselves to infection from the discharges of a cancerous surface.

When one first called attention to intestinal auto-intoxication and to the conditions which result from it, ridicule was heaped on it. As an outstanding example of the innumerable attacks made upon it, I would quote an article written by that eminent pathologist and clinician Professor Adami as recently as 24th January, 1914, in the "British Medical Journal." He states: "To-day I wish to consider not as a clinician, but as a pathologist, how far we may reasonably accompany Sir Arbuthnot and to what extent his doctrine is to be accepted; for, honestly, at first sight, these seventeen symptoms and nine diseases, indirectly induced, seem to be in a horrible jumble." He then went on to accuse me of "that most dangerous, if not the last, infirmity of noble minds—obsession." Dr. Adami was much too great a man not to be influenced by the evidence I subsequently supplied him with, so that, when convinced by it, he asked me how he could remove the effect of his words in regard to intestinal auto-intoxication, and he did this by writing an article entitled "On Intestinal Stasis, Intoxication and

Subinfection," for a book "On the Operative Treatment of Chronic Intestinal Stasis" which I wrote. In that he accepted fully the views I put forward.

Few realize the vast amount of deleterious matter that is being absorbed daily from an infected small intestine. I would give only one illustration. In the Congress in 1914, when there assembled in the wards and operating theatre of Guy's Hospital more distinguished surgeons than had ever come together before, there was demonstrated a number of toxic people for whom colectomy was performed—that is, the removal of the large bowel or colon. Among them was a young woman suffering from rheumatoid arthritis, most of whose joints had been so affected that she could not touch her face with her hand, which with her arm was stiff and useless. Within twenty-four hours of the removal of her colon she was able to write her name in the pocket-books of those who had examined her carefully previous to the operation. One could produce innumerable similar examples of the effect of toxins on the tissues and their rapid disappearance when the supply of infected material was cut off by the establishment of perfect drainage.

CHAPTER IV

The Influence of Diet on Health and Disease

IT is clear from the foregoing chapters, at any rate by implication, that diet plays the principal rôle in the maintenance of health and the avoidance of pathological conditions. This conclusion, to which I have been impelled as a result of my own work in the surgical field, and which has received cumulative confirmation throughout the whole period of my professional experience, is slowly influencing medical opinion and practice after a period of considerable hesitancy. In his last report on the State of the Public Health, Sir George Newman, Chief Medical Officer of the Ministry of Health, says:—

“Healthy and complete nutrition is something infinitely wider than mere feeding or filling of the stomach, mere stoking of an engine. It requires a healthy body; *it needs a clean alimentary tract*; it needs a brain and nervous regulation in tone as well as a healthy muscular and digestive system, a sound circulatory system as well as a normal lymphatic system. It is part of the sum total of sound physiological being.”

And later—

“It is not too much to say that our national capacity for work and output is impaired by unsatisfactory nutrition; it is not exaggeration to say that some of our commonest diseases are directly due to deficiency, or excess, of certain food constituents. For instance, rickets, dental decay, anæmia, tuberculosis, and goitre, perhaps even bronchitis and infectious diseases, are often due, directly or indirectly, to some particular deficiency; again, diabetes, gastric ulcer, appendicitis, colitis, lumbago, ‘rheumatism,’ are often closely associated with some particular excess in dietary or ordinary lack of care of the digestive organs; once more, children and pregnant women are all too often unwisely or unsuitably fed for their requirements. These are three examples which illustrate the observation of Professor E. P. Cathcart, F.R.S., that ‘we do not suffer so much in this country from the inability to obtain food as *inability from one cause or another to utilise to the best advantage such foods as are available*. The adequate nutrition of the child—food, exercise, rest, fresh air, personal habit—is one of the primary functions of the home, to be supplemented where necessary by the school and

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by the advice and counsel of visiting doctors and nurses of the several public medical services. The appropriate nutrition of the adult, and particularly of the pregnant woman, is largely a matter of the common sense of the well-informed individual. There is no royal road to national health and sound nutrition. They are the effect of experience in wholesome living by individuals. There is a science and art of life as there is a science and art of medicine, or law, or engineering. We must learn the facts, the knowledge, the science of life, and bring our art and practice to accord therewith."

On what Sir George Newman, with his customary lucidity and happiness of phrase has laid such emphasis, the New Health Society has enlarged in season and out of season throughout the course of its existence.

Research in this country and abroad has established beyond any doubt the association of healthy function with a diet rich in natural food constituents; it has furthermore demonstrated in the clearest manner possible that degeneration and deficiency diseases follow inevitably upon the devitalised dietary so common among large sections of our civilised populations. The work initiated in regard to vitamins

by Professor Sir Frederick Gowland Hopkins and others, must influence profoundly the whole trend of medical knowledge and practice during this and succeeding generations. Let me quote the words of this distinguished authority:—

“While the health, the capacity, and the effective activities, alike of a race and of an individual, are primarily determined by inherited factors, all are secondarily influenced by the environment in which the race or individual has developed and exists. With an unfavourable environment high qualities conferred by inheritance fail to find full expression; with a wholly favourable environment, and especially one in which the factor of nutrition is optimal, the results of a less satisfactory inheritance may in a real sense be mitigated. Whatever may be true of evolutionary history, it is sure that in deciding the status and capacities of an existing generation, Nurture may assist Nature to a degree which is unmistakable, and right nutrition in this respect is a factor of prime importance. The full importance of its influence is, indeed, only now being fully demonstrated by controlled observations and experiments; it may escape recognition in more superficial studies.

“The mere survival of a community, for instance, is too often taken as proof that the nutrition of its constituent individuals is adequate; lack of health or efficiency being attributed to racial or other uncontrollable factors. In social-economic surveys a race or community is found in equilibrium with an environment which includes its food supply. It is often forgotten that such environment is fortuitous and that the equilibrium reached is one in which the community, while managing to survive, may yet be functioning at levels far below those possible to its innate capacities. It is truths of this sort that the science of nutrition, having reached the stage of controlled experiment, is now demonstrating.”

And again:—

“Only a couple of generations ago it was supposed that a community in which the crude appetite of all individuals is duly satisfied, and obvious starvation avoided, is a community adequately nourished. Ill-health and inadequate performance in such a community must, it was assumed, be due to causes in which nutrition has no part. We now know that the satisfaction of appetites by mere bulk consumption is no final

proof that a food supply is adequate, and this is as true of the animals which we breed for our uses as it is of ourselves. Quality in food is at least as important as quantity; details are of the utmost significance; the absence of factors which add almost nothing to the bulk of a dietary may make the whole entirely inadequate. We know now that conditions recognized as actual diseases develop because the supply of some minute nutritional necessity has failed, while, short of obvious disease, ill-health may depend upon a lesser degree of such a deficiency. Lack of substances of which the necessary amount is equally small may be responsible for failure of proper growth in the young, and for loss of fertility in the adult. Recent observations seem even to have shown that fundamental instincts, such as maternal care for the progeny, may, in animals at least, be affected by the absence of a factor from the diet! In all individuals such a lack may greatly increase the liability to infection by bacteria and other parasites. Facts such as these are already established. There are countless others to be discovered. . . . We are learning, moreover, of unexpected mineral needs; even metals such as copper and manganese are apparently essential to the

animal body, though, of course, in very small amounts. Of the substances which we have come to call vitamins there are certainly many, and a supply of each one is necessary because each exercises its own quite specific functions in the body. Modern studies are making it clear indeed that nutritional needs are in reality very complex; so complex that the results of these studies sometimes awaken scepticism among those who have not appraised the evidence. They are conclusive, however, to those who have seen them at first-hand."

The researches of Colonel Robert McCarrison, of the Indian Medical Service, are of particular interest and importance. In a report in "The Lancet," of 4th February, 1922, McCarrison states:—

"For some nine years of my professional life my duties lay in a remote part of the Himalayas, amongst isolated races far removed from the refinements of civilization. Certain of these races are of magnificent physique, preserving until late in life the characters of youth; they are unusually fertile and long-lived and endowed with nervous systems of notable stability. . . .

"During the period of my association with

these peoples, I never saw a case of asthenic dyspepsia, of gastric or duodenal ulcer, of appendicitis, of mucous colitis, or of cancer, although my operating list averaged over 400 operations a year. While I cannot aver that all these maladies were quite unknown, I have the strongest reason for the assertion that they were remarkably infrequent. The occasions on which my attention was directed to the abdominal viscera of these people were of the rarest. I can, as I write, recall most of them—occasions when my assistance was called for in the relief of strangulated hernias, or to expel the ubiquitous parasite—*Ascaris lumbricoides*. Amongst these people the abdomen, over-sensitive to nerve impressions, to fatigue, anxiety, or cold, was unknown. Their consciousness of this part of their anatomy was, as a rule, related solely to the sensation of hunger.”

These races live upon a diet which is natural and simple and is not a causative factor in that disease of diseases, constipation, which in my view is the root cause of all the diseases of civilization, as we know them in Western countries. In an earlier publication, “Studies in Deficiency Disease,” McCarrison refers to the application in his own practice of results

obtained over a considerable period of experiments conducted on monkeys and other animals. Quite recently he delivered before the Royal College of Surgeons two lectures on "Some Surgical Aspects of Faulty Nutrition," which give the strongest confirmation to his earlier conclusions and the trend of which was to demonstrate how easily the diseases of civilization can be induced in rats and other animals whose physiological functions bear a close analogy to those of the human being.

In the laboratories of the Indian Research Fund Association at Coonoor in Southern India, McCarrison has reared some thousand stock albino rats and he uses on the average 1,100 animals a year. This stock is fed on a diet similar to that eaten by certain peoples of Northern India, among whom some of the finest physical specimens of mankind are to be found. The diet consists of whole wheat-flour, unleavened bread (chapattis) lightly smeared with fresh butter, sprouted Bengal *gram* (legume), fresh raw carrots and cabbage *ad libitum*, unboiled whole milk, a small ration of raw meat with bones once a week, and abundance of water, both for drinking and washing purposes.

During a period of two and a quarter years there was no case of illness in this community

of albino rats, no deaths from natural causes in the adult stock, and, but for a few accidental deaths, no infantile mortality. Post-mortem examinations disclosed no evidence of disease with the exception of an occasional cyst in the liver, containing tapeworm larvæ. Disease and death have been excluded almost completely by minute attention to three environmental conditions: cleanliness, comfort, and food.

Other groups of rats were fed improperly on diets resembling those of Indian races in which certain diseases are prevalent, and by these means it was possible to induce in the animals precisely the same diseases. Variations of ill-balanced diets composed mainly of cereal grains or cereal products and vegetable fats with little or no milk, butter, and fresh vegetables proved conclusively that one-sided diets which are disproportionately rich in cereals and poor in animal fats, milk, and *fresh* vegetables are capable of inducing in albino rats a large proportion of the diseases included in our calendar of human ailments. McCarrison adds that of all the faulty diets he has used, that composed of white bread, margarine, tea, sugar, jam, preserved meat, and scanty over-cooked vegetables—a diet in common use by many people in this country—proved to be one of the worst and most likely to be associated in

rats with many morbid states, especially diseases of the respiratory and gastro-intestinal tracts. Experiments with other animals yielded similar results:—

“In every species—pigeons, rats, guinea-pigs, rabbits, and monkeys—I have found the same thing; properly fed animals remain remarkably free from disease, improperly fed animals are remarkably subject to it. It is reasonable, therefore, to assume that the human species is no exception to this rule and that many of the ailments, to which man is erroneously supposed to be heir, are the outcome of his improper feeding, a general conclusion which I have been emphasising during the past 12 years. Some may hold that it is not possible directly to translate to human experience the results of an experiment such as that just described. This may be true if we seek to do so too rigidly and fail to take sufficient count of other environmental factors to which human beings may be exposed. But in general the results of an experiment of this kind do, in my opinion, apply to man, and point the way to a solution of many ætiological problems connected with his physical infirmities.”

In this connection it is interesting to refer to McCarrison's "Studies in Deficiency Disease," and to the chapters in which he describes the effects of introducing changes into human dietaries which, at first glance, might appear to the layman adequate in variety and vitamin content. He considers the food eaten from five points of view, that is to say, as to (1) deficiency of vitamins, (2) deficiency of protein of good biological value, (3) deficiency of inorganic salts, (4) excess of carbohydrates, and (5) excess of fats. He gives a case in point, that of a boy, aged nine, whose parents were in a good social position. He was surrounded with every comfort, and so far as housing, hygiene, and happy home surroundings were concerned the conditions under which he lived were perfect, yet he did not thrive.

"He was pale, thin, weedy, 'with a miserable appetite' and irregular teeth; he suffered from boils, and from 'night terrors' so severe as to cause his parents grave alarm. He was said to have 'a thickened colon,' but his bowels were regular and 'his internal arrangements excellent.' His history was as follows: Born in the East, he was nursed by the mother for the first month, after which breast-feeding was discontinued because of

the mother's health. He lost weight and had diarrhœa. He was brought to England at the age of five months, and remained there in apparent health until fourteen months old. On returning to the East he developed croup and bronchitis, and 'never did well after that.' He was, however, 'Never ill, although never vigorous.' He was 'always white and quiet and with little appetite.' Just after he reached the age of three years, his parents 'took fright at his steady loss of weight' and brought him to England. He was seen by a consultant, who said, 'he was terribly anæmic, had a tendency to adenoids, but nothing organically wrong.' He was 'put on a strict diet, given raw meat, iron, cocoa, and no fruit except juice, while his milk was cut.' He grew stronger in the course of a year or so, and 'was never actually ill after that but for bad colds.' Sometimes he had 'mysterious bouts of abdominal pain' thought to be 'indigestion.' He also complained of pain in the knee if he walked much. This was thought to be due to 'muscular strain from a weak ankle.' So he reached the age of six years, at which period his 'appetite was miserable, and he had no interest in any kind of food.' He was therefore taken to a consultant again,

who thought 'his adenoids appeared worse, but did not advise operation.' Six months later he had tonsillitis with 'a mysterious rash, which was pronounced to be neither scarlatina nor measles.' Shortly after this he was found to have 'slight curvature of the spine,' and was ordered 'Massage and exercises.' His 'appetite never improved, and he got very easily tired after any exertion.' His 'second teeth came slowly and overcrowded.' His dentist said 'his jaw was too small, and must be stretched,' and that this was due to 'tonsils and adenoids.' He suggested a throat specialist, and the tonsils and adenoids were removed. He 'appeared to improve.' Later he got 'violent pain in the stomach,' which was considered to be due to 'thickening of the colon.' Slight mucus was then noticed in the stools, but as his bowels were regular, no further attention was paid to this symptom. Raw fruit was prescribed, and another specialist consulted, who considered the boy's state of health was due to 'imperfect breathing,' and that in consequence he was 'much developed below the waist and too hollow-chested.' He advised 'two hours lying down on a hard surface, with the chest supported on a sand-bag, so as to force the boy to breathe with

the top of his chest. For some time he had been having a cold bath every morning, and doing ten minutes' exercise of the most strenuous kind after it. Thus he reached the age of nine years. A short trip to Cornwall, where he had a different kind of food, improved him, and he gained a little weight, which was partially lost on his return to his own home—a home situated in one of the healthiest and most bracing parts of England. At this point I saw the boy. He was pale, hollow-chested, especially over the right chest, thin and ill-developed, his ribs showing, his abdomen slightly protuberant. His motions were large and dry, and covered with a coating of slime. His stomach was slightly dilated, and the whole colon tender, especially from the splenic flexure downwards. His teeth were irregular and his jaws narrow. He had the scars of recent large boils on the buttocks, and a large angry-red boil on the hip. I could find no other evidence of organic disease. His mother was greatly distressed at the severity of his 'night terrors.' I asked her to prepare for me a statement of everything he ate and drank throughout the day. This she did with a perfection of detail most admirable. This was the boy's dietary :

Breakfast, 8 A.M.: soup-plate of porridge (not wholemeal) with a spoonful of Jamaica treacle; rasher of bacon with potatoes or fried bread; or, 'buttered eggs,' made with Cook's dried eggs and margarine, on toast; or, 'fish cakes,' made with cod or hake, potato, and a Cook's dried egg; or, 'fish pie' made the same way; or a slice of cold ham; or, 'soused mackerel,' or mackerel rolled in oatmeal and fried; one 'tiny piece of toast' and margarine, or a small piece of white bread and marmalade or jam; two teacupfuls of milk (boiled), coloured with tea.

1.15 P.M., Lunch: roast beef or mutton, generally New Zealand or Canterbury lamb; potatoes, some baked with the meat, some boiled; French beans, or marrow, or mashed turnip, or spinach or cauliflower; sometimes stewed beef with onions, carrots, etc., or haricot mutton done in hotpot with vegetables; or cottage pie; or minced meat or stewed meat shape, the last about once a week; stewed damsons or blackberries or pears with junket, cornflower, or rice shape, or custard made with milk and custard powder, or milk pudding once a week. When he had recooked or 'made-up meat' (cottage pie, etc.), he had in addition some kind of suet pudding, either steamed ginger

pudding or raisin or lemon pudding, with a hot treacle sauce, or white sauce, or lemon and arrowroot sauce, or a fruit pudding made of stewed fruit with suet crust. On Sundays he had fruit tart or pudding made of stewed fruit poured on white bread and allowed to soak, and afterwards turned out cold with custard poured over it. Sometimes cheese and bread after his pudding, not often. Never a second helping of anything. One glass of water and a piece of butter-scotch completed the luncheon meal. Tea, 4.30 P.M.: three pieces of bread and butter (margarine), sometimes white bread, often brown or 'Veda' malt bread; rarely took jam or honey; sometimes had a slice of cake; two teacups of milk (boiled), coloured with tea. Supper, 7.30 P.M. (taken in bed): a teacupful of 'Ovaltine' made with milk; two gingernut biscuits or two shortbread biscuits or two slices of bread and margarine. Surely this was a dietary varied enough and liberal enough; especially so as it had been supplemented during the last three months with a raw banana, apple, or pear the first thing in the morning. Yet the boy did not thrive, and had 'a miserable appetite.' "

Now, on examining this elaborate dietary, it is noticeable that, despite its variety, it was for this boy, with his low food intake, deficient in vitamin A and in vitamin B. It was also not rich enough in vitamin C. In short, it did not contain an adequate allowance of the natural foods—wholemeal, milk, butter, fresh eggs, raw fruit, and raw leafy vegetables. The case, therefore, was classed as being similar to that of monkeys fed on autoclaved food, whose symptoms are loss of appetite, loss of weight, anæmia, unhealthy skin, and colitis. The boy's symptoms were loss of appetite, loss of weight (or more properly failure to put on weight), anæmia, unhealthy skin, and colitis. Accordingly he was weighed and put on the following diet:—

7.30 A.M.: Glass of hot water with the juice of an orange in it.

8.30 A.M.: Three-quarters of a pint of warm fresh milk with the yolk of one fresh egg beaten up in it; oatcake and fresh butter as much as he cared to eat; one English apple.

12 noon: A drink of water.

1.15 P.M.: Lunch: Freshly-cooked English beef or mutton, or liver twice a week; potatoes cooked in milk, served and eaten

with the milk in which they were cooked; a large raw tomato; one young lettuce of ten small leaves; stewed fruit with enough sugar to neutralize acid taste; small piece of cheese; oatcake, butter.

4 P.M.: A drink of water or weak tea; nothing to eat.

Supper (two hours before bedtime): As for breakfast, but without the apple.

As an alternative to oatcake, wholemeal bread or standard bread was allowed. The boy rested for one hour after the midday meal. His cold baths and exercises were stopped, with the exception of breathing exercises at an open window. His mother was instructed to let him run wild, and to give him a dose of Gregory's powder once or twice a week. The result of this treatment was remarkable. He increased in weight, his 'night terrors' ceased after the first five days of treatment, his appetite returned, and he often remarked of his food, "This is delicious." He began to "eat well," and at the end of one month he had gained 3 lbs. 3 ozs. in weight, in spite of a heavy cold. His mother reported: "He is certainly better in every way, more vigorous, a better colour, and eating splendidly; he has had no night terrors and no abdominal pain." By the end of five months

the boy's general health had greatly benefitted; his weight steadily increased and the colitis gradually improved, indicating that his previous ill-health was due largely to faulty food. The identity in kind of his symptoms to those of monkeys fed on autoclaved food is remarkable. "It is not maintained that another boy might not have flourished on the very varied dietary he had been receiving: the point is that this boy did not flourish on it, and therefore it was inadequate for him. Reading through his history, one notes the slow, sure onset of colitis due to the deficient food and especially to the lack of sufficient vitamins. One wonders, too, whether the removal of the adenoids and tonsils, the "stretching of the jaws" by an elaborate odontological device, the two hours spent in a recumbent position on a hard surface, would have been necessary had the boy's food from his earliest infancy contained an adequate supply of the unsophisticated foods that nature intended him to have." Other cases are described in which similar changes of diet attained similar results. McCarrison points out that this example emphasises that it is not on the variety of food presented to the individual, but on the quantity actually eaten, on its balance, on its content of vegetable residue and salts, and especially on its vitamins,

that the nutritive value of food and the health of the individual depends. He also adds that the subdivision of vitamins into many classes is not without the risks attendant on decentralization. Vitamins, like other essential constituents of food, are not to be regarded as independent of the assistance derivable from their associates in the maintenance of nutritional harmony. Each vitamin is but a member of a team, and the team itself but a part of a coordinated whole.

The trend of thought thus adumbrated by McCarrison has been taken several stages further by recent research, especially by Dr. Chalmers Watson in his investigations into the influence of irradiation on nutrition. After eighteen years of more or less intensive research, medical science does not know very much about the actual nature of vitamins, although, according to reports at the time of going to press, claims are being substantiated under which it has been possible to isolate one or other of the vitamins. Be that as it may, in Dr. Chalmers Watson's view, the failure to probe the secret of vitamins may be due to the fact that hitherto they have been approached from the biochemical rather than from the biophysical side. In his view, vitamins are essentially products of radiation and not chemical substances. In

nature, he says, vitamins exist only in plants, and he concludes that they are put there by the Sun, the source of all energy. Animal life, he continues, is entirely dependent upon the supply of the Sun's energy which is obtained either directly through the skin or indirectly through the ingestion of vegetables. In the case of man, this energy can be derived directly by eating vegetable foods or indirectly by the consumption of animal tissues which have previously ingested large amounts of vegetable food.

In elaborating his theory, Dr. Chalmers Watson* shows that solar energy can be artificially used in the production of vitamins, *e.g.* exposure of the body to the ultra-violet rays, and the irradiation of medicinal substances, *e.g.* ergosterol and cod-liver-oil. It is thus seen that solar energy is transferred in nature and by artificial means into chemical energy; and it is apparent that between the chemical energy, as it is stored up in the plant or substance, and the sunlight energy, which starts the process, there must exist a very close kinship in nature.

“By way of explanation of the different known vitamins, it is possible that the special

* “Radiation in Relation to Human and Animal Nutrition. With a Theory as to the Nature of Vitamins.” By Chalmers Watson, M.D., F.R.C.P. Edin. (John Bale, Sons & Danielsson, Ltd.)

vitamin or vitamins specific for the plant may have an analogy with the selective power inherent in the plant in relation to colour.

“The surest and best source of vitamins is the use of ‘live’ food; a large proportion of foods in common use are more or less dead (devitalized). The amount of ‘vitamins’ in food has a definite ratio to what may be termed the nearness of the food to the original source of its energy.

“The general correctness of the hypothesis here advanced as worthy of investigation must be determined by clinical and laboratory study. If there are any established clinical data which rule it out of count, it falls to the ground. I know of no such data. Similarly, the existence of any proved data from the region of physics or chemistry, either at present known, or later ascertained, may show it to be invalid.

“If the hypothesis is found to be correct, its acceptance will involve a profound change in some of the medical theories on which current medical practice depends; in the event of its being found invalid, the investigations required to disprove it are likely to prove of value for the advance of practical medicine. The acquisition to our knowledge

of physical science in the past twenty or thirty years has made it imperative that the subject of nutrition should be more intensively studied by the light of that increased knowledge. This involves the close study of the energy value of food in relation to what may be termed its sunlight properties.

“The available data appear to warrant the suggestion that the present position of the vitamin question, including its nomenclature, should be revised in the light of the theory that a biophysical factor—the radiant energy of the sun—is the primary factor. In endeavouring to assess the value of this hypothesis it is important to keep in mind the dictum laid down by Sir James Jeans in ‘The Mysterious Universe’; ‘No scientist who has lived through the last thirty years will readily be too dogmatic as to the future course of the stream, or as to the direction in which realities lie.’ In science, where our knowledge is incomplete, a simple explanation may carry conviction in proportion to its simplicity.”

Enough has been said to indicate the recent trend of modern scientific and medical views on the subject of nutrition, not only in relation to its importance in the maintenance of health,

but also as indicating types of nutrition most generally suited to the average human being. For those who wish to study the subject from a concise yet authoritative source, I cannot do better than to recommend "Food, Health, Vitamins," by Professor R. H. A. Plimmer, D.Sc., and Mrs. Violet Plimmer. This short treatise deals in a popular manner, but in considerable detail, with the various problems which present themselves to those who are anxious to take advantage of scientific research on this subject.

It is timely, however, to issue a note of warning, since the correspondence files of the New Health Society make it abundantly clear that many who have followed a faulty diet and are paying the penalty in debilitated health, and others who through that cause have developed organic disease, appear to regard an immediate and drastic change of diet as a panacea for all human ills. Diet and habit may do a great deal to restore what has been lost, but results are often gradual and persistence is required in order to derive benefit. A competent medical opinion is often necessary before the layman is able to take advantage of available knowledge, and in any case, sudden and drastic changes are often ill-advised and dangerous. There is also the question of personal idiosyncrasy.

Certain constitutions are intolerant of diet and habits which are eminently suitable for the average person; and in such cases modifications are indicated, which only a competent medical authority can prescribe as a result of diagnosis and close observation. Nevertheless, broad dietetic principles can be laid down and can be followed safely by all those who do not exhibit a pathological condition calling for medical attention.

It is in this direction that the New Health Society has endeavoured to create a new habit of mind as well as of body among the general public.

CHAPTER V

The Menace of Cancer

IN middle life, one person out of eight dies of cancer in civilised communities. No death could be more horrible, no suffering more acute than that of the majority of these cases. Moreover, the incidence of cancer is increasing with alarming rapidity; and while much money is being spent on research and much devotion is being shown in the losing fight for the cure of cancer, its ravages are extending with merciless progression. What is cancer? Why have we failed in the fight against this most dread of modern diseases?

It must be realised in the first place that our bodies are composed of "cells." These cells, which are microscopic in size, differ in proportion, shape and appearance. When our bodies are fully grown, they consist of organs and tissues each of which is made up of cells of a particular kind. In an article in "New Health," Dr. A. C. Jordan describes very clearly in popular language the processes of growth and change which predispose to that disproportionate multiplication of cells which ultimately results in the growth we call cancer.

“If a section of any organ or tissue be put under the microscope, an expert can tell at a glance to what structure the cells belong. Throughout life, the cells of every organ go on multiplying in a regular manner, new cells taking the place of those worn out. While health remains, this process of renewal goes on, so that the organ as a whole remains unchanged.

“A time may come in the life of an organ when this orderly process of repair and renewal gives way to a very different—a most disorderly and riotous—state of things. The cells ‘go mad’; they multiply too fast, without reference to the needs of the organ which is composed of them; and so the organ begins to grow larger, to change its shape, to encroach on its neighbours and destroy them. There is no checking its progress.

“Then some of the ‘mad’ cells find a way into a blood vessel or a lymph vessel, and are carried to distant parts and are deposited there. They go on multiplying, and form ‘tumours’ or lumps of cancer in remote parts of the body. At last so many organs are choked with cancer masses that they can no longer carry on their functions. Sooner or later an essential organ is put out of action, and then death claims its victim.”

As I have pointed out in an address to the Physical Society of Guy's Hospital, at present surgery and medicine appear to be one horrible *melée* of attempts to understand and treat end results, little or no endeavour being made to obviate the development of these conditions. The profession is only just beginning to realize the enormous part played by the defective functioning of the gastro-intestinal tract, the consequent fouling of the food supply, and the poisoning and deterioration of the tissues by septic material absorbed from the intestine. Cancer is not recognized as a part of a mechanical sequence, and as never affecting a healthy organ, but is regarded as a primary condition. Yet the cancerous cell will only grow in a suitable soil, and that soil is provided by the prolonged action of toxins in the tissues. Cancer, I repeat, never affects a healthy organ. In every case in which I have had an opportunity of verifying it, I have found that the cancer patient was suffering from chronic intestinal stasis, and that the infection by cancer was an indirect consequence of this condition. Cancers of the skin and tongue which are produced by chronic traumatism alone are not included in this category. If this assumption is correct, it is obvious that, to prevent the development of cancer, it is necessary to obviate these changes,

which result in the gastro-intestinal tract from the diet and habits of civilization. Cancer is the final stage in the sequence of chronic intestinal stasis. It is the last chapter in the story of defective drainage of the large bowel, as it is in the rest of the gastro-intestinal tract.

At the present time the public are urged by certain people or bodies to pay no heed whatever to cancer, nor to investigate it for themselves, but to eat whatever food they wish, since they are informed by many authorities that diet plays no part in the causation of cancer.

With all this it is a matter of common knowledge that our health and happiness depend largely on what we eat, and that any excess in the matter of food or drink brings with it a certain retribution in the guise of some intestinal or general disturbance. The public are perfectly aware that indigestion and constipation are very general, and those who think at all realize that the habitual flooding of their tissues by poisons, picked up by blood vessels and lymphatics from an intestine whose contents are stagnant and decomposing, results sooner or later in degenerative changes in every tissue in their bodies.

Gout used to be only too familiar to us, but a diminution in the quantity of meat eaten, and a wise restriction in drink, has converted

gout from one of the most common, painful and fashionable complaints to almost one of the greatest rarity. This improvement in the health of the people has resulted from diet—an alteration in the food which produced those conditions.

Besides the diseases of degeneration, such as those of the brain, heart, blood vessels, lungs, liver, kidneys, etc., due to constipation and its sequence, many others arise from the invasion by organisms of the degenerated tissues whose resisting power has been lowered in this manner. By paying more attention to diet and fresh air, but more especially by availing ourselves of the remarkable health-giving rays of the sun, which exert a most important influence on diet and the tissues of the body, the incidence of tubercle has been steadily diminished, year by year. The public generally is quite able to form its own opinion on the vital part played by these agents in the causation and prevention of this disease, and hardly a single member of it would be impressed by the statement that diet and sanitation play no part in the development or the cure of tubercle.

The people are also well aware that food exerts a very great influence in the diseases of certain organs, as, for instance, the kidney, and when the presence of such disease has been

recognised in this organ, the medical attendant at once impresses on the patient the necessity of ceasing to flood the damaged organs with poisons absorbed from a constipated and stagnant bowel, and he establishes a careful diet.

At this period of the world's history it should hardly be necessary to tell the public what Hippocrates taught the Greeks 2,300 years ago; namely, that diet, habits and the sun play a most vital part in the maintenance of health. For anyone, therefore, to assert that these factors exert no influence on the incidence of that most hideous of complaints—cancer—or, indeed, of any other result of intestinal auto-intoxication, is utterly futile. The public have begun to think for themselves and are no longer influenced by dogmatic statements from people or bodies, however eminent; they insist on being supplied with evidence on which they can form an opinion for themselves. Medicine has ceased to be a mystery to them, and their faith has been rudely shaken by the utterly contradictory statements which have been made by medical men very prominent in the profession on the subject of diet generally.

The evidence in favour of the influence of diet, habits and sunlight on the causation of cancer, and, indeed, many of the diseases which are so familiar to us in civilization, is clear and

incontrovertible. The following facts are sufficient to demonstrate this point.

I have already referred in detail to the researches of Colonel McCarrison. Let me also quote Colonel Hallilay, a very experienced officer, also in the Indian Medical Service, who spent 22 years among the hill tribes. He states :—

“During the whole of my time in Lyallpur, a populous district of over a million inhabitants, containing some thirty dispensaries for which I was a regular inspecting officer, and for the whole of the statistical reports of which I was responsible, I never encountered or saw one case of appendicitis, nor one case of acute cholecystitis (inflammation of the gall bladder), nor a single case of gall stones, nor gastric and duodenal ulcer. I can only recall three cases of cancer of the breast, and one case of cancer of the uterus.”

Dr. F. L. Hoffman, the eminent American consulting statistician, wrote to me as follows:—

“Your views regarding dietary or nutritional causation (of cancer) coincide with my own based upon extensive research among native races. I recently returned

from a trip to South America, where I lived for seven months among native Indians and mixed bloods. During the entire period not a single case of cancer was brought to my attention."

Similar reports come from F. P. Fouche, in the Orange Free State; Dr. Bernard Hollander, in reporting the observations of the late Sir Arthur Stanley, the African explorer; Dr. Dyce Sharp, in Northern Nigeria and Abyssinia.

Equally significant are the facts set out by Dr. Ernest H. Tipper, a great deal of whose medical experience has been acquired among the natives of Benin. What manner of people, he asks, is this cancer free community? How do they live? How have they escaped this scourge?

In a vivid passage he described the life and outlook of the Bēnē race :—

"Cut off for centuries from the sobering and saddening effects of civilization, Southern Nigeria is a land of hard work in the open, light, love and spontaneous laughter, which seem to be an inseparable quartette. The natives rise with the sun and retire soon after it sets; they have no artificial light to help them steal a few hours from the night

(a scale-pan containing palm oil and a dossale of wool, his candle), and no clocks. By standing erect at any hour of the day and looking at his shadow on the ground a man forms a human sundial; he measures his year by the rise and fall of the Niger River. At daybreak you see the blue smoke coiling up from their villages and hear the innumerable thuds of the foo-foo sticks as they pound their yams with might and main, in preparation for breakfast. Then one sees whole villages of people, men, women and children, wending their way in single file, some to the farms, others to the palm forests, others again to their canoes; and the awakening forests echo and re-echo to the sound of merry laughter as they tell their tales and titbits of village gossip. Their vitality and vivacity seem extraordinary."

This race subsists on a largely vegetarian diet, varied very occasionally by the consumption of fish, fowl and meat, the latter, however, in such occasional and rare quantities as to be negligible.

In support of his conviction that man was driven to meat eating as a last resort only, Dr. Tipper points out that in the extreme hinterland where huge tracts of country are

almost entirely denuded of vegetation except just around their villages, the natives are carnivorous and are "a poor wretched lot of savages." Among these people he has seen cases of cancer which were entirely unknown in the vegetarian strata of this race; while on the coast, where the conditions of life were changed and civilization well advanced, cold storage meat abundant and cheap, and bread a staple commodity, constipation and cancer were common. Dr. Tipper attributes the freedom from diseases of this race to the prominent part played in their diet by fruits and vegetables and the copious use of palm oil and capsicum peppers, which had the effect of inducing regular evacuations after each meal. Dr. Tipper's experience has led him to the conclusion, which he states most emphatically, that in his view meat eating and cancer in civilised communities show practically the same curve. Cancer, he says, will not be cured in the laboratory, it will be cured in the kitchen, where it commenced, and it will be our women-folk who will deliver us, as they have always done when danger threatened. "We want mothering, not medicating, still less being dissected."

To rely entirely upon surgery and the microscope for the total abolition of cancer is comparable to throwing a pebble into an advancing

wave as it bends to its break on the beach, in the hope that it may recede.

While we may not all agree with Dr. Tipper in the precise measures he advocates for a return, both in diet and habits, to more natural conditions, he does endeavour to indicate how we can without departure from tradition break away from some of the devitalised foods to which we have accustomed ourselves and return to the more wholesome habits of our forefathers. He wisely urges that civilization must get into direct touch with pure wheat grain; undecorticated, unpolished, and unground into flour.

“Every household should at least have its 7 lb. bag of pure wheat in constant use, and learn to know its quality by sight and touch. It lends itself to every form of the culinary art; let us learn those twenty perfectly good ways of using it in the kitchen: in our soups, sweetened dishes, etc. When I was a boy, the Somersetshire farmers used to bring up basinsful of parboiled wheat; sugar, allspice, currants or raisins were added, and it was again boiled and made into a delightful dish called Frumenty—what has become of that good old-fashioned dish?

“We used to make excellent broth of

wheat-grain, too, containing vegetables. We never see pure wheat now. Nine people out of ten would not know what it looked like if they saw it; every form of starchy substitute that sophistry can cheat us with has taken its place; sago, tapioca, semolina, rice, macaroni, hominy, so-called pearl-barley, but *pure whole wheat grain*—No; we have lost sight of it for the benefit of the pockets of the profiteer, baker and pastrycook. Let us get back to it and no longer be cheated out of the real thing. When we want to grind it we can do it in our own kitchens with coffee-mills, or get bigger ones, and enjoy it very much better; and when we put it to its twenty good uses it will do five times the good to our systems and our pockets that ready-made bread and bought pastry and cake can do, and we shall have got one step back to first principles, have shed somewhat of the artificial, and relieved our digestions of a lot of alum and yeast and colouring-matter, aniline dye, cochineal, glucose, treacle and numerous impurities incorporated, some into bought whole biscuit-coloured bread and others into cakes and pastry, but above all we shall have ridded ourselves of the *necessity* of eating so much stodgy, binding, glutinous bread. If we

must have flour for some purposes, let us insist upon its being that of the entire grain and 'firsts' in point of quality, and limit its uses."

Again :—

"The habitual eating of bland food is by no means without its effect on our cancer statistics. If we constantly wear darkened glasses before the eyes, we tend to weaken and invalid them. If we constantly lean on crutches, we soon lose the power of our limbs; so, too, when we habitually eat bland food we tend to cause atrophy of the muscular and secreting coats of the stomach and bowel, resulting in atony and torpor of the gut. The habitual taking of bland food ends in habitual constipation. Living fish have to keep their heads up-stream; the dying and dead ones float down with the current. We MUST get back to our simple and original condiment, as we have to get back to our original pabulum, or perish utterly."

Dr. Tipper expresses himself so racily and vividly that I cannot help quoting once again a passage of sound common sense:—

"It would be absurd to think, nevertheless, that the dietetic habits of hundreds of years' standing belonging to one highly

civilized race, can be suddenly altered and those of an entirely different race of thousands of years' standing adopted, their climatic conditions, habits, laws and customs being as the poles apart; one might as reasonably expect a man who has suffered from atrophy of the legs for years to get straight up and walk. Still, since this tribe of the Negro race is cancer-free, while year by year in leaps and bounds we are, *pari passu* with the growth of the cold-storage-meat industry, becoming a more and more cancer-ridden race, more conventional and sedentary in adult life, more artificially fed, and as a community more constipated and reliant upon drugs, it behoves us to take one precious page from the Negro's book of life, and to avoid meat as much as possible, or learn to eliminate it altogether from our diet. It is quite unnecessary, and in my opinion a highly potential source of mischief; but if the habit cannot be broken, which is absurd to imagine, or at least greatly modified, there is all the greater urgency for keeping the bowels well open by natural means, by eating an abundance of green vegetables, salads with oil, and fruit, and by largely substituting potatoes for bread."

The incidence of cancer among civilised communities affords evidence as to the relation of cancer to diet and habits in a very interesting manner. Dr. Franklin Martin, the distinguished President of the College of Surgeons in America, and of the Gorgas Institute (an organization founded to perpetuate the name of that great man who made the construction of the Panama canal possible), asserts that the carefully compiled statistics of the incidence of cancer in the United States show that one in six of the inhabitants of that great country die of cancer, and that in spite of their possessing more radium than any other nation, and a surgical profession whose personnel compares favourably with that of any other country.

The incidence of cancer in the various groups in our community also supplies further evidence of the effect of diet upon this fell disease. The comparative mortality from cancer among clergymen, priests and ministers in Great Britain is 45, while that of butchers is 105, and brewers 125. The actual mortality in the case of the butcher and brewer is much greater than the figures suggest, since cancer, being a disease of old age, should affect the long-lived clergyman much more than the shorter-lived butcher or brewer.

Advice is given from time to time by the

medical profession and by others in authority, that great care should be taken by everyone to observe the first evidence of the presence of cancer, yet practically no organised effort is being made to educate the public and to demonstrate in a convincing way how this disease arises and what means can be taken to avoid it. Let me summarise the position as follows:—

In spite of the great skill of the medical profession in the use of operative measures and the employment of radium, and the X-ray—measures which do much to remove or alleviate the disease—cancer is increasing in frequency from year to year at an appalling rate. About this there is no doubt whatever, as is shown by the carefully prepared statistics of Dr. Frederick L. Hoffman and other eminent investigators.

If it is true that cancer never yet affected a healthy organ (as I asserted many years ago), it is obvious that the only way by which this plague can be avoided is by ensuring the normal functioning of those organs, that is, by keeping the body in a perfect state of health. This statement applies with equal force and accuracy to all the diseases which occur in civilization, but from which the more vigorous native races are quite free so long as they avoid the habits and diet of civilization.

CHAPTER VI

The Golden Rules of Health

FOR the guidance of many correspondents and others who are anxious to make use of practical hints on healthy living, I have compiled ten commandments of health, which have been published as the Ten Golden Health Rules. In this chapter I should like both to amplify the advice given in these rules and to explain some of the reasons which make them desirable in daily practice.

The rules are as follows:—

1. Eat meat only in moderation, giving preference to liver, sweetbread, brain, heart and kidney. Fish is an excellent substitute.

2. Never fail to include in your daily diet wholemeal bread or rye bread, some citrus fruit (oranges, lemons, grapefruit) and other fruits, green vegetables, potatoes, dairy products (including milk), and yeast extract. These supply all the vitamins in combination and the invaluable roughage which ensures proper intestinal action.

3. Aim at having a regular motion of the

bowels after each substantial meal. This should be quite normal on such a diet as the above, and if all over-refined manufactured foods like white bread are strictly avoided.

4. Drink at least six tumblers of water a day—two on rising, two on retiring, and others between meals.

5. Work and sleep as far as possible in well-aired rooms or in the open air.

6. Take every opportunity of allowing the fresh air and sunshine free access to your skin for regular periods.

7. Wear only light underclothing, and put on heavier outer clothing in case of colder weather. All clothing, however, should be sufficiently porous to enable free action of the skin to take place.

8. Equally important to the functioning of the skin is the daily bath. Hot baths should be taken only in the evening.

9. Brush the teeth at least morning and night, particularly just before retiring.

10. Exercise night and morning for 10 minutes, particularly in a way which will improve the action of the abdominal muscles and promote easy evacuation.

The Golden Rules of Health

1. *Eat meat only in moderation, giving preference to liver, sweetbread, brain, heart and kidney. Fish is an excellent substitute.*

The amount of meat which may be eaten, and indeed the desirability of eating meat at all, are questions which cannot be answered categorically, since they are dependent upon the ability of individuals to eliminate either promptly or tardily the waste products of digestion. It has been said that what is really important in man's physiological functioning is, not what fuel he puts into the engine which is his body, but what the body does with the fuel when it has been received. That, of course, is only true in a small degree, but it serves at any rate to illustrate the important part played in health by residuary toxins in the digestive tract and especially in the colon. This has already been explained in earlier chapters. If we envisage the derivation of all that is essential in nutrition as emanating from the vegetation which is drawn out and vivified by the rays of the sun, it is apparent that the consumption of meat, milk, eggs, etc., is at best a second hand means of ingesting into our bodies nutritive matter which, in the case of a powerful animal like the gorilla (physiologically almost identical with a human being) is obtained from the con-

tinuous consumption of enormous quantities of greenstuff, fruit and nuts. The mere fact that we are endowed, like the gorilla, with about 30 feet of intestine, provides evidence that the natural propensity of man is vegetarian rather than carnivorous; a propensity which usage has modified as circumstances have rendered meat eating necessary for the survival of communities cut off from natural foods. It is obvious that, under conditions of civilization, we must continue to meet the acquired character of our dietetic instinct, but it must be done with a realization of the extent to which it is both safe and expedient. Meat must be regarded as an energiser, a tabloid food rendered necessary by circumstances of life which offer so much scope for our energies that our intake of food is a duty for which only periodic opportunities can be reserved. We cannot, like the gorilla, or the cattle in our fields, devote unlimited time to the intake of nutriment. We must regulate that intake in accordance, not only with the energising properties of various foods, but with their vitaminic content; in other words, in accordance with the degree of relationship they bear to the vital living food which is our natural sustenance. These considerations are instinctively present in the minds of primitive peoples, for it is well known that among them, the liver, sweetbreads,

brain, heart and kidneys of animals slaughtered for food are the prerogative of the chief of the tribe. Scientific research confirms this preference in so far as we know that these organs contain some of the most valuable vitamins necessary for our healthy functioning. Liver is particularly valuable, as has been demonstrated repeatedly in its use remedially in cases of pernicious anæmia which had hitherto defied the skill of the physician and proved rapidly fatal. These organs also supplement the amount of vitamin B required for the maintenance of health and physical energy—a vitamin in which even a fairly good mixed diet is apt to be deficient.

Apart from its tonic effect, meat is valuable as a body builder and to some extent as furnishing roughage, but everything that meat provides for the maintenance of the body, might equally well be provided by other proteins such as cheese or fish. Nevertheless, a digestion accustomed to the consumption of meat cannot conform immediately to other forms of protein diet. On general principles, as well as for other reasons, I would strongly urge a more general consumption of fish in place of meat as frequently as possible. After all, digestibility must always be taken into account in summing up the value of a food.

It is not the actual amount of food ingested that counts, but the proportion which is assimilated as actual nourishment. The value of a food very rich in protein may be notably defective in nutriment by its resistance to the digestive processes.

Fish may be regarded chiefly as a source of protein. Protein is digested in the stomach and small intestine by the gastric juice, the juices of the pancreas and the intestinal secretions.

All authorities are agreed that white fish generally (especially whiting and the varieties of sole) is more easily and rapidly digested than butcher's meat. An authority states that fish should be classed with chicken and lamb in digestible properties, and is equally well absorbed. White fish is especially valuable for children and convalescents and those engaged in sedentary employment as it does not make heavy demands on the digestive organs, and is not so stimulating as butcher's meat on account of the comparative absence of the nitrogenous extractives which are found in red meat.

Fatty fish (such as herring, bloaters, kippers, mackerel, salmon, sardines, and sprats) is not so easily reduced by the digestive processes as the lean of the white fish, but when properly cooked such fatty fish still constitutes an easily

digested food, especially when served with appropriate gustatory adjuncts. The nutritive value of fish as a substitute for meat need, therefore, not be further stressed.

2. *Never fail to include in your daily diet wholemeal bread or rye bread, some citrus fruit (oranges, lemons, grapefruit) and other fruits, green vegetables, potatoes, dairy products (including milk), and yeast extract. These supply all the vitamins in combination and the invaluable roughage which ensures proper intestinal action.*

I would like especially to stress the advice I venture to give in this Rule, for reasons which will be obvious to those who have read carefully the earlier chapters describing the mechanics of digestion and elimination.

The human organism requires certain classes of food in definite proportions according to age, weight, climate and work done.

These classes of foods are as follows:—

1. *Water* supplying the water of the blood lymph tissues and excretions.
2. *Proteins* or flesh formers, supplying nitrogenous material for the formation of muscle, glands, brain and nerves. These are contained more particularly in lean

meat, poultry, game, milk, fish, eggs, cheese, peas, beans, lentils and nuts.

3. *Carbohydrates*, chiefly starch and sugar, affording material for muscular energy and the production of heat supplied by cereals, potatoes, roots, fruits and cane sugar.

4. *Fat* supplying material for the production of heat, supplied in meat, fatty fish, milk and milk products, nuts and vegetable oils.

5. *Mineral matter* in the form of phosphates, chlorides, sulphates and of lime potash, soda, and iron, supplying the salts necessary for the formation and maintenance of bone and teeth and the replenishing of the salts found in the blood, digestive juices, and tissues generally found in all foods.

6. *Phosphates* in organic combination with glycerine and fatty acids, termed the lipoids, specifically concerned in the nutrition of brain and nerves and cells while undergoing proliferation. These organic salts are mainly found in fish roe, yolk of egg, brain, blood, yeast and the germ of cereals.

7. *Roughage*, *i.e.* inert indigestible material giving bulk to the contents of the intestines, enabling the bowel muscles to grip the contents and pass them along for digestion and final excretion. This ballast is chiefly sup-

plied by the cellulose and fibre of our fruit and vegetable foods.

Plimmer refers to vitamins as chemical substances of vital importance. "At least five vitamins have been clearly distinguished and there appear to be others. For simplicity the vitamins are called A, B, C, D and so on. If any one of them is absent from the food for three or four months, death is the result. One vitamin cannot be substituted for another in the same way as one carbohydrate can be replaced by another, or one fat by another. Oatmeal can be used instead of rice, olive oil instead of lard, and in the case of proteins, cheese can replace meat, but each vitamin must be considered individually.

"Each vitamin is present in very small quantities in different foods, and thus they are difficult for the chemist to extract. The comparative vitamin value of the various foods can only be ascertained by means of feeding experiments on animals, or in the case of human beings by practical experience.

"The expression 'vegetable salts' is often wrongly used and really refers to vitamins and not to salts. From the chemical point of view salts are all of the same character, whether they are vegetable salts or mineral salts. Vitamins

are not mineral salts because they are destroyed by processes which leave the mineral salts unharmed. Vitamins are not vegetable salts because the concentrated preparations of the vitamins, which have been prepared, do not possess any of the characters of a true vegetable salt. The vitamins and the salts are present in the same part of the animal or plant and may be removed together as in the milling of grain, or in the cooking of vegetables, hence the confusion.

“The heating, ageing and drying of foods has a harmful effect upon some of the vitamins and they are destroyed by certain chemicals. These processes do not affect the vegetable salts.

“One of the most important facts about vitamins is that they cannot be made in the human body and must, therefore, be supplied in the food. They are produced in plants and vitamins found in animals have come from the plant food. Vegetarians have one advantage over meat-eaters, that they get their vitamins direct from the plants.”

The principal vitamins may be classified as follows:—

Vitamin A.—Fat soluble, governing in conjunction with vitamin B the growth of cells and tissues. Found in all animal and fish fats.

Vitamin B.—Water soluble, consisting of two factors:—

(a) Anti-neuritic specially related to the nutrition of brain and nerves; and

(b) A growth factor connected with the development of new cells and tissues. Found in the germ and bran of cereals, most green vegetables, yeast and the pulses and fish roe.

Vitamin C.—Water soluble, anti-scorbutic, preventing the incidence of scurvy and keeping the skin clear and the blood pure. Found in fruits and vegetables.

Vitamin D.—Fat soluble anti-rachitic, preventing the incidence of rickets. Found specially in some animal fats, fish fats and cod liver oil.

Much has been written and perhaps more remains to be written on the development of the vitaminic theory and its practical application. As has been pointed out earlier, Chalmers Watson and other investigators like Tallarico, in Italy, are moving away from the elaboration of the vitaminic theory towards a bio-physical rather than a bio-chemical conception of the basic principle of irradiation as the source of nutritional energy. These researches I cannot follow here, but I would remind my readers of certain well-known facts in the development

of our knowledge of vitamins, *e.g.* the prevalence of scurvy in the Navy and Merchant Service, before the introduction of vitamin C in the form of lemons and lime juice as part of the daily ration; or of the almost fortuitous discovery of the value of orange juice in the dietary of hospital patients. It is not now necessary to produce elaborate scientific data in order to convince the layman of the immeasurable value of fresh fruits, especially citrus fruits, uncooked salads and green vegetables. A brief period of experiment on his own person proves the most overwhelming argument of all.

With regard to potatoes, in my opinion it is difficult to overestimate the value of this cheap and often abused vegetable, which so frequently is regarded as the cause of obesity—when other factors, most of all lack of internal cleanliness, should really be blamed. The extraordinary health records and magnificent physical development of the peasantry of Western Ireland or the inhabitants of Tristan da Cunha, for example, have been built up largely on a diet of potatoes. Both in Western Ireland and in Tristan da Cunha potatoes are largely supplemented by milk and other dairy produce, but there can be no doubt of their remarkable body building and energising powers.

So much has been written of the food value

of milk and so much prominence has been given to experiments carried out on school children with a supplementary ration of milk, that it is perhaps not necessary for me to say more than to point out again that milk is a perfect food for adults as well as the young and adolescent, that it contains vital properties not concentrated in any other single food, and that it should be a matter of national policy to double and treble its consumption in all classes of the community.

The facilities now offered, at any rate to our larger urban populations, for obtaining milk which has been cleaned and pasteurised with practically no loss of its vital properties, is a matter for satisfaction. At the same time a great deal remains to be done in educating the dairy farmer and in the regulation of economic and social conditions calculated to effect cleaner methods of production and distribution from the outset. It is not always possible for the farmer, especially the small farmer, to give the care to his cows and byres which alone can ensure clean and healthy milk; it is a matter involving not only education, but the traditions of farming and the particular circumstances of many small farmers. When the British farmer follows the example which has been set abroad for the simplification of his problems by co-

operative methods, benefit will accrue not only to him, but to the nation, and such qualities of milk as Certified and Grade A (T.T.) will come more readily within the means of working class and middle class people. The public can assist materially in the attainment of a higher standard, both by increasing the daily consumption of milk and by bringing the pressure of public opinion to bear upon local conditions within their own knowledge, where improved methods are being resisted merely on grounds of prejudice or apathy.

In regard to the value of yeast extract, I would refer to Professor and Mrs. Plimmer's "Food, Health, Vitamins." I have myself so frequently stressed the value of yeast that I would only mention in passing my regret that more use is not made by the public of this wonderful commodity, which should be obtainable for a negligible sum, since it is one of the by-products of the brewing trade, among others, and must be available in considerable quantities.

With regard to wholemeal bread, I propose to make some observations in connection with Rule 3.

CHAPTER VII

The Golden Rules of Health—continued

3. *Aim at having a regular motion of the bowels after each substantial meal. This should be quite normal on such a diet as the above, and if all over-refined manufactured foods like white bread are strictly avoided.*

The facts about constipation need not be repeated here, and I would again refer the reader to previous chapters where the subject has been fully dealt with. The one important fact to be realised is that on the devitalised foodstuffs with which we daily affront our digestive systems, constipation is an inevitable concomitant of civilised conditions. The part played in the diet of the majority of the inhabitants of this country by bread is considerable. Many humble homes must calculate most narrowly the share of the weekly wage to be expended on this foodstuff or that; and there can be no doubt that the daily food intake includes a most disproportionate amount of white bread, a devitalised food *par excellence*, which is intended to form the real basis of nutriment—the staff of life. For those in more

fortunate circumstances the substitution of wholemeal bread for white is perhaps of less vital importance, although even in their case it is undoubted that the ordinary mixed diet is deficient in vitamin B, and therefore inadequate for health. In the case of poor people, whose daily meals consist largely of white bread, margarine, inferior qualities of jam and strong tea with little milk, the obvious deficiency is almost suicidal. Reference to an earlier chapter in which the clinical experience of McCarrison is quoted in support of the disastrous consequences of a shortage of vitamin B, will make the point quite clear.

The scientific considerations influencing the choice between wholemeal bread and white were extensively examined by a distinguished Committee of the New Health Society, on which such eminent authorities as Sir Kenneth Goadby, Professor R. H. A. Plimmer, Sir Arthur Keith, Dr. S. Henning Belfrage, Dr. Nathan Mutch, Professor Frederick Hobday, and Mr. H. J. Paterson, gave their invaluable services. In the report issued over their names the claims of wholemeal bread were incontrovertably established.

Nor is white bread to be condemned on account of its vitaminic deficiencies only, as compared with wholemeal bread, in which both

the life and substance of the wheat are retained in their pristine force. White bread is also unsatisfactory in regard to roughage, for while the differential content of roughage between white and wholemeal bread in relation to bulk is small, the constipating action of white bread renders its mere bulk nugatory.

White bread contains from 0.3 to 0.4 per cent. of cellulose, while wholemeal bread contains an average of 1.5 per cent. The anti-constipating action of wholemeal bread depends largely on certain properties of the bran, which increases "peristalsis," *i.e.* the worm-like contractions of the muscle wall of the bowel which causes the propulsion onwards of its contents.

As was pointed out by the Committee, constipation is often caused by insufficiently active peristaltic movements of the bowel, due at first to want of stimulation, and later to actual weakness and progressive wasting of the muscles of the bowel. If the bran is too coarsely ground, and in large particles, its action may become excessive in some individuals. This is especially the case in very young children and weakly individuals. This, however, does not occur generally in normal individuals, especially if the bran is finely ground. If bran is taken in this way, in bread and flour, the bowels become healthily active. Liberal use of vegetables and

fruits compensates to some extent for the lack of cellulose in white bread. Seeing that constipation is so prevalent a disorder in civilized communities, as evidenced by the enormous consumption of purgative drugs, any absence of a sufficient quantity of roughage from the diet is of serious importance. Hence one of the principal virtues of wholemeal cereals.

4. *Drink at least six tumblers of water a day—two on rising, two on retiring, and others between meals.*

It would be difficult to exaggerate the enormous value of the regular drinking of pure water in the maintenance of health. While for many centuries doctors have prescribed for their patients the drinking of this or that medicinal water to effect a cure, the modern physician often gives the much more valuable advice that, in the maintenance of health and the avoidance of disease, the drinking of pure water between meals is one of our most valuable allies. It has been shown in an earlier chapter how Dr. Alexis Carrel has been able to maintain since 1911 living tissues by regularly draining as well as feeding them; and the same principle applies to the aggregation of tissues which constitute the human body. To drink pure water is in a very short time to flush the tissues of the whole

body, since the water is rapidly absorbed and passed through the system. Some delicate digestions do not react satisfactorily to cold water, especially first thing in the morning, and in such cases tepid water is to be substituted. It is important to allow a reasonable interval to elapse before food is taken into the stomach. Early in the day half to three-quarters of an hour should be sufficient, while in regard to the water drunk between meals, it is best that this should be taken about two hours after a meal and one hour or more before the succeeding one. Other beverages taken between meals effect the same purpose, but to a more limited extent, since the presence of other food factors in such beverages restricts the cleansing effect of the water on the tissues.

5. *Work and sleep as far as possible in well-aired rooms, or in the open air.*
6. *Take every opportunity of allowing the fresh air and sunshine free access to your skin for regular periods.*

One of the most striking manifestations of the influence of air and sun on the human body is to be found in Dr. Rolliers' Sanatorium in Switzerland. Here young boys and girls who are either suffering from tuberculosis in its early stages or have a predisposition to that disease,

live almost entirely in the open and, what is more, with a mere shred of clothing such as leaves their bodies entirely exposed to the air both in summer and winter. In the cold, clear, pure air of the Swiss mountains these children rapidly shake off the influence of disease and become extraordinarily healthy, happy and vigorous. It is only logical to ask—if such is the effect of air and sun upon the weak and diseased bodies of these children, what must be their powerful influence on bodies which are not diseased, but whose vitality is lowered through living under unnatural conditions? The answer is to be found in the realisation of the value of sunbathing which is now happily gaining ground. The suspicion with which sunbathers have been regarded for some years is passing away, thanks to such public-spirited action as that taken by Mr. George Lansbury when he was at the Office of Works and the provision he has made for London children and London bathers to take advantage of air, sun and water. The pollution of the atmosphere of our cities is a problem of great importance, and has a close bearing on the incidence of diseases of darkness such as rickets and tuberculosis. With the increasing use of electric power and lighting and the consequent reduction of coal smoke, our bodies will be able to get a greater

proportion of the ultra-violet rays and we shall benefit as a result. In my opinion it is not necessary for purposes of health to adopt the somewhat extravagant measures pursued by nudity clubs in Germany and also, I believe, to some extent in England. Such rational societies as the Sun-Bathing Society in London provide adequate facilities for exposure of the skin to sun and air without offending the susceptibilities of others. Much can be done, too, in one's own home or garden, and in the winter months we can make up for the lack of natural sunlight by having recourse to artificial sunlight lamps.

7. *Wear only light underclothing, and put on heavier outer clothing in case of colder weather. All clothing, however, should be sufficiently porous to enable free action of the skin to take place.*

The variability of the English climate is such that we must be our own arbiters almost from day to day as to the weight and character of the clothing we adopt. As a general rule, we should be wise to err on the side of excessive lightness rather than weight, since excessive weight in clothing is apt to cause an overheated body and render us particularly liable to chill on abrupt changes of temperature, unless our skin is exceptionally responsive and our pores

able to open and contract with sufficient rapidity. On the purely scientific side the question of clothing opens up a fascinating field of inquiry. This has been recognised by the New Health Society, which has set up a Clothing Sub-Committee to investigate the claims of different types of clothing. Research has been carried out into the hygienic properties of wool, cotton, artificial silk or other textiles. After much experimenting, satisfactory apparatus for testing the heat transmission and the water vapour transmission has been designed, but no final conclusions have been reached. It is interesting to note that at the University of Leeds, where these experiments have been carried out, Mr. Howard Priestman has conducted researches bearing upon the heat-retaining properties of woollen and worsted fabrics and from time to time results obtained by other investigators have been published. With reference to heat transmission, the jacketted copper cylinder test carried out by Mr. Priestman suggested that we should be warmer without clothing; while the method of measuring heat transmission by maintaining a constant temperature within the cylinder led to many technical difficulties, which have only just been satisfactorily surmounted.

The retention of heat by any textile fabric is

dependent upon the "fibre-stuff"; upon the surrounding air and its circulation. It has been necessary to design and re-design special apparatus to separate these three factors, and the difficulties have been so great that only after a year's work was it possible to attain to scientific accuracy.

Similarly, with water and water vapour transmission, corresponding difficulties have been encountered, and it has been necessary, again, to make and re-make special apparatus to attain to the scientific precision desirable. This accuracy, however, has now been attained, and interesting results are already recorded.

But this is only the beginning of the work—these pieces of apparatus are, as it were, only two tools by means of which one phase of the investigations may be attempted. Other tools have yet to be evolved and other tests to be made. Then it will be possible to co-ordinate all the results, and to approach the physiological and psychological problems involved with powers of investigation and insight which should lead to really sound deductions with reference to the hygienic properties of both fibres and fabrics.

8. *Equally important to the functioning of the skin is the daily bath. Hot baths should be taken only in the evening.*

Many illnesses from "chills" to rheumatism are directly related to an inability on the part of the skin to adapt itself to temperature changes. The habits of civilization compel us to exclude from sun and air by far the greater part of our skin, and in consequence that organ tends to become inefficient in carrying out its important work of regulating the body heat to harmonize with weather conditions. By the judicious use of baths, however, it is possible to overcome to a large extent the handicap of clothes and to improve the adaptive resources of the skin.

Let us consider plain water immersion baths, for these are available for the majority of the population. The cold bath (50-70° F.) in suitable cases is stimulating to the whole system. It should be of short duration and is best taken in the morning or as a tonic to the skin after a hot immersion. The aim of the cold bath is to obtain a "reaction", *i.e.* a pleasant warm glow on emerging from the water. If such a reaction is absent, even after rough friction with a towel, then clearly these baths are inadvisable. It should be noted that cold immersions are definitely unsuitable in people who suffer from hardened arteries or from heart disease.

The hot bath (98-104° F.) is at first exciting to the nervous system, but if prolonged is

definitely exhausting. To commence with, the temperature should not be above 98° F., but it may be gradually increased. Hot baths lead to a relaxation of the skin blood vessels and to drowsiness and indisposition to effort. Therefore they should be taken last thing at night just before going to bed, otherwise there is a risk of chill. A hot bath if followed by a hot drink will generally induce sweating, and a "cold" may thus be cut short owing to elimination of the poison. Chronic rheumatism may also be benefited in the same way. In the excitement of some forms of mental disease and in sleeplessness, hot baths continued under supervision are invaluable sedatives. In cases of heart, arterial and brain disease hot baths are to be avoided.

The tepid bath (80–90° F.) lowers the body temperature and is mainly used for that purpose in the treatment of high fever, while the warm bath (92–97° F.) is gently soothing, and is of value in the treatment of neurasthenia and anxiety states.

9. *Brush the teeth at least morning and night, particularly just before retiring.*

The paramount importance of dental hygiene is frequently stressed, yet it is true that we probably have the worst teeth of any nation in the

world. The principles of oral hygiene have been so well stated by an eminent member of the dental profession, who is also on the Council of the New Health Society, that I venture to quote from him at some length. In a recent article in a popular magazine Sir Frank Colyer points out that it may be truthfully said that a clean mouth is essential for the maintenance of health. But we cannot have clean mouths if the teeth and gums are diseased. It is by no means sufficiently realised what immense harm can be done to the body by a septic condition of the teeth and what an enormous amount of dental disease is actually in our midst. Roughly 90 per cent. of adults in this country have some form of teeth trouble. But appalling as this may sound, dental disease is also rife among the children of our race. 45 per cent. of children have decayed teeth on reaching school age, and in 14 per cent. of these the trouble is severe. Decayed teeth are usually tender, and as a consequence the child bolts its food and indigestion and its effects on the growth of the body follow.

The two principal diseases of the teeth are decay (caries) and pyorrhœa. Decay is due to food lodging between and on the teeth. The hard part of the tooth is gradually destroyed by acids formed from certain foods, especially

starches and sugars, and the soft part is then broken up by the action of germs. The decay, if left untreated, spreads to the pulp cavity, the pulp dies and an abscess may form around the end of the tooth.

The prevalence of decay in the present day is due to the altered character of our foodstuffs. These are softer and require less mastication, the fibrous element has to a great extent been removed and the carbohydrates, that is sugars and starches, from which the acid is formed, are more fermentable than the foods in general use in former generations. Foods made from starches cling about the teeth, while the sugars are readily dissolved and find their way into every crevice. The most harmful foods are soft biscuits, bread made from roller milled flour, and sweets. Experiments have shown that children who eat sweets in large quantities will return from school each term with a plentiful supply of fresh and generally rapid caries, but when the eating of sweets is stopped the amount of fresh caries quickly declines. People who dislike sweets and sweet things invariably have teeth above the average.

Pyorrhœa is caused by the food which lodges in the trough between the gum and the tooth. The food ferments there, and destroys the soft tissue and a "pocket" is formed where more

food collects and putrifies. Eventually all the tissues which hold the tooth together waste away and it falls out. By no means all the diseases usually attributed to septic teeth can be justifiably termed a direct result. But sepsis of the mouth is undoubtedly a contributing factor to many diseased conditions of the body.

The sepsis acts in two ways :—

1. The poisonous matter is being continually swallowed with the saliva, and in time this leads to trouble in the whole of the digestive track. Chronic indigestion is often due to this cause.

2. The diseased teeth often affect the surrounding bone and the poisons are absorbed through the blood stream and may affect the various tissues and organs.

A condition of general ill-health may follow, or a certain weak tissue may suffer before others that are stronger, or a part already diseased may be prevented from recovery because of the poison in the blood stream flowing to it.

How can we prevent all the trouble connected with faulty teeth?

The important thing to remember is that both decay and pyorrhœa are caused from food clinging about the teeth. The obvious course, then, is to keep the teeth clean. This should be

done by both natural and artificial methods. The natural one is to eat food that does not cling about the teeth. Efficient mastication is the best toothbrush of all. Eat food that requires mastication and avoid soft, pappy diet.

This is doubtless a counsel of perfection and is very difficult to follow in conjunction with our modern methods of preparing food. But if you must have starches and sugars try to end the meal with something that is not starchy. An apple is often advised, but an apple after every meal is not within the means of all. It should not be difficult, however, to finish a meal with a piece of lettuce or any kind of fresh green vegetable food with stringy and cleansing properties. Above all things do not take biscuit and milk food before going to bed.

Another point to remember is correct breathing. Always breathe through the nose, as breathing through the mouth causes the gums to become inflamed, and also increases the number of germs in the mouth. If care is taken with children in these matters their teeth will become all the stronger and more likely to resist possible attack.

The second line of defence lies in artificial cleaning.

It may not be possible to use a toothbrush after every meal, but a good swill with clean

water will go a long way to get rid of the food debris. Never go to bed without cleaning the teeth. Your brush should be small with not too many bristles, and not too stiff. The upper teeth should be brushed downwards and the lower upwards—in other words up and down instead of crosswise. Do not brush the gums. Some people imagine they should do this till the gums bleed, but this means removing their soft cover and rendering the tissues more liable to infection. The spaces between the teeth should also be cleaned carefully each night by a piece of dental floss-silk. It is a good plan to visit a dentist twice a year. If a tooth has commenced to decay it can easily be treated. And further, a periodical removal of the “tartar” on the teeth is most essential if the mouth is to be maintained in a healthy condition. Remember above everything that the surest method of prevention is keeping the teeth clean.

10. *Exercise night and morning for 10 minutes, particularly in a way which will improve the action of the abdominal muscles and promote easy evacuation.*

Whether it be in the form of an athletic sport, or in the form of a stereotyped drill, exercise primarily strengthens and develops the muscles. In consequence, the carriage is improved, for

slouching shoulders and sagging abdomens are impossible with well toned and well controlled muscles. Deep breathing is invariably necessitated and the increased inflow to the lungs of oxygen enriches and purifies the blood and preserves the elasticity of the breathing tissues. The deep regular inspiration of pure air is undoubtedly the best tonic to the nose, throat and air passages and the best preventive of the respiratory chills and catarrhs which are so often the forerunners of grave chest illnesses.

Exercise to be really effective must be carried out in the fresh air and sunlight, and I therefore place *walking* first on the list of ways and means to muscle development and control. I do not refer, of course, to a sauntering stroll. Walking, if it is to constitute a real exercise, must be a vigorous determined step-out, preferably in the country amidst the beauties of nature. In this way are combined the physical benefits from rhythmic muscular action and the mental benefits from the rest from the bustle and noise of the town. Be sure and throw out your chest when walking, expanding deeply your lungs, retract or release your abdominal muscles periodically and swing your arms energetically.

For adults the chief aim of exercises should be to develop the musculature of the trunk, particularly of the abdominal and pelvic regions.

The exercises devised by F. A. Hornibrook in "The Culture of the Abdomen" (published by Heinemann), are excellent for this purpose. The following is both simple and effectual. Lie on your back on the floor with knees bent and feet firmly planted on the floor as near the hips as possible: the hands and arms should be flat by your side. Now raise your hips two or three inches from floor and while the body weight is resting on head, shoulders and feet, swing the body vigorously from side to side—throwing each hip upwards alternately. Repeat this exercise about twenty times; then rest, and perform this cycle four or five times in all. In this way the abdominal wall is stimulated—a point of great importance in remedying constipation.

Some easily performed exercises have also been devised for women (especially expectant mothers) by Sir F. Truby King. In essence, these consist of systematic bending movements of the trunk, backwards and forwards and from side to side, accompanied by deep breathing. This is followed by the exerciser lying flat on the back, elevating first one leg and then the other, and then, fixing the feet, rising slowly and deliberately to the sitting posture.

Keeping in mind the basic principle illustrated in the exercises described, it is an easy matter for anyone to elaborate their own set of

exercises and to derive a great deal of mental as well as physical satisfaction from their performance. It is clearly by no means necessary to fit up a gymnasium in the home in order to carry out effectual exercises, though of course there are mechanical aids to exercising which are of considerable value. Stationary rowing and cycling machines are excellent for those of a sporting disposition, while those more passively inclined may derive considerable benefit from one of the many vibratory massage machines now on the market. In conclusion, let me emphasize that the most important point about exercise is not so much the means by which we obtain it as the regularity and thoroughness with which it is practised.

CHAPTER VIII

Sex Problems of To-day

SEX problems of a far-reaching character and much complexity underlie most of the social and economic, as well as some of the medical, controversies of the modern world. In England they are complicated by the inherent prudery and hypocrisy which are rightly assigned by foreign observers to the Englishman as his birthright. In spite of a supposed emancipation of the spirit labelled "post-war," and attributed to our younger generations, vast strata of the population, young as well as old, exist mentally in a Victorian atmosphere of repression, make-belief and blindness to obvious facts. The popular newspapers tend to foster this attitude by providing a pabulum of mushy sentiment which even a churchwarden of the old school must surely find nauseating and meretricious. It is not that publicity is withheld from matters of sex; on the contrary, sex talk and sex implications are seldom absent from the news pages and the gossip columns. But they are served up slyly, with piquant sauces such as an unscrupulous chef might use to cover a doubtful bird or fish of degenerate flavour. The licence

allowed to novelists is abused in the interests of undisguised pornography, while films and plays exploit the sexual element subtly without offering the censorship specific grounds of objection. Granted that to-day, as in the past, there are spineless people of vicious mind who aspire to the best of both worlds by enjoying sin vicariously, the lack of candour, the tittering coyness with which sex is discussed or hinted at in many circles does not reflect flatteringly on the "culture" we like to call "civilization." To ask a popular daily newspaper to deal boldly and frankly with pressing sexual problems is like asking the editor to walk naked down the Strand; the indecent suggestion is received with horror and amazement. Yet the need for guidance and enlightenment is urgent and undeniable; to withhold them is to aggravate evils that threaten not only the health, but the very existence of the nation.

What is the position? As a race we are breeding with reckless profusion our poorest stocks, which in any case are already subject to acutely degenerative environmental influences in town and country; the congenitally diseased and mentally defective multiply their kind with alarming regularity. A nation, taxed to breaking point, floundering in the trough of successive economic depressions, burdened

with millions of unemployed and their dependants, is called on to support whole armies of men, women and children who are housed, fed and clothed out of the earnings of the taxpayer and rate-payer. Inevitably, therefore, the overburdened middle and upper classes, and the better informed and better disciplined working classes, are restricting the size of their families to a minimum, or are refusing to add to their burdens the responsibilities of parenthood; with the result that physical degeneration is perpetuated and desirable eugenic elements are repressed by a reversal of nature's intention to select only the fittest for survival.

Statesmen and politicians have not yet condescended to apply their minds seriously to the biological conception of their public duty. Yet the time has been ripe for almost a generation—calling on them to interpret in terms of biology and practical eugenics the problems of population. Inevitably the nemesis of an idle and useless population of physical and mental defectives will overtake our purblind statesmanship. The writing is plain on the wall. Doses and institutional palliatives cannot convert our millions of degenerates into useful and productive citizens. As in the case of the diseases that afflict our C 3 population, we must no longer tinker with end results; we must deal

with the *causes*, not only the effects, and cut out evils by the root.

It may be true that the British peoples would never tolerate the autocracy of a Mussolini, by which such drastic changes could be quickly effected; but if the popular newspapers would put forward courageously the true facts of the position and explain the remedies that lie to hand, we could achieve through the pressure of intelligent public opinion what foreign nations force upon the community by autocratic rule. Is birth control frankly discussed in the daily press? Or the sterilization of the unfit? Or the problem of illegal operations and unauthorised abortifacients? Far from it. Covert references are made in guarded language which is puzzling or incomprehensible to the average newspaper reader. He turns with relief and understanding to the plain facts of the political situation or the sporting pages, relegating eugenics to the region of quackeries, fanaticisms and cloud-cuckoo-land generally . . . while around him a hideous gangrene devours apace the flesh and marrow of the body politic.

Thanks to the courage and pertinacity of such women pioneers as Marie Stopes and Margaret Sanger, public opinion has been well prepared for the consistent aid of the Press, if

and when its protagonists are suffered to enter the arena. We require now not so much moral sanction for birth control (since this has been widely established) as adequate organisation for the application of its principles where they are most needed. Let me illustrate this by quoting from that enlightened churchman, Dean Inge, who invokes statistics as follows:—

“A blind woman had two daughters blind at 40. Of her five grandchildren only one escaped; the other four were blind by 30. Of her fifteen great-grandchildren thirteen had cataract. Of the forty-six great-great-grandchildren who can be traced, twenty were of feeble sight at 7, and some lost the sight of both eyes. Forty defective individuals in a stock still multiplying, which nature, left to herself, would have cut off at its very inception.”

This is but a single instance of one aspect of the problem. Add to the physical degeneracy of a people largely fed on devitalised, drastically manipulated foodstuffs, the specific physical and mental disabilities that are heritable from venereal diseases, from involuntary parenthood, from mental deficiency, from criminal tendency and from the breeding of degenerate stocks, and you have a picture which should

haunt the sleep of those who are set over us as the rulers of the people.

The problem is further complicated by changing economic conditions. The effects of the almost complete mechanisation of industry, on the one hand, and the existence on the other of an adolescent population reared on the "dole," with a definite distaste for employment of any kind, are profoundly disturbing, especially in their reactions on the mentality of the working classes. Ideas of thrift and foresight do not flourish in such soil, while reckless marriages and reckless child-bearing permeate the evils of slum life. Against this dismal background the falling birth-rate of the country's best elements is sharply accentuated. Late and childless marriages are becoming more and more general; while at least a million or more surplus single women of child-bearing age wither into sterility under Pharisaical restrictions that exact deadly social penalties from the unmarried mother and her offspring. Cannot we solve the problem of surplus womanhood by new social sanctions which would release the surplus woman for honourable motherhood without marriage? Sooner or later the State and public opinion will have to face frankly the need for the rationalization of child-bearing. No nation can afford to allow its

poorest elements to breed at random while its desirable elements dwindle into a negligible minority. Nor can institutional care, education and the unscrupulous flattery of politicians infuse into the proletariat the sound health and character which can only grow out of the roots of a sound heredity. While it is doubtless true that the State must uphold the integrity of family life in its own interests, it should be realised that "integrity" can be interpreted only in terms of quantitative and qualitative characteristics of the family. Large families of the semi-invalid and the mentally defective are not a foundation on which anything of use or value can be built; small families of unexceptionable soundness do not suffice as the foundation of a great State. The prosperity of the Victorian age was made possible by the fertility of the Victorian middle class. To what triumphs will the fertility of our unemployed and unemployables, of our stunted over-industrialised C 3 working-class population lead us unless we deliberately check the increase of at least its flagrantly anti-social elements and encourage at the same time the fertility of the middle class, which alone has the physique and tradition to restore to the population as a whole the sound mind and the sound body which are so rapidly disappearing?

Neither birth-control nor the sterilization of

the unfit offer a complete solution; they complement each other in so far as their systematic application would clear the ground for a constructive eugenic policy. I am unable to follow those enthusiasts who claim sterilization as a panacea for all heritable ills, but nothing could be more exasperating than the attitude of its opponents, which is an unfortunate example of the hypnotic influence of *laissez-faire* on certain types of mentality. Sterilization will not curtail every kind of degenerative heredity; but it would destroy at least its most flagrant manifestations. It would rid us of many thousands of mental defectives and syphilitics; it would give our gaols, asylums and institutions some measure of respite. Moreover, both in the case of men and women, sterilization is a safe and simple operation, involving no real hardship, since it leaves its subjects free to indulge their natural inclinations while entirely removing any possibility of offspring.

To interpret the sterilization of the unfit negatively is merely to beg the question. We must use it as part of a constructive policy applied to the sex problem as a whole. The same is equally true of birth-control. I will not reiterate the arguments which have been put forward by Dr. Marie Stopes except to record my hearty endorsement of her views and of the

methods she advocates. It is not too much to say of Dr. Stopes that by her courage and sincerity she has brought into many thousands of homes throughout the world a finer conception of married life; and she has secured for the children of marriages where child-bearing has been wisely spaced a fuller share of parental care and a finer opportunity in life. She has made parents realise that the human, as well as the material, constituents of marriage, can be carefully and conscientiously planned; and by her publication of actual correspondence from working class mothers she has exposed the evils of involuntary motherhood and its degenerative effects. This does not mean, however, that we are likely to abandon in a day, or a year, our incurably haphazard methods of tackling social problems, nor that we shall cease as a nation from being led blindfold by prohibitionists of every type into one ridiculous dilemma after another. I feel convinced that were a census possible in regard to social problems we label "controversial," not one person out of two hundred would support our fantastic "Dora" legislation or share the views of all those "Anti" elements which oppose in the name of God and mankind every attempt to shake off mediæval concepts of man's inherent wickedness and the strive to shackle him with

more legislative chains for his salvation in this world and the next. We are at least as self-controlled a people as the French or the Germans who may drink when they please and can buy a cigar at midnight if they choose. Can it be expected that a people, who, in the heart of the world's greatest city, meekly agree to be thirsty only between 11.30 A.M. and 2.30 P.M. and again between 5.30 P.M. and 11 P.M., should face the realities of life and sex?

Yet it is in this snuffling spirit that the opponents of progressive sex ideas put forward arguments for their case. The English people are so conservative that whenever folly has crept into the Statute Book she sits there entrenched for generations. Especially in regard to social legislation we are constantly at the mercy of Acts of Parliament which have not been repealed since the time of Queen Elizabeth or George III. As pressure is put upon successive Governments some partial modification is secured while leaving open a retreat to superannuated laws. It is not that our draftsmen are bad, but that we prefer to proceed in this jerky and illogical fashion until some grave abuse becomes so intolerable that immediate and drastic action must be taken. We are approaching this position in regard to the existing law of abortion, which is now com-

pletely out of relation to the conditions and facts of modern life. It is futile to expect that our legislators should take such bold and comprehensive views as are being applied successfully in the vast experiment of Soviet Russia. But there is a crying need for new legislation to sweep away old anomalies and to relieve from suffering and death women and girls who are driven by social conditions and the unhappy circumstances of their lives to resort to illegal methods for procuring miscarriages where the birth of a child appears to them a social or economic misfortune they are unable to face. We must admire the courage and good sense of a Judge of the High Court who cannot administer the unsatisfactory law of abortion as it stands without earnestly emphasising its tragic inadequacies. I refer to recent pronouncements of Mr. Justice McCardie, and I should like to take this opportunity of expressing my admiration for the public spirit which has prompted his timely pronouncements. Let me quote from a recent Judgment:—

Extract from Mr. Justice McCardie's Judgment.

“The knowledge of men has grown, and I am glad to see a new and a wider vision has grown up.

"I think these abortion cases will continue so long as the knowledge of birth-control is withheld. Already one-tenth of the population of this country is either physically or mentally deficient. It is unfit for citizenship of this great nation. It is the terrible result of the random output of unrestricted breeding.

"Abortion will be all too common so long as the knowledge of birth-control is so cruelly refused or withheld. I use plain words. There is indeed no one who has travelled through the country for many years, whether at assizes or not, who can object to them, with the knowledge that there must have been grave cases to provoke those words. In my view, and I say it plainly and publicly, the law of abortion should be amended. The law as it stands at present does more harm than good.

"I pass over the cases of surgical practice of abortion, but I merely point to them to show that even they are publicly forbidden by the ludicrously wide words of the Act. I will, however, take a few other illustrations.

"Very often mentally defective women or girls become pregnant, either by another mental defective or by a normal man. In my view such a child should not be born with that terrible taint upon it. It is almost inevitable that mentally defective women will breed

mentally defective children. Those who allow such a child to be born are, in my opinion, guilty of a grave moral crime. For such a child—an innocent child—is condemned to inescapable misery and degradation. There are 300,000 mentally deficient women in this country, and only a small proportion of them are under institutional care. They are breeding freely day by day in every city and in every county. The consequences are terrible. In my view miscarriage in such cases should be made compulsory.

“Again too often, as at this assize, girls become pregnant by their own fathers. That is the crime of incest. In my view such a child should not be born. And there is also at the present assizes a horrible case where a mentally defective girl was pregnant by her own brother. The outlook for such a child is repulsive beyond description.

“I am dealing with the grim realities of life. It is time that the public knew them. There are, too, often men, husbands, released from the control of asylums who go home and make their wives pregnant. The birth of such children in such cases should not be allowed. So, too, with the cases of epileptics and those otherwise diseased.

“I will take only one final illustration out

of many. Some years ago a beautiful and delicate girl of fourteen years, the daughter of a country gentleman, was raped by a drunken fiend. The man was sentenced to penal servitude, but the girl was pregnant. I cannot think that the father of that girl would have been morally wrong if he had sought to prevent the birth of the child. What could be the future of such a child?

“In my view, and I speak designedly, it is a moral duty in many cases to procure miscarriage, and those who so loudly support the present law of abortion are either devoid of experience or have given no thought to the subject. I need not deal to-day with the numerous cases where women are utterly exhausted and worn out with child-bearing, nor with cases where exceptional circumstances may render the birth of a child undesirable. I feel deeply on these grave matters, and the wider my experience grows the deeper my feelings become. The question of birth control and an amendment of the law of abortion must be looked at free from prejudice, whether theological or otherwise, and whether those prejudices are based on self-interest or lust. The risk of abortion if performed with proper surgical skill is slight, and I speak with knowledge of the medical and surgical authorities

on this matter. In my view the time has come when the nation should be warned. I warn it to-day."

It is apparently necessary to reassure well intentioned people that to reform the law affecting abortion does not mean the abandonment of moral safeguards or ethical standards. Nothing could be worse than the existing state of affairs which virtually provides one law (or at least one evasion of law) for the rich and another for the poor. It is notorious that, whatever the risks, abortifacients administered by qualified practitioners are within the reach of those who can afford to pay for these luxuries, while a poor woman, perhaps about to be an involuntary mother for the sixth or seventh time—or a young and ignorant girl who is the victim of her own inexperience and of primitive impulses which she has not been taught to understand—is driven into a sordid dilemma which ends in the criminal court and the prison. As in the case of sterilization and birth-control, to tinker with end results is worse than useless. The problem of abortion is a part of the whole sexual problem and can only be dealt with satisfactorily by broad-minded measures calculated to embrace every aspect of sex life. The first essential in

regard to abortion, at all events, is to survey the whole field in much the same spirit as has been done in Russia and to offer the aid of the medical profession to expectant mothers, married or otherwise, who for good reasons should not be allowed to bear children. Certain ethical and economic standards are applied in Russia to the limitation of legalised abortion within approved limits. I do not suggest that these standards are necessarily suited to our own conditions; but there is no inherent difficulty in considering the problem from this point of view, and whether on humanitarian, economic or other grounds differentiating between cases which are or should be legally abortable.

There is evidence that some of the more progressive local authorities are standing up to the sex problem so far as existing powers enable them to do so. Birth-control clinics are coming into existence in several types of district where there is adequate scope for the assistance they are able to give to mothers of the working-class. Maternity and Child Welfare Centres and especially pre-natal Clinics are doing wonderful work and have the opportunity of inculcating progressive ideas. I would particularly emphasise the value of the pre-natal Clinic which is proving so helpful in breaking down old-

fashioned ideas in regard to the "shamefulness" of seeking medical advice during the months of pregnancy, although much still remains to be done in educating women to seek advice as soon as they know that they are to be mothers. One of the most effective weapons for combating the unquestionably heavy incidence of venereal disease, especially among young mothers innocently infected by their husbands (who themselves are the victims of ignorance), is the pre-natal Clinic where a suspicious condition may come to light, thus enabling a woman's health to be protected and the life or sight of the unborn child saved. Numerous cases of gonorrhœal infection are discovered in the pre-natal Clinics among young women who themselves are quite unaware of their condition and who could not have been given the necessary treatment until after the birth of the child when infection would have become obvious as the result of *ophthalmia neonatorum* in the child. While cases of acute syphilitic infection come into the free treatment centres all over the country, the gravity of gonorrhœal infection, particularly in women, is not realised, so that in later life grave and often fatal operations result from ignorance or negligence. The pre-natal Clinic tends to bring such cases to light at an early and often remediable stage.

I should like to see a wider vision and greater energy on the part of Medical Officers of Health who have such a wonderful opportunity in the Centres under their control for giving not only timely treatment, but timely instruction in the essentials of preventive medicine. The powers which they possess under the Public Health Acts to utilise public moneys for the purposes of health education and propaganda may be baulked by the conservatism or stupidity of the Public Health Committee or that part of the local government machine through which the necessary funds can be applied. Those who have worked in the interests of preventive medicine and who know how great and how urgent is the need for constant education of the widest public earnestly press upon Medical Officers of Health and the local authorities the need for constant vigilance and action.

CHAPTER IX

Mental Troubles and Physical Causes

UNTIL quite recently there has centred round the subject of mental troubles a conspiracy of silence and neglect which has occasioned much popular misunderstanding of the origin and treatment of afflictions of the mind. Even to-day, mental disease is still regarded by many if not by most people as something rather fearful and mysterious, as something quite different from bodily disease. Such an attitude of mind is hardly surprising when we consider that there has long persisted a tendency to confuse mind with soul, a misconception which has led to the belief that the mind is an entity independent of, and apart from, the body it inhabits.

Now, in the interests of mental health, it is highly important that we should have a clear view of the relationship of mind to body, for only then will it be possible to appreciate that ills of the mind do not arise without definite causes, but that they are in every way similar to ills of the body. Actually, as I shall show, there is no definite frontier between disease of the body and disease of the mind, while mental

health is quite inseparable from physical health. It is fundamental that this point should be grasped, for upon it are founded the principles of mental hygiene.

The aphorism, "a sound mind in a sound body," is well known, but its full significance is seldom appreciated. Modern psychological science has shed considerable light on the relation of mind to body, though I do not suggest that this relationship has been completely elucidated. It will be sufficient if I deal with the ascertained and indisputable facts. We do know, in the first instance, that the manifestations of mind take place through the medium of the nervous system. In other words, the mind is dependent upon the brain and without the brain there can be no mind. Sir Thomas Clouston, a distinguished Edinburgh psychiatrist, expressed this basic fact thus: "Mind may be regarded as the highest form of nerve force. It is not 'created' in the brain, but it is absolutely conditioned by that organ."

Upon the healthy functioning of the highly specialised cells of the brain cortex, or grey matter as it is sometimes called, all mental activity depends, and should these cells be injured, as by a blow on the head, or should they be poisoned, as by alcohol or disease toxins, then mental disturbance will result. In order

to possess healthy and vigorous brain cells, and consequently a healthy and vigorous mind, it is essential, first, that the inherited constitution of these cells should be of good quality; and, secondly, that they should be plentifully supplied with nourishment. The first condition we cannot obviously control—as we are unable to choose our parents—but the second we can fulfil by keeping our blood pure and by preserving our heart and blood vessels strong and elastic.

Examples will make this clear. If the poisons from a septic womb following childbirth accumulate in the blood, the brain cells may be so affected that an acute attack of a confusional nature results. In fact, mental confusion is a sure sign of poisoned brain cells—no matter what the cause. Again, if the brain arteries are thickened and hardened, the brain cells will be inadequately nourished and will degenerate—the result being an impairment of *all* the mental functions such as occurs in morbid old age.

Now, although the brain is essentially the organ of mind, it is constantly receiving impressions *via* the nerves from every part of the body—and these impressions are continually exerting upon it an influence which is either harmful or beneficial. Thus all parts of the body are linked in sympathetic contact with the mind which

thus comprehends the whole of the bodily life. Upon the healthy or unhealthy working of the lungs, heart, digestive organs, skin and ductless glands, the background of our mental feeling plainly depends. In this connection we need only recall how our moods and intellectual activities are influenced by hunger or repletion, fatigue or rest, cold or warmth, pure or impure air, the state of the bowels, and so on.

In our everyday life, the bodily routine is harmonised with the mental routine. If we are healthy we rise in the morning alert and vigorous, and our intellectual powers attain to their maximum as the day advances. With the using up of energy they gradually wane, but are refreshed by nourishment and intervals of rest. Towards the end of the day, fatigue overtakes us and we finally pass into the oblivion of sleep.

Further evidence of the intimate relationship between mind and body is furnished by the effects of physical disease. The sanguine optimism of the consumptive is familiar to all. Affections of the heart are frequently associated with marked anxiety and fear. Liver troubles lead to a gloomy and somewhat spiteful outlook on life, while most of us have come across examples of dyspeptic irritability of temper.

And conversely, a sick mind affects the body in many remarkable ways. Severe depression,

notably as it occurs in the disease called melancholia, leads to an enfeebled working of all the digestive organs and increases the body's susceptibility to germ infection. Even in a minor way, we have all had experience of how an "attack of the blues" robs us of our appetite and may lead to dyspepsia. The sexual function is deranged in nearly all major mental troubles and in hysteria, a purely mental illness, various forms of paralysis may arise.

From the evidence I have given, it is apparent that the function of mind is indissolubly bound up with the function of body and that it is futile to study mind apart from body. We must acknowledge this essential unity of mind and body, for only then will the problems of mental ill-health be intelligible and the full meaning of "a sound mind in a sound body" be realised.

We can now approach the material causes of mental disease on safe ground, although before discussing these I must refer to the factor of heredity or the transmission of an unstable nervous system. In the past, undue importance was attached to this as a causal factor, creating an unfavourable outlook on the problems of mental disease. Fortunately, with our increased knowledge of psychology we are now able to view heredity in a better perspective than formerly, and we realise that while a bad here-

dity maybe the basic influence, in that it produces susceptibility to mental disease, it need not be the determining factor in the causation of that disease. We have discovered that external and frequently material factors are relatively of greater significance, for these are the direct and immediate precipitants in a great proportion of cases.

This is a great advance, for to attribute the cause of mental disease to heredity was to believe that little or nothing could be done to cure it—and it was this attitude of mind which prevented the progress of mental hygiene and in fact led to the misconception that mental diseases were quite different from bodily disease. Now, it is imperative that this erroneous belief should no longer exist. Mental diseases, including what are termed the insanities, have very definite and specific causes apart from heredity and these causes are both preventable and removable.

Among the physical causes of mental troubles, the many forms of poisoning rank high in the list. I have already mentioned the sepsis which may arise subsequent to childbirth as a frequent source of mental confusion, and in this condition we must also bear in mind the physical stress and strain of labour, especially should it be a difficult one, as an additional factor. Extreme confusion,

or delirium, may also arise, of course, during a toxic fever, such as influenza, pneumonia, typhoid or malaria, while degrees of confusion may accompany any of the self-poisonings, whether it be in the intestines, nose, ears, or urinary tracts. The acute poisonings of uræmia, from failure of the kidneys to excrete the body waste, or of diabetes, similarly tend to produce confused mental states.

Most important as a cause of mental disease is prolonged and excessive indulgence in alcohol. This factor alone may account for as much as 10 per cent. of the number of patients admitted to mental hospitals. Alcohol produces its deleterious effects upon the mind in a variety of ways, from "delirium tremens" to a persecutory insanity, but it ultimately tends to lead to dementia or mental extinction.

Equally grave are the different forms of drug addiction such as morphinism and cocaineism. The habit of drug taking has so greatly increased in modern times that it is now regarded as one of the scourges of our civilisation. Drugs of this kind enslave their victims with remarkable rapidity, and once in their clutches it requires an almost superhuman effort to escape. They produce their evil effects more subtly than alcohol and are even more sinister, in that the moral deterioration which they cause is

earlier in its onset and more intense in degree.

Another racial poison, also a fertile source of mental disease, is syphilis. This disease, already referred to, especially when only partially treated, often leads many years after the original infection to the condition which is called "general paralysis of the insane." It is a deadly disease of mind and body, passing through various stages until the mind becomes practically non-existent. Mention must be made, however, of the recent method of treatment of general paralysis by induced malaria. The high temperature artificially produced seems to have some beneficial effect upon the course of the disease, for a considerable proportion of the cases treated in this way have had remissions of symptoms lasting in some for many years. Syphilis ranks with alcohol as the most frequent of physical causes of mental disease.

Disturbances of the endocrine or ductless glands must also be considered in relation to the causation of mental disease. Should the thyroid gland become feeble in function or fail altogether, definite mental changes of a degenerative nature occur. Consciousness is blunted, power of concentration is diminished, and initiative almost disappears. Removal, disease, or degeneration of the sexual glands similarly

induces mental abnormalities. This is well exemplified by the frequency of mental disorders during the climateric or change of life in women. The gradual glandular failure, especially if it is associated with a neglect of the bodily hygiene, is peculiarly apt to lead to attacks of depression sometimes amounting to true melancholia. Fortunately, for the most part, such mental illnesses are transient and complete recovery is the rule. In men, the "difficult period" of sexual decadence comes later in life, and it is more gradual in onset. Nevertheless, it brings its problems. Here, too, the factor of the bodily health is exceedingly important, and if mental robustness is to be preserved, careful attention to the diet and bowel habits is essential, for hardened arteries are the penalty of unnatural living and hardened arteries bring on premature senility.

On the subject of malnutrition, I need only say that this factor is a frequent predisposing cause of mental troubles and, should it be extreme, it may constitute the sole cause. Prolonged under-feeding of the body inevitably leads to a relative starvation of the brain and mental exhaustion is the sequel. There is no doubt that a considerable percentage of the lesser nervous disorders—the "neurasthenics" and other neuroses—owe their origin to the

haphazard and faulty habits of diet which are so prevalent to-day even among the educated sections of the community. You cannot have sound nerves without sound nutrition. Let me add, however, that it must not be presumed that I wish to ignore or even to under-estimate the importance of purely psychological factors. There are many mental illnesses which are entirely psychological in origin—in other words, they arise from difficulties of adaptation to life's problems. I have stressed the physical factors in this article because I believe it is necessary that the public should realise that the ills of the mind *do* have their causes just like the ills of the body, and that they are *generally preventable*, and that it is necessary that we should adopt the same charitable and sympathetic attitude to mental ill-health as we adopt to bodily ill-health. After all, true health is the consummation between *both* mental and physical health.

The connexion between excessive indulgence in alcohol and mental troubles has been stated. What is the real position regarding the moderate use of alcohol?

The custom of drinking alcoholic beverages in some form or other dates far back in the history of mankind. I doubt if there has been any race or people in existence which has not

invented some variety of fermented liquor. To-day, throughout the civilised and uncivilised world—in spite of legal restrictions in some countries—alcohol is widely used and, unfortunately, widely abused. Regarded by some as a curse, by others as a blessing, what should be the attitude of the average health-conscious man or woman to the consumption of alcohol? I begin by confessing that this is by no means an easy question to answer: yet it is an important one—not to be shirked or evaded, for certain vital health issues are at stake.

Alcohol has its ardent supporters and its equally ardent opponents: in fact, those who are articulate in their expression of opinion on this subject tend for the most part to be extremist. Discussions on alcohol are generally sustained in emotionally charged atmospheres. Moral and sentimental factors are over-emphasised at the expense of scientific facts. Assuredly, this is unfortunate. The problem of alcohol—and no one will deny that it is a problem—calls for a level-headed consideration of the ascertained scientific information available. Our judgment need not be final, for science is never static, but we can hope at least for some working principles to guide us. Here I propose to deal chiefly with the physiological and psychological aspects of the alcohol problem,

and shall endeavour to present a balanced opinion from the health point of view.

The most important constituent of alcoholic beverages is ethyl alcohol, which is produced by the fermentative action of the yeast fungus upon sugar. It is on this product that the physiological effects of alcoholic drinks almost entirely depend. Now, the first thing to realise concerning alcohol is that it exerts an inhibitory or depressant action on the nervous system. This, of course, is contrary to the popularly accepted idea that alcohol is a stimulant. It is scientifically established that, under the influence of alcohol, the higher controlling nerve centres are inhibited and consequently there is a release of the lower centres. Its effect is similar to the removal of a brake, with the result that certain activities of the mind and body are accelerated and thus appear to be stimulated. For example, the slight quickening of the heart's action after taking alcohol is not due to direct stimulation of the heart nerves, but to a damping down of the nerve impulses which normally control the heart beat. It is important to realise that the fundamental effect of alcohol is *depressant*, even when it is ingested in small quantities. This effect is very obvious, of course, when large amounts of alcohol are consumed.

In the case of the mental activities the action of alcohol is exceedingly interesting. In reasonable amounts its effects are subtle. (As to what is signified by "reasonable" will be discussed later.) There is a lowering of the mental tension: in other words, the forces which control our finer mental adjustments—our reactions to social conventions, traditions, and moral and intellectual impulses are diminished. Now, as most people find that the restrictions of highly civilised life impose a certain strain, the removal of this strain by alcohol brings about a relative feeling of well-being and relief. Minor irritations and disappointments tend to disappear and the outlook on life becomes more amiable and tolerant. Fears and worries fade: feelings of inferiority wane, and so it happens that the after-dinner speech not infrequently sparkles with wit and is delivered with confident eloquence. Alcohol, for a time at least, smooths out conflicts which impede the mind's working; it removes the affectations and artificialities imposed by class conventions: it makes a man more himself. There is much truth in the old saying that "a drunk man is a true man."

I will return to the psychological aspect of alcoholic indulgence later, but for the moment let us examine the claim that alcohol is a food.

There is some divergence of opinion on this point, but it is generally accepted that alcoholic beverages do have a certain food value in so far as they are sources of energy. Alcohol when drunk is rapidly and completely absorbed by the stomach and intestines. In moderate amounts, it is completely burnt up in the body (oxidised) and this combustion liberates energy. This energy can be used by the body to its full value and therefore alcohol *can*, within limits, replace fat and carbo-hydrate in the diet. Compared with other energy foods, however, alcohol differs in so far as it is directly burnt up and cannot be stored in the tissues for future use. It thus acts as a readily available fuel food, sparing the fat, carbo-hydrate and protein already stored in the body to the extent of energy liberated.

At the same time, one cannot divorce the food value of alcohol from its drug effect. To do so would be most unwise and misleading. After all, how many people really do take alcohol as a food? Most of us who take alcohol will agree that we do so because of its agreeable appeal to our palates and because of its pleasant relaxative effects upon our nervous systems. Some few deliberately indulge in alcohol as an escape from life's difficulties, but such indulgence is definitely in the realm of the morbid.

We must, therefore, now consider how far, if at all, alcohol is detrimental to health and thus shortens life. Here we are on debatable land.

There is, of course, no question of the evil effects of excessive consumption of alcohol over prolonged periods. Every physician is all too familiar with the physical and mental disasters of alcoholism. They abound in every country—the tragedies of abuse and ignorance. There is practically no organ or tissue of the human body which is not adversely affected by the drug action of alcohol. Blood vessels are hardened, kidneys and heart degenerated, liver congested and disorganised, stomach deranged, bronchi and lungs made susceptible to inflammation, and the vitality of every cell in the body is deteriorated. Most piteous are the effects of alcoholism upon the mind. There is a marked reduction in intellectual vigour. The business man loses his initiative, the artist his flair, the hand of the workman its cunning. With extreme poisoning of the brain cells, there is apt to arise mental confusion which may amount to delirium. In other cases, there is a marked loss of emotional control and not infrequently a development of delusions of suspicion and persecution. Ultimately, there arises a complete mental degradation and mental ex-

tinction—provided that some physical crisis, such as pneumonia, has not carried off the sufferer at an earlier stage.

Clearly, there can be no dispute about the disastrous results of excessive indulgence in alcoholic beverages. Public health statistics, even though they are probably inaccurate in their estimation of alcohol as a cause of death, prove this up to the hilt. But what of the moderate use of alcohol? Because there are many who undoubtedly misuse this commodity, are we to condemn it out of hand? In my opinion—No! I believe that the correct usage of alcohol is no destroyer of health and that it does not appreciably diminish the span of life.

What constitutes the temperate or moderate consumption of alcoholic liquors? How much alcohol may we take without running the danger of any impairment of our physical and mental health? Is teetotalism or complete abstinence preferable even to extreme temperance? Here are important questions on which even expert opinion is divided.

I think it may be asserted that, if the amount of alcohol drunk is such as will be *completely* oxidised or burnt up to provide an immediate source of energy, the drug action will not reach the stage when it will produce harmful results

in the body. This amount, of necessity, varies within certain limits, and depends upon the kind of life the individual is living. In general, it may be stated that open air workers can utilise in this way more alcohol than indoor sedentary workers, but it is suggested that not more than two ounces should be taken in the twenty-four hours. I make this suggestion on the authority of a report published during the Great War and drawn up by a Committee of the Royal Society at the request of the Board of Trade of Great Britain. This quantity of alcohol, viz. two ounces, is contained, approximately, in—two pints of beer; three pints of mild ale; one pint of natural wine; and one gill of spirits. If this quantity of alcohol is exceeded as a habit, the drug action becomes manifest and health of mind and body is deteriorated.

While the actual quantity of alcohol taken is of fundamental importance, a great deal depends on the actual conditions under which it is drunk. The Committee already mentioned advocated two special provisions. First, "to avoid continued action of the tissues such an interval should elapse between the times when alcoholic beverages are drunk as will prevent persistent presence of a deleterious amount of alcohol in the body." Secondly, "to avoid

direct injury to the mucous membrane of the stomach, alcohol should not be taken in concentrated form and without food." More simply, these rules indicate that alcoholic drinks should be taken in the moderate quantities already indicated and preferably in the more diluted forms, such as beer, ales, cider and natural wines; also, that drinking between meals and on an empty stomach is inadvisable. In this last provision, there is some condemnation of the modern habit of cocktail drinking—where a concentrated spirit is drunk with a view to artificially stimulating the appetite. In point of fact, however, most temperate drinkers fulfil these two provisions.

I think it is obvious that by now we have got to the root of the alcohol problem. The consensus of opinion, with which I am in agreement, leads us to the conclusion that the pleasant relaxative effects which most people seek in alcohol can be obtained by quantities of alcohol, properly used, which will not, in normally constituted people, be followed or attended by any appreciable adverse effects upon the mental or physical health. More briefly, we may say that the moderate drinking of alcoholic beverages is physiologically permissible.

The Committee of Investigation, already

referred to, summed the matter up in the following able manner: "The temperate consumption of alcoholic liquors in accordance with these rules of practice may be considered physiologically harmless in the case of the large majority of normal adults; and this conclusion, it may be added, is fully borne out by the massive experience of mankind in the wine and beer drinking countries. On the other hand, it is certainly true that alcoholic beverages are in no way essential for healthy life; that they are harmful or dangerous if the above-mentioned precautions are not observed; and further that they are definitely injurious to children and for most persons of unstable nervous systems, notably for those who have had severe injuries to the head, or who have suffered from attacks of mental disorder or nervous shock."

Alcohol is like a good many things in life; it can be friend or foe according to how we use it. No doubt it is easily abused. Everyday experience teaches us that. Nevertheless, it brings a comfort and satisfaction into the lives of multitudes who exhibit ordinary wisdom and are not given to any kind of excess. And in so far as it increases the sum total of individual well-being, it cannot be regarded as a menace to health or life-shortening in its

effects. It is not suggested from this that those who are completely abstinent from alcohol will be any the worse off, or that moderate drinking makes for longevity. Such people find mental sedatives in other ways according to their tastes. It is always to be borne in mind that there are other excesses in life which are as detrimental to health as excess in alcohol. Let those who are fanatical in their views on the use of alcohol never lose sight of that simple every-day fact.

The true way to health is always the way of moderation in all things. Let it not be forgotten also that those unfortunate people who take alcohol to excess are often those who are excessively sensitive to the harshness and cruelties of life. Possibly owing to difficult circumstances, or to the inheritance of a nervous disposition, they are finding the realities of their existence almost unbearable. They have striven hard and they have failed. Is it a matter of surprise that not infrequently they desire to escape from themselves and the world which too often misunderstands them? And alcohol offers them the golden road to oblivion. Let us think of such people as life's victims and offer them our sympathy and help rather than mock them with indignant condemnation.

CHAPTER X

New Ways for Old Ills

IN this remarkable age of invention and discovery, scientists are continually providing us with new weapons in the fight against disease and new armour for the protection of health. It is imperative, therefore, that we should be prepared to exploit to the utmost these health-giving achievements, for the artificial habits of civilisation now render the maintenance of fitness of mind and body a difficult and arduous task. In this chapter I wish to discuss the subject of sunlight and the ultra-violet rays, about which so much has been written and said of late, and to touch upon modern research on the influence of the glands.

Several centuries before the birth of Christ, the natural curative and disease-preventing powers of sunlight were proclaimed by Hippocrates, the Father of Medicine, who founded his belief on careful observation and simple experiment. Unfortunately for mankind, this belief disappeared with the fall of the classic civilisations, and many centuries passed before men re-discovered the unique qualities of the

light of day. Actually, it was not until the middle of the nineteenth century that a number of pioneer voices, among which was that of Florence Nightingale, were raised to re-affirm the Hippocratic faith in sunlight and to plead for its reinstatement as a prime factor of health.

The plea did not meet with the warm reception that might have been expected, and it is only within comparatively recent times, in fact, since Finsen used the sun to cure tuberculosis of the skin and Rollier to cure tuberculosis of the bones with such spectacular results, that the multitudes have come to evince an interest in the life-saving possibilities of sunlight.

In this last decade, the nature of its health-giving properties has been thoroughly investigated from a scientific point of view and its value both in the field of preventive medicine and in that of healing have been soundly established. We now realise that a great amount of ill-health is directly attributable to deprivation of sunlight, including such grave and disabling diseases as rickets and tuberculosis, so accurately and graphically described by Dr. Saleeby as the "diseases of darkness," and we hope soon to see the day when these scourges will no longer trouble mankind. More

than that, we hope that the proper use of sunlight will help to prolong our lives, but before discussing this important issue we must first consider how sunlight produces its beneficent influence.

In a general way, we know that sunlight is indispensable for the existence and well-being of all living organisms on this planet. Without the sun there is no life. What is there, then, in the sunlight that vitalises inanimate matter and also provides us with radiant health?

The sun gives off an enormous number of rays, varying in their nature and effects, and those which reach us on the earth we call sunlight. This is composed of luminous light, so-called because it is visible to the human eye and, in addition, of heat rays and ultra-violet rays. It is to these *ultra-violet rays* that the curative and restorative powers of sunlight are almost entirely due—the infra-red or heat rays playing but a minor part.

How do the ultra-violet rays affect the human body? In the first place, they react on the skin, vitalising it in a remarkable way. The nerve-endings are stimulated and send impulses to the brain which are referred back to various of the internal organs causing them to work more efficiently. Then under the prolonged influence of the rays the skin becomes bronzed

and pigmented, and a pigmented skin responds to minute external influences, such as temperature changes by contraction or dilation of its fine blood-vessels, thus acting as a sort of "peripheral heart." The tone of the general circulation is improved. A more intense and regular flow of blood is occasioned, and in this way the deeply-seated organs are incessantly flushed with blood and their working is facilitated.

This happening is particularly noticeable in the case of the muscles, which under the direct and prolonged influence of sun rays, without the use of massage or electricity, and even in bed-ridden patients, develop into athletic form. This building up of the musculature is extremely valuable, not only in the treatment of certain forms of tuberculosis, such as spinal disease, where well-developed muscles act as a splint, but also in the stimulation of the respiratory function with consequent thorough oxidisation of the blood—a vital condition of health. Important also is this pigmented skin's power to oppose the penetration of harmful germs. Dr. Rollier describes the ultra-violet rays as "the most energetic and the most efficacious of all antiseptic dressings."

Further, the ultra-violet rays have been

proved to stimulate the blood-forming organs. The red blood corpuscles and their contained hæmoglobin (oxygen-carrying substance) are markedly increased under their influence. There is also the effect of these rays upon the mind. We all know how a bright sunny day is definitely stimulating to our spirits and produces a feeling of intimate satisfaction with life in general. This is directly attributable to these wonderful rays.

Finally, the ultra-violet rays indirectly affect the body by enriching the vitamin content of our foodstuffs. As has been explained earlier, it would appear that the elaboration of vitamins in plants, from which all our food including animal flesh is derived, is dependent upon these rays. Actually, vitamin D, the anti-rickets factor, has been produced experimentally by exposing certain substances to the ultra-violet rays. Very important also is the effect of sunlight upon cows. If these animals are kept in dark ill-lit stalls and fed on oil-cake, not only are they more prone to tuberculosis, but their milk is markedly depreciated in vitamin content—in contrast with the rich vitamin content of the milk of cows fed on open pastures.

Can anyone doubt, then, that in the ultra-violet rays we have a tremendous influence for

human good? I think not, but the real problem that faces us is how are we to make the best of this influence in the interests of health and longevity. In the summer months we can use the sun as our source of the vital rays; in other words, we can sun-bathe as often as possible. But in winter, when the skies are darkened by dull clouds which form an impenetrable curtain to the ultra-violet rays, we must have recourse to some artificial source.

Fortunately, electricity comes to our aid. It has been found possible to generate ultra-violet rays by striking an arc between electrodes of carbon, or tungsten, or of columns of mercury enclosed in a tube of quartz, and lamps have been devised which enable the output of the rays to be conveniently controlled. It is by means of these lamps that the physiological effects of the ultra-violet rays have been determined in a precise manner.

Used with discretion, excellent results have been obtained with ultra-violet rays in the treatment of disease. Naturally, they have proved of great value in certain skin diseases, notably tuberculosis infections (lupus), chronic ulcerations, patchy baldness, boils, acne and impetigo. They are specific in the treatment of rickets and malnutrition in infants, and they are highly beneficial in anæmia, run-down

conditions, rheumatic affections, respiratory disorders, including asthma, and in tuberculosis of glands, bones and joints. Let me add a word of caution, however. Although the ultra-violet rays have a definitely curative action in so many diverse conditions of ill-health, they must not be regarded as a panacea. The excessive therapeutic claims which have been made for them from time to time by unscientific persons serve only to bring a tried and efficient remedy into disrepute.

Clearly, we now have at our disposal an agency which not only cures disease but prevents it; and any agency which accomplishes this if utilised to its full extent inevitably will increase the expectation of life. We must therefore invoke the aid of sunlight in the home, the school, the factory and the workshop.

We must teach our children from their earliest days to appreciate, to love, and to use the sun. This is not a simple matter in our big cities, where the sunlight is so often obscured by a veil of smoke; but in the summer months at least the children should be encouraged to live outdoors as much as possible, and sun-baths should become part of their daily routine. Care must be exercised in exposing young children to sunlight to prevent an excessive dose. It is well always to avoid the

midday sun and only to give ten or fifteen minutes exposure before ten o'clock in the morning. Protection for the eyes, head and upper part of the spine is also important. During the winter much good can be obtained by the judicious use of ultra-violet rays from one of the many varieties of home lamp—but I emphasise that such lamps should *never* be used for the home treatment of disease. That is the doctor's function.

It would also be a great advantage to our children's health and incidentally to the health of future generations, if open-air schools were provided for *all* children and not only for the ailing and backward. Under the natural conditions of such schools not only do the children flourish in mind and body, but the epidemics taken for granted in ordinary schools are unknown.

Sunlight must also play its part in industry. A great many of the so-called industrial diseases, notably rheumatism, tuberculosis and anæmia, would be greatly diminished in their incidence if ultra-violet rays were made available for the workers. Undoubtedly, this measure, if extensively applied to industrial organisations where the workers are compelled to labour indoors, would beneficially influence both the output and the emotional lives of the

workers to the economic advantage of industry.

In England, a start has been made in this direction by the installation of an artificial sunlight clinic at the pit-head of a certain colliery. The miners have displayed a great interest and enthusiasm, and the results were remarkable. Absenteeism was diminished, and there was a great improvement in the physique and general health of the miners. The cost of installing a sunlight clinic is comparatively small and, apart from humanitarian reasons, would be a sound investment for employers of labour.

It is imperative that all of us—men, women and children—should get our full quota of ultra-violet rays if we want to live long and useful lives. If we cannot get them from natural sunlight, then we must get them from an artificial source. Sun-worship once prevalent in the early days of mankind is reviving once more—to the great benefit of health, physical, mental, and spiritual. Sunlight is the best tonic, the best stimulant, the best disinfectant; indeed, it is the greatest of all physicians. Let us see to it that the sun ministers to all the needs of our health as does a good physician.

To urge the rational survival of sun-worship is to be reminded that since man first delved

into the mysteries of philosophy and science, he has sought with patience and hope to discover the secret of eternal youth. Clearly man has been for ever discontented with his allotted span, a discontent as prevalent to-day as it was in the dark ages. "Back to Methuselah" echoes a sentiment experienced by mankind throughout the civilised world. The amenities of modern life drive home to us how brief are our lives. Speed is the order of the day, and yet how few of us feel that we shall ever accomplish our life's work.

We want to live longer, but those extra years we crave must be years of health and vigour. It would surely be no boon to prolong our existence into valetudinarian misery. In other words, we must first *defer* old age, and secondly we must ensure that old age when it comes will be relatively healthy and happy. It will be said, and rightly so, that already the expectation of life in civilised countries has increased remarkably in the last half century. This is a result of the creation of an environment of health, the control of certain epidemic scourges, and the more successful treatment of disease generally. But it cannot be said that the actual span of life has been materially lengthened to any extent.

The Biblical "three score years and ten" is

still regarded as the average limit of human longevity, and those few who survive to be centenarians are considered in the light of curiosities of nature. Must we accept that the span of human life is fixed and that all efforts to increase it are futile and doomed to failure beforehand? This is a point on which biologists are by no means certain but there is a growing opinion that the human life cycle is *not* fixed and immutable, but that it is to a very large extent modifiable according to the circumstances under which we exist.

Be that as it may, we are not here concerned with theoretic speculations on the ways and means of increasing the actual span of life, but we are concerned with the prolongation of the longevity of the average man and woman. And here again I would insist that it is not merely a question of adding a few years to life—it is essential that such years shall be equivalent to the years of vigorous maturity.

Let us first consider the causes of the failure of so many people to reach the allotted span, while still preserving a reasonable vitality of mind and body. Of course specific acute and chronic diseases such as pneumonia or diabetes carry off a great many before their time, but there are certain subtle and hidden processes which lead to degeneration and decay of the

human tissues, and which to a very large extent are preventable. It is often said that most people dig their graves with their teeth, and in this aphorism there is much sound and practical truth. The food we eat, and the manner in which we eat it, determines the health of our digestive organs, and there can be no health of the body generally if these organs are at fault.

I need not dwell again upon the evil effects of malnutrition. These are particularly obvious in childhood, as shown by the stunting of growth and development, but in adults the results are less obvious, being revealed in an inability of the tissues to resist disease. There is also the factor of self-poisoning. A civilised dietary, as most people should now know, is peculiarly lacking in those elements which prevent intestinal stagnation, or more simply constipation. When this state is established the intestinal canal becomes a source of real danger to health and life. It constitutes a poison factory from which poisons are disseminated throughout the whole body, lowering the vitality of all the body cells and leading to their ultimate death.

Now, there are certain glands in the body, namely the thyroid and the adrenals, among the functions of which is that of helping to

destroy the poisons absorbed from the intestinal tract. These glands belong to the groups which are called endocrine or internal secretory (about which I shall have something to say shortly), and altogether they control human destiny in a most remarkable fashion. At the moment, however, I wish to point out that a relative failure of the thyroid and adrenal glands is instrumental in hastening body decay and senility. It occurs in this way. These glands, while able to destroy moderate amounts of intestinal poison, are themselves susceptible to these poisons, and it is obvious that a time must come when they are unable adequately to carry out their anti-poison campaign, with the result that the widespread systemic effects of the intestinal poisons proceed unhindered. It should also be noted that emotional factors are significant in this connexion. Strong emotions, and particularly prolonged fear, worry and anxiety, over-stimulate the adrenal gland and lead to an early functional incapacity and a consequent early appearance of senility.

I now come to a most interesting factor which bears significantly on the problem of longer life and the possibility of rejuvenation. It has long been known that the sexual gland in both men and women has an important influence on health generally, but particularly

in relation to senility. The sex gland has an endocrine function (as well as that of producing germ cells) and, at this point, I should explain that there is a chain of endocrine glands throughout the body, tiny glands the secretions of which determine to a large extent our mental and physical configuration. Deficiency or excess of their secretions may decide whether we shall be dwarfs or giants, stout or lean, imbeciles or wise men, faint-hearted or bold and aggressive. This is a fascinating subject, but I can deal here only with the sex endocrine glands.

In the first instance, these glands control mainly our sexual development, and generally control our physical and mental vigour. Their absence or deficiency in early life results in an emasculated individual, impotent and of poor physique. In old age there is a natural tendency for these glands to diminish in their functional activity, in fact many of the morbid processes of senility are directly attributable to a lack of the sex endocrine secretion. It was this well-established fact which led a French physiologist, Brown-Séquard, towards the end of the nineteenth century, to endeavour to ward off and to cure senility by injections of extracts of the sex glands of healthy animals. His results were unsatisfactory, but we now know that this was

due to the extreme difficulty of administering a sex gland extract in such a way that it can be utilised by the body cells. The Brown-Séquard experiments were largely discredited at the time, and hopes that a veritable elixir of life had been discovered were sadly disappointed.

However, other investigators continued this line of attack on the conquest of old age, and there accumulated a considerable amount of scientific evidence to suggest that a failure of the endocrine glands, and particularly the sex gland, was the central feature in the causation of premature senility. Attempts were made to replace the worn-out sex glands in senile subjects by grafting the sex gland of a vigorous healthy animal. The name most commonly associated with these experiments is that of Serge Voronoff. He transplanted the sex gland of apes into human beings and his results were most remarkable.

Voronoff elaborated a complicated technique of operation, and he has had the opportunity of testing his results over a considerable number of years. He found that until three months after the graft had "taken," little change was to be observed in the senile person, but then noticeable alterations took place. Memory power improved, there was greater aptitude

for intellectual effort, while the tone of general well-being was enhanced. Even more remarkable were the physical changes. The skin became firmer, more elastic and of better colour. Wrinkles disappeared. The hair grew more freely and became more glossy and colourful. The eyes were brighter and the general attitude became more youthful and vigorous. Muscle tone increased and movements were more supple and sure. Digestion was improved and blood pressure was lowered.

Such effects of grafting seem hardly short of the miraculous, yet they have been substantiated by unbiassed observers. In a recent publication of Dr. Voronoff are some interesting illustrations showing the effects before and after grafting in a senile man, and these photographs certainly bear testimony to the success of the rejuvenation operations. The question immediately prompted is—how permanent are the rejuvenation effects? In this matter Dr. Voronoff's claims are fairly moderate. A general survey of his results indicates that the favourable phenomena described above appearing a few months after operation, persist from three to five years. After this time, the graft tends to die, being replaced by connective tissue, and its effects

pass off. Repetition of the grafting operation may then be carried out in suitable cases.

Another experimenter, Steinach, has carried out similar transplantation operations in animals with similar results. Animals previously feeble, decrepit and unfit for breeding purposes gained in physical vigour and appearance and became sexually potent. Steinach has also elaborated another rejuvenation operation applicable to human beings. He ties the duct which leads from the sex gland with the object of stimulating the endocrine sex function at the expense of the procreative. This is a comparatively simple operation and Steinach has achieved a considerable success in producing rejuvenation.

These attempts at the conquest of old age are admittedly fascinating, but what about their practical value? Are we to rest contented in the belief that a rejuvenation operation will solve all the problems of our old age? Is senility really conquered? I will admit that these discoveries are scientifically important, but I do not believe that we should place our confidence in gland rejuvenation as a means to a long and healthy life. In some cases, it may be that a gland operation is both necessary and advisable, in a case of hereditary gland failure for example, but the average individual

must learn to prolong his life in another way. Besides, to mention but one difficulty, is there not a danger in rejuvenating a person whose arteries are permanently hardened? Gland rejuvenation is a short cut to longevity, and we should always be on our guard against short cuts in the matter of health.

The best insurance for a long life is to live healthily. This may seem self-evident but it is a fundamental truth almost universally ignored. Mankind even to-day prefers to put its faith in potions and elixirs, and hopes that science will relieve it of its responsibility to observe the primary laws of health. Most decidedly, that is not the function of science. It is the purpose of science to reveal to us the *best* way to shoulder our responsibilities not how to shelve them.

We must learn how to *defer* old age and so to increase our years of usefulness. Surely, that is a higher ideal than to endeavour to *defeat* old age once it has arrived. At the commencement of this chapter I briefly mentioned the effect played by diet and the efficiency of the intestinal function upon the development of premature old age. Therein is the key to an increased longevity with a stable and lasting foundation. Simplicity of diet and intestinal cleanliness are the two primary essentials for

a healthy life and long life. To find centenarians to-day we must seek amongst primitive peoples uncontaminated by the habits of civilisation. If *we* would be healthy centenarians we should not put our faith in gland rejuvenation but rather in Nature's foods and Nature's laws of health.



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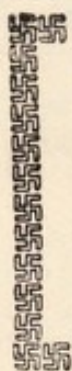
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