Some problems of longevity / by Frederick L. Hoffman.

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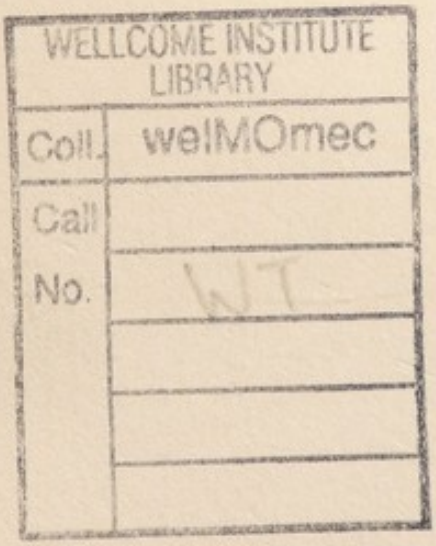

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INTRODUCTION

THE duration of human life in the individual is always problematical. The chances of death, while calculable with precision for every year of life, are calculable only for large numbers of persons. The individual at best can only forecast his future longevity with reasonable certainty upon the basis of a thorough knowledge of his organism and its functioning. Tables showing the expectation of life applicable to life insurance purposes with admirable usefulness, are not applicable to the individual otherwise than as a rough estimation of the approximate lifetime likely to be lived, one with another, by a group of people of the same age. Thus the complete expectation of life at the present time of a white male person at birth is given as 55.33 years by the United States Census Office. It is given as high as 59.82 years for the State of Kansas and as low as 52.82 years for the State of New York, but it would be absurd to conclude from that difference that a child born in Kansas at the present time, other things being equal, is likely to live seven years longer than a child born in the State of New York. Life tables, in other words, merely show what has happened and they provide only a broad basis of conjecture for a variety of purposes as to what may happen. The best evidence of this is to be found in the fact that no two life tables have ever produced precisely the same results. But comparing or contrasting life tables over many years, there is shown to have taken place a progressive improvement in the expectation of life, certainly during the last century,

so that it is safe to assume that a child born at the present time has practically fifteen to twenty years longer to live on the average of one with another than a child born fifty years ago.

This improvement in longevity has not been a matter of pure chance but represents the deliberate, intelligent purpose of an enlightened civilization. In other words, it is now clearly realized that the prolongation of life by deliberate means is feasible, though, of course, obviously within fairly definite limitations. The proverbial "three score and ten" is no longer looked upon as a maximum, but the century mark is within reach of a considerable portion of people whose lives conform to a rational understanding of the principles of public and personal hygiene.

Immense progress has been made in public health education and most of the essential principles of longevity are now fairly well within the understanding of the vast majority of the people. But the understanding is still quite vague upon many essential matters and the supreme importance of strict conformity to certain rules and principles of right living are still far from being fully appreciated. It is as yet not clearly realized that the seeds of premature old age are laid during the early years of adult life, when certain habits are formed which are later gotten rid of with great difficulty. This applies particularly to errors of diet and to habits of smoking and drinking, though last not least, to habits of non-exercise of certain bodily functions, which are permitted to degenerate as the result of laziness or indolence. Modern life, unfortunately, makes far too few demands upon the human body for physical exertion. We are not in need of sporting activities half as much as we are in need of rational physical activities practised each and every day, though not necessarily with military regularity. Walking, among others, is perhaps one of the most beneficial of physical exercises which is falling largely into disuse. A certain amount of running in middle life is also advisable, though rarely practised. Swimming

is exceedingly useful, though not always possible. To offset such natural activities by sporting activities, like golf and tennis, falls far short of the desired objective. In sporting activities or athletics, there is also always the danger of overexertion, which sometimes leads to serious consequences, even death.

Much is made of those who live beyond the century mark, but their numbers are few. Much more important is the considerable number of those who reach seventy-five years and over and which during 1923, for illustration, reached 189,287. But the facts of death and extreme old age are of such extraordinary interest that it may be pointed out that during 1923 the number who reached 90–94 years of age was 1,236, the number reaching 95–99 years of age was 306, and the number reaching 100 years and over was 96. That may at first seem a small number in so large a population as ours, but it must be considered that our age returns are on the whole more trustworthy than those for Southeastern Europe, from which have come some of the most astonishing returns for centenarians and supercentenarians.

If much further progress is to be made in attaining extreme old age, there is required a much broader interest in the diseases of old age, which heretofore have received but very superficial consideration. Sir Humphrey Rolleston, President of the Royal College of Physicians of London, a few years ago contributed a most interesting lecture on "Some Medical Aspects of Old Age," which is one of the best text books on the whole subject, reflecting the vast learning of the author and the wide experience of a great physician.

Of late many speculations have been indulged in as regards the ultimate attainment of extreme old age on the part of an ever-increasing number of persons. There is much evidence to justify the belief that this objective is reasonably within reach. But all statistical calculations must necessarily be a mere matter of conjecture. The prevailing death rate in most civilized coun-

tries is now between ten and fifteen per thousand, an incredibly low figure when compared with conditions of only thirty years ago. Everywhere the population is aging, or in other words, the average age of the population is rising. This necessarily brings to the forefront the increasing importance of diseases of middle life, to which more qualified attention is now being given than in the past.

Too much emphasis cannot be placed upon the great practical importance of periodic medical examinations, which, if made by one qualified to do so, frequently reveal the earliest impairments which, if safeguarded against, can be cured without great difficulty. The inherent menace of modern life is the increasing amount of leisure time which, as a rule, is misapplied rather than utilized for proper recreational and health-restoring purposes. While statistics are wanting to substantiate this conclusion, there are reasons for believing that the increase in the average weight on the part of many persons past middle life is a serious menace to their future health and longevity. This is largely the result of overnutrition and a lack of physical exertion. Nothing is more important than to keep the bodily machine in the best possible physical condition through wholesome recreational and physical exercise rather than through athletics or sports and pastimes which involve the risk of overstrain. Even more important is the need of moderation in eating. Past fifty years of age, two good meals a day are sufficient for bodily needs. The increase in weight observed with increasing age is one of the underlying causes of premature decline. There are no inherent physical reasons why body weight should increase after thirty and certainly not after forty.

Another aspect of increasing age is the question of suitable employment. It is now generally admitted that to discontinue an occupation which has been followed for many years and to retire into inactivity after sixty is dangerous. Modern over-

specialization in vocational directions frequently makes readjustment to other pursuits a matter of great difficulty.

To be thoroughly healthy and happy, one must be usefully occupied at some pursuit suitable to one's temperamental and bodily needs. Idleness in old age readily leads to weariness and the conclusion that life no longer serves a useful purpose, which it does not. As yet, little progress has been made in the direction of ascertaining occupations most suitable for persons far advanced in life. But the question is one of very great importance, which, no doubt, will receive more qualified consideration in the future.

Another phase concerns the mental and spiritual life of the aged, who often suffer from disastrous reactions producing despondency and weariness of life. Suicide in old age is by no means as rare as is often assumed to be the case. Yet suicide, at any time of life is evidence of maladjustment to life's urgent needs in the direction of usefulness and social service. No life can be useless if thoroughly subjected to a critical consideration as to its proper adaptability to a wide range of human possibilities. Hence the importance of developing early in life a sound philosophy of right living and right thinking. The best possession in old age is a happy memory of a useful existence, particularly in the direction of service rendered to others. Old age is obviously the period of life at which good counsel can safely be given to the new generation to avoid pitfalls and disaster, but counsel must be given with restraint in the light of ever-changing human conditions. Too many old persons are bitter and resentful in their isolation. It is, therefore, of the utmost importance to keep alive a broad sense of sympathy towards the new generation which has a right to solve its own problems in its own way and at its own cost. But nothing yields a greater measure of happiness than the satisfaction that our own experience in life has been useful in saving the young from making

disastrous experiments in directions foredoomed to failure. A life which has for many years been useful to others can never be otherwise than a happy life in old age and only such lives are really worth the effort to measurably prolong the human existence beyond the scriptural three score and ten.

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CHAPTER I

WHAT IS LONGEVITY?

WE are often told and with increasing emphasis that we are living much longer now than at any time in the past. Careful calculations seem to prove that collectively the average duration of life is about fifteen years more than fifty years ago. At that time the average death rate was not less than 25 per 1,000, while at the present time it is about 12 per 1,000. But what is the significance of all this to the individual? For what is collectively true represents an average which includes all possible durations from a few moments after birth to ten or fifteen years beyond the century mark. The individual has little concern with averages unless he joins a life insurance company and pools his financial interests with a sufficient number of others to obtain by this means the assurance of a sum certain in the event of death or on the attainment of a given age. Individually, we are as much perplexed as ever as to how long our own lives may last.

It is true that our life is largely affected by external conditions over which we have little control. There are always three essential phases of longevity which should be thoroughly understood. The first is public hygiene which aims at the control, or the prevention of infectious or transmissible diseases through public

agencies. These everywhere in civilized countries are being more and more perfected so that many diseases are now much less common than formerly. Such diseases as typhoid fever or the spread of smallpox, yellow fever, or malaria, diphtheria, scarlet fever and measles, are more or less preventable and dependent for their control upon a thoroughly efficient public health organization.

The second phase concerns industrial hygiene or the conditions which adversely affect the health of the worker. These depend largely upon the efficiency of labor departments which aim at the regulation of conditions in industry and upon employers giving thought and attention to such conditions, but also upon labor organizations insisting upon observances of health laws and regulations which have the sanction of experience.

The third and most important of all is personal hygiene, which in its ideal sense makes every one his own health officer and medical adviser. Personal hygiene aims at the improvement and proper maintenance of the human body conceived as a delicate machine in constant need of careful supervision. It concerns the organic functions of the body, such as the heart, the kidneys and the lungs, which need careful watching often amplified by a thorough medical examination. It includes attention to the teeth, the eyes, the ears and other organs of a delicate nature easily injured by wrongful habits. It implies in other words an individual understanding of the basic nature and the workings of one's own body which differs always in some essentials from every other body in directions in which serious harm may follow indifference and neglect.

Within recent years, personal hygiene has made prodigious progress and the public is now much more familiar with matters of anatomy and physiology than formerly. Attention is everywhere being given to personal habits and every possible injury to the human machine. The earliest symptoms of derangements

or impairments are, to an increasing extent, being recognized and attended to. To the extent that this is being done, the duration of life is largely within the keeping and the control of the individual.

Time was when fifty and sixty years were looked upon as old age. But today these mark only the beginning of a new period of years full of vigor and capacity for sustained physical and mental effort, for with improved health goes improved physical power. We are realizing more clearly every day that physical energy is the basis of physical good health. Unfortunately certain conditions of modern life make against these. The universal use of the motor car deprives many of the habit of walking which is one of the most important aids to a good physical condition. Sedentary habits also preclude the full use of every part and portion of the body, leading often to early degenerative diseases which can only be disclosed by a frequent or periodic examination. But as has been said before, people, to an increased extent, realize that each and every one, in the matter of health, is largely his own keeper in that the responsibility for much of the ill health which prevails rests essentially upon the individual and much more so than upon the community or even the industry or vocation in which the person may be employed. Hence the broad conclusion that the attainment of longevity or of life beyond the proverbial "three score and ten" is attainable on the part of a large proportion of the people if they will give their bodily needs the same amount of needed attention as they would give to a mechanical machine, such as the engine of a motor car or the proper working of a radio.

Chapter II

PROBLEMS OF HUMAN INCREASE

SCEPTICS everywhere are viewing with apprehension the rapid increase of mankind, which now collectively the world over numbers probably not far from two billions. But the earth has vast spaces which are as yet but scarcely touched for human purposes, while constantly new methods and means are being discovered in aid of the effort to make the conditions of human life more endurable.

Mankind increases naturally by the excess of births over deaths. In olden days, the birth rate was extremely high, possibly as much as 50 per 1,000, offset by an equally high death rate leaving but a small margin of increase, if not showing an actual decline. Primitive man is generally healthy and relatively free from most of the ailments common to civilization, but the conditions of life are extremely hard. Food is often scant and ill adapted to man's needs, while conditions of shelter and clothing are generally precarious. Infant life is wasted among savages and semi-civilized people to an enormous extent. Old age is badly cared for and it is seldom that people live above fifty or sixty years. In civilized countries, the birth rate is much lower while the death rate has been diminishing to such an extent that the excess in births over deaths is possibly larger now than it has ever been at any time in the past. In the United States, the birth rate today is about 25 per 1,000, while the death rate is about 13. It may be said that normally, civilized man has

now a natural rate of increase of about 10 per 1,000. But there are wide variations for different countries and some very notable exceptions well deserving of thoughtful consideration.

There is the case of Japan which on 260,000 square miles supports 60,000,000 people, who have a birth rate of 34 and a death rate of 22, giving a rate of natural increase of 12 per 1,000 per annum. Contrast this with Australia which has three million square miles and about five and a half million population. While the birth rate is 24, the death rate is only 9.9. Is it any wonder that Japan objects to the Asiatic exclusion laws of Australia, which, however, rest upon sound conceptions of white supremacy. There is India with not quite two million square miles of area and 318,000,000 people. While the birth rate is high, the death rate is also, one almost balancing the other, especially during years of pestilence and famine. There is Canada with its three million square miles and only nine million population, while little Barbadoes with only 166 square miles supports 166,000 people. Chile which has abundant room for a large population has one of the highest death rates in the world. England is considerably overpopulated considering the means of subsistence, while vast imperial regions cry out for immigration which is not forthcoming.

There are those who believe that the food supply available for mankind's needs is limited. Theoretically this is true, but practically nothing is more fallacious, considering the inventive ingenuity of mankind and the enormous possibilities of more economic methods of living. In this country, we waste enough food to support millions of people in comfort. The tropical regions as a source of food supply have only been touched on the fringe. Hence it is absurd to worry about the future, which in any event is so remote as regards a serious pressure upon the means of existence that no one need waste time upon a problem often presented with a great deal of learning and an abundance of

statistics, but to no practical purpose. It is equally futile to speculate as to what the probable population of the earth may be fifty, one hundred or two hundred years hence. Unquestionably the birth rate will continue to fall, while likewise the death rate will be further diminished, and for regions already overpopulated like India, this will result in serious social and economic problems. But as far as this country is concerned, for some generations at least, these matters are not of serious concern. We shall continue to increase in numbers and countless millions of acres which are as yet untilled or poorly tilled will be brought under efficient cultivation, while our foreign trade will continue to grow as the result of the further expansion of our manufacturing capacity.

Chapter III

THE MARITAL DEATH RATE

THE marriage industry of the United States is not as flourishing at present as it used to be, nor for that matter in as healthy a condition as in years past. Young people marry later in life, but in many cases perhaps to better advantage. But in many other cases the outcome is a sad failure. When marriages are dissolved for good reasons or bad, society is shocked, though often the separated parties are better off than before. Divorces are on the increase and at a greater rate than new marriages are contracted. Hence the marital death rate is in the forefront of our social problems, for which the wisest can offer no adequate solution. The facts of the present situation in the light of the past are briefly revealed to us by the official returns.

In 1925 the number of marriages per 1,000 of population for the United States was 10.2 against 11.0 in 1923, but the actual number of marriages in 1925 was 1,181,838, quite a substantial evidence that on the part of about two and a half million persons, the marriage risk was readily assumed. But nevertheless it is a significant fact that in proportion to the population, fewer marriages should now be contracted than in former years regardless of a superabundant prosperity widely diffused throughout the country.

Still more significant is our increasing divorce rate. In 1870, the rate per 1,000 of population was 0.28. This by 1900 had increased to 0.73, by 1916 to 1.13, and by 1925 to 1.52. Here

then is positive evidence of a decided trend towards the disintegration of the home. In actual numbers in 1926, there were 175,495 divorces, equivalent to over 350,000 persons separated for good or for ill as the case may be.

Thus the marital death rate is increasing while the human death rate is diminishing. No effective means have yet been discovered by which new marriages can be placed on a more lasting basis. The evidence is quite to the contrary that in many cases marriages are more hastily contracted, while marriages at unequal ages are apparently increasing. It should be self-evident to any one that a man at seventy has no moral right to contract marriage with a young woman of eighteen. Likewise a boy of twenty should not be permitted to marry a woman of sixty. Yet such marriages occur and they are by no means uncommon. Unfortunately no complete analysis of our marriage statistics with regard to the differential ages of bride and groom are published by the Census Office.

Likewise there are serious objections against the marriages of the very young. In New York State, exclusive of New York City in 1919, there were three girls married who were only thirteen years of age, twenty-three who were only fourteen years, and one hundred thirty-one who were only fifteen years, all mere children, physically, as well as otherwise, unfit to enter into marital relations. But much more serious are interracial marriages, or of persons of unlike races, particularly whites and negroes. The last has not yet been heard of a recent scandal of this sort which found its way into the courts. All investigations have shown that such marriages almost invariably prove disastrous. In New York State during 1916–18, there were fourteen marriages of white women to negro men. It is very curious, however, that marriages between white women and Indians, to the contrary, generally prove satisfactory and we have a large population in the West and Southwest which is rather

proud of its Indian origin. As far as it is possible to judge, the Indian approaches more closely to the white type than the negro. The same is true, to a certain extent, of Orientals. In the Hawaiian Islands, the offspring of Caucasian-Oriental origin is generally of a superior type, but in such cases the intermarriage is generally between the higher rather than the lower types. In Mexico, a vast intermingling of Indians and Spaniards has produced a mixed blood race which under given conditions is a decided improvement. At the same time interracial marriages involve a grave hazard which should only be assumed by those who are thoroughly well aware of what they are about.

The mistake is often made of quoting current marriage and divorce statistics as proving that one marriage in ten or nine or eight is a failure. Divorces are not derived chiefly from current marriages but from the total number of existing marriages. In 1870, 0.80 per 1,000 of the married population of the United States was divorced. In 1924 this proportion was 3.73. Thus, in other words, marriages are now a failure in not quite five times the proportion as about fifty years ago. In actual numbers, there were in 1920, 21,849,000 married men against 235,000 divorced men. There were also 21,318,000 married women against 273,000 divorced women. In other words, while in 1920 divorced men formed 0.5% of all men fifteen years of age and over, the proportion of divorced women was 0.8%. These figures clearly indicate that the vast body of our married population is still in a thoroughly wholesome and sound social condition. Divorces represent the fringe of the matrimonial industry and while the evil is a serious one and increasing, it is still far from striking at the root of a home-loving people.

Of interest in this connection are the marriage rates of different countries. The highest rate reported for any country is for European Russia or 12.8 per 1,000. It is followed by Belgium with a rate of 10.5, by the United States (1922) with a rate

of 10.3 and Rumania 10.1. Countries with extremely low marriage rates are Ceylon with a rate of 5.4, Uruguay 5.3 and Jamaica with a rate of only 3.8. In Jamaica where the population is almost entirely black, the marriage ceremony is, generally speaking, dispensed with and about 75% of the births are illegitimate.

An interesting exception to the divorce situation is South Carolina, where no divorces are granted for any cause. South Carolina manages very well and the marriage rate is increasing. In 1925 the South Carolina marriage rate was 12.7 against an average for the country at large of 10.2. The rate was higher, however, in the State of Maryland, or 16.3. The divorce rate was highest in Nevada or 13.98 against an average for the country at large of 1.52. It was lowest, excepting South Carolina, in the District of Columbia or 0.31. In New York State the rate was also exceedingly low or only 0.41, which must be partly attributed to the large Jewish population which constitutes about one-third of the total population of New York City, and among whom divorces are relatively rare. Divorce rates are high on the Pacific coast, having been 3.47 for Oregon, 2.78 for California and 2.65 for Washington.

The foregoing statistics give important food for serious reflection. The outstanding scandal of the situation is the laxity of the divorce laws in Nevada. There are those who are anxious for a United States law on the subject, which would make the practice of granting divorces uniform, but such a move would be extremely ill advised. The marriage institution, like all others of human origin, is in process of evolution. It is well and wise to give it wide latitude, for no one has the wisdom to work out a uniform plan that will meet the immensely widely varying conditions throughout the whole country.

There is at least one other phase of supreme importance and that is the causes for which divorces have been granted. In

1925, of all divorces granted to husbands throughout the country, 45.8 were on account of desertion, 27.3 on account of cruelty and 16.0 on account of adultery, and in only 0.3 was drunkenness the cause. Of all divorces granted to wives, 42.4 were on account of cruelty, 25.7 on account of desertion and 7.1 on the grounds of adultery. In 1.9% of the divorces the cause was drunkenness. But in divorces, as in suicides and murders, the underlying causes are extremely difficult to be ascertained correctly.

Chapter IV

FECUNDITY AND BIRTH CONTROL

WHITHER are we drifting in our national fecundity? The national birth rate has been steadily falling during the last fifty years and now (1926) stands at 20.1 per 1,000 of population. Even as late as 1915, it was 25. The phenomenon of a falling birth rate as observed in this country is, however, almost universal throughout the civilized world. The highest birth rate is probably that of European Russia or 42.5 per 1,000. The Mexican birth rate is probably about the same. Bulgaria comes next with a rate of 40.7, followed by Chile with a rate of 39.4. In North America, the highest birth rate prevails among the French Canadians, which for 1925 is given as 31 per 1,000, which stands in marked contrast to a rate of only 18 for British Columbia and of 22 for Ontario. In certain sections of French Canada, however, the rate is very much higher. In 1925, the town of Chicoutimi, reported a birth rate of 65 per 1,000! But even in French Canada, the average rate is now much less than formerly. The lowest European birth rates are for England, 19,* and for Sweden 18. The German birth rate, of which we hear so much from time to time, is about 21. The French death rate almost equals the birth rate so that the population is practically stationary.

The birth rate of our cities is about the same as that of the rural districts, which, however, is slightly higher. While the

* In 1926 the rate was only 17.8.

birth rate (1923) of the white population was 22, that of the colored population was 26, but the negroes have a much higher death rate than the whites, so that the natural increase in population is less. For certain sections of this country the rates are considerably above the average. Thus Kentucky has a white birth rate of 27.4, Mississippi has a white birth rate of 24.5. These, however, are outmatched by North Carolina, which has a white birth rate of 30.7, while for South Carolina the rate is 26.4 and for Virginia 26.2. Generally, however, the birth rates for the different sections of the country do not vary as much as would be expected. For California (1926) the rate was 19.1, and for Massachusetts (1923) 22, for New York (1926) it was 19.7 and for Wisconsin 22. Since our death rate is about 12 per 1,000, this gives a net rate of annual increase of about 10 per 1,000, which is fairly normal, but a significant fact nearly everywhere is that the birth rate is falling and that the number of families with no children or only one child is increasing.

Moralists, physicians and social reformers are much concerned about the situation. No one longer questions that the observed decline in the birth rate of civilized countries is the result of voluntary restriction or birth control. An influential organization is at work throughout the country spreading contraceptive doctrines which are reaching every section of the population with the results indicated. The plea for voluntary parenthood rests upon both social and economic as well as moral grounds, but the evidence is confusing. While no one can object to restricted fecundity on the part of those who are obviously unfit for social purposes, such as delinquents and defectives, mentally or physically, as the case may be, the argument applicable to this element has been carried in directions where it is doing positive harm. In other words, birth control rests essentially upon the selfish motives of the interested parties. They do not want children, because they are a hindrance to the individual. Children are

costly to bring up, difficult to maintain and often a disappointment. But children are essential to the state and it would not be going too far to argue in favor of a national subsidy to every mother giving birth to more than two children. Maternity is as much an industry as factory work, but the results essentially benefit the nation, which depends upon it for the maintenance and increase of its population, its prosperity and power.

Birth control involves serious moral and physical consequences, which are but vaguely understood by those concerned. Physicians are almost unanimous in their opinion that birth control often injures at least the woman and sometimes the man. It is, broadly speaking, contrary to nature and brings disaster to many a home which might otherwise have been happy and prosperous. The only child is an anomaly in the social organization. It lives a lonely life and is generally over-indulged with the result that it is a product often unsuitable for social purposes. A large family is always an asset in course of time. Investigations have shown that inmates of alms houses are generally those who have no family ties. But the ethics of birth control strike at the root of our civilization. They are destroying the altruistic motives of the individual and the family. They are an aid in the development of a selfish and inconsiderate type of people, who in later years represent a discouraging social maladjustment.

On the other hand, there are strong reasons for supporting birth control on the part of the obviously defective or delinquent types of people. It requires no argument to support the theory that the insane or mentally deficient should not produce offspring, but proposals for wholesale sterilization are dangerous. Yet if we are to preserve our inherited traits and tendencies, we must conserve the stock which produces these, and who by common consent are the better element, because of the inheritance of good character and exceptional mental capacity. No favorable environment can produce these traits in those who do not possess

them by inheritance. An abundance of investigations has shown that heredity plays a tremendous part in the development of the best type, as viewed morally, intellectually and economically. Yet it is our so-called "best people" or those in easy circumstances, well educated and well placed who are everywhere showing evidence of birth control practices, which must be considered contrary to public policy and the best interests of the individual and the families concerned.

Birth control leaves a trail of physical evils which are manifest in the vast amount of gynecological practice. There are even reasons for believing that birth control is partly responsible for the increase in cancer of the female generative organs. The number of stillbirths in this country is about 4% of live births. Many of these stillbirths are the direct results of criminal practices. They represent a considerable waste of human life that, being once in existence, has a right to be brought to maturity. There is evidence that the proportion of stillbirths is increasing. Stillbirths are proportionately more common after a second or third child has been born. It seems to admit of no question of doubt that in many cases, birth control practices are responsible for this lamentable situation.

The question is often raised as to whether it is not better to have fewer children and bring more to maturity. But as a matter of fact, there is nothing in this argument. In this country in 1923, the average native born white woman had borne three children and raised 2.8 to maturity. The average foreign born woman had borne four children and raised 3.4 to maturity. It requires no extensive calculations to prove that the offspring of the foreign born element will in the long run vastly outnumber the offspring of native stock. Many years ago, the late Professor Walker made the statement that if we had never had any immigration since 1850, but had maintained the then prevailing birth-rate, we would have as large a population as we

have actually at the present time plus the vast immigration from abroad. If he were living today and could consider the facts, he would be decidedly more disconcerted as to the outlook for the future.

Chapter V

WASTED CHILDREN'S LIVES

NOTHING is more pathetic than the enormous waste of infant life regardless of strenuous efforts to reduce infant mortality. Conversely nothing is more inspiring than the progress which has been made, particularly during recent years, towards a substantial reduction in the infant death rate which is one of the glories of collective action aiming at the conservation of human life. Between 1918 and 1923, our infant death rate had been reduced from 101 per 1,000 to 77, meaning by infants all children under one. For the white population, this reduction has been from a rate of 97 to 73, and for the colored population from 161 to 117. A careful study of the whole question has convinced the medical profession and the social worker that a further and still more substantial reduction is within reach. The question requires to be studied locally, for there are immense differences in the infant death rate in cities and towns, with a due regard to the racial characteristics of the population. Thus, for illustration, the infant death rate of male children born of native mothers in 1923 was as low as 69 and for children of English origin as low as 67, while it was as high as 101 for children born of Polish mothers and 91 for children born of French Canadian mothers.

The infant death rate is always higher for boys than for girls, having been 87 for male children and 69 for female children. This is practically a universal phenomenon wherever trustworthy

data are available. While for male children, our American death rate is 85, it is as high as 247 for the male children of Chile and 218 for Ceylon. Even for Germany, the rate is 147 and for Japan still higher, or 177, while we have in contrast a rate as low as 67 for Australia, while the lowest rate is maintained in New Zealand, where it is about 50. The why and wherefore of these tremendous differences are to be found in the intelligence, in the care, and in the environment of the people concerned. Infants die chiefly of three clearly recognizable causes. There is first, the heavy mortality from premature births, which is reducible by better pre-natal care. There is second, the heavy mortality from diarrhea and enteritis, which is reducible by better methods of infant feeding and a more careful supervision of the milk supply and breast feeding wherever it is possible. There is third, the heavy mortality from bronchitis and bronchopneumonia which is reducible by the better protection of infants against weather agencies. Wherever infant mortality is excessive, it is primarily attributable to the last two of these causes, which are largely preventable and depend upon attained intelligence, a high sense of maternal duty and effective public health agencies.

The geographical variations of infant mortality are of profound interest. It is generally found that a high infant mortality coincides with poverty and low economic efficiency. It is usually very high in textile centers where wages are low. Fall River in 1918 had an infant death rate of 180, which by 1923 had been reduced to 92. Lowell had a rate of 159 reduced to 107, and New Bedford had a still higher rate in 1918 or 193 reduced to 106. Infant mortality rates are also very high in mining centers such as Scranton, where the rate has been reduced from 141 to 98. Negroes, as pointed out, have a much higher infant mortality rate than the whites in the same community. Even here, slow but measurable progress is being made. As a matter

of fact, those who have been much in contact with the negro population are convinced that they are more susceptible to sanitary teachings than the whites, when properly approached and in an economic position to carry their convictions into practice.

Infant mortality is heaviest during the summer months when high temperatures and high humidities coincide. This is as yet but an obscure phase of the question, which is but vaguely realized by the mother, who on hot humid days should take extraordinary precautions. It is likewise excessive during the cold winter months, when necessary precautions against weather agencies or needless exposure are often neglected. Among primitive races where there is practically no intelligent care, children die from weather exposure in large numbers. Since among civilized people, most children are bottle fed, it is of supreme importance to conserve the purity and nutritional qualities of the milk supply against the ever-present risk of contamination. Breast-fed children invariably have a lower death rate than bottle-fed children, but this is primarily because bottle feeding involves the necessity of extraordinary care in the prevention of contamination.

Conservation of infant life is now everywhere one of the many functions of the public and the local health administration. Every state or local board of health provides a wealth of useful and suggestive information, with which every mother ought to be reasonably familiar. The United States Public Health Service has issued countless publications on every phase of the subject amplified by a still more aggressive campaign on the part of the Children's Bureau of the United States Department of Labor. The latter has made extensive surveys of many communities revealing facts of permanent interest. Thus, it is entirely safe to assert that a large proportion of our infant deaths at the present time are wasted lives, due to ignorance, indifference and apathy. The conservation of these lives is not only a community but a

profound individual responsibility which demands that nothing of importance shall be neglected on the part of those responsible for infant care. The new-born child itself is helpless and a sacred trust, demanding the most rigorous attention to even minute details which bear upon life and death. Every infant represents a substantial investment in money, time and suffering. But the higher ethical values are represented by the mother's love for her new-born child, and she has a right to look forward to its happy realization in bringing the child to maturity and usefulness. The hope for the future lies in bringing home to all mothers the conviction that in its last analysis, the responsibility for life and death lies largely within their own keeping.

Chapter VI

THE HEALTH OF PRIMITIVE MAN

IN an old account of America published soon after its discovery, our Indians are referred to as being healthy, lusty and of good physique. Wherever races exist practically out of touch with what we call civilization, they are reasonably free from the diseases or affections which are the bane of our modern life. While our records are naturally defective and our knowledge concerning the diseases of primitive man is but very imperfect, yet we know that under normal conditions of primitive life, the larger portion of it is reasonably free from infections or organic diseases. Primitive man lives nearer to nature, his habits are more natural and he is less influenced by his environment, except in so far as he frequently suffers from undernutrition and nearly always from exposure to weather agencies. The infant mortality among primitive people is nearly everywhere enormous, due to the complete absence of a rational understanding of the principles of infant care. Often the situation is seriously complicated by tribal customs, which bear heavily upon infant life and the care of the expectant mother. Primitive man also is indifferent to the needs of the aged and as a result the longevity of most primitive people is many years less than that of civilized man. If it had not been for these circumstances or conditions, the numerical progress of primitive populations would have been prodigious, for the birth rate is invariably very high, but offset by a very heavy death rate in infancy and old age.

Primitive man wears little clothing and most of the body, as a rule, is exposed continuously to the direct effects of sunlight. It has taken civilized man far too long to realize the beneficial principles of direct sunlight exposure, which in certain diseases is one of the most beneficial and one of the cheapest of remedial agencies. The body of primitive man early in life is inured to hardships and exposure. Only the physically fit have a fair chance to survive. The food habits of most primitive people are very simple and of course conditioned by the environment. Most of the food is of vegetable origin, and while meat is eaten whenever it can be had, it is often scarce, and out of reach. Primitive man suffers little from many of our digestive disturbances, which often are the result of an artificially manipulated and even adulterated food supply. Appendicitis and diabetes are rare and while accurate data are wanting, it is a safe assumption that, broadly speaking, the bodily proportions of primitive people are more normal than those of civilized man.

In sickness the medical treatment is generally a grotesque perversion of magic and superstition. At the same time, primitive man has always had an observing attitude of mind and many of the medicinal drugs, roots, herbs, etc., in use are of genuine value. We have not yet learned to consider these practices dispassionately from a scientific point of view.

Primitive man is much more intelligent than he is often given credit for. His observational and reasoning powers are frequently of a very high order. He is purely concrete in his conclusions and reasons strictly from cause to effect. Nowhere perhaps is this better illustrated than in some of the medicinal practices of the Indians of Peru and Bolivia, who are the descendants of the Incas. Much is also be learned from the medicinal practices of the Indians of our Southwest and old Mexico. Many explorers testify to the value of the Indian medicinal practices in emergencies. In our arrogance, we overlook what is good, be-

cause so much is obviously bad and harmful rather than beneficial.

Primitive man increases but slowly in population. The conditions of life are too hard to permit of the attainment of old age. Such diseases as cancer are very rare, but once that the diseases of civilized places are introduced, an enormous mortality follows. This is particularly true of smallpox, measles and tuberculosis. But it is an open question whether the disease resistance of native races is not generally very low to most of the infectious diseases that are the bane of our civilized life. Primitive man usually stands operations very well but he lacks the will to live. He is under the influence of a superstitious fatalism which makes him an easy victim. Venereal diseases, introduced among native races by the whites with whom they have come in contact, rapidly spread and frequently to immense proportions. Primitive man has no reasons to look with gratitude upon the many alleged benefits of civilization, which are often to his harm and lead to his destruction. The introduction of strong drink among our Indians has probably done more harm in years past than any other evil except the social diseases.

Primitive man is of a much higher moral nature and primitive women are generally far more modest than they are given credit for. They are usually truthful in their relations to the whites and while given to petty pilfering, honest and trustworthy in business relations. But everywhere the world over, strictly primitive races are vanishing fast or by slow degrees. An interesting survival is that of the Maoris of New Zealand, who have fortunately been well protected by the Government for many years. They have an extremely interesting history from which much is to be learned. The Maori as a navigator, as an explorer, and a colonizer plays no mean figure in the early history of Polynesia. The family and social relationships of these people make a fascinating study. But the native knowledge of medicine was prac-

tically a mixture of magic and superstition. Some 50,000 Maoris still survive, which is about 10,000 more than thirty years ago. The death rate in 1924 was only 14 per 1,000, thanks to the extraordinary efforts of the New Zealand Government to conserve this interesting remnant of its aboriginal population. The infant death rate is 131, which does not compare unfavorably with many civilized countries. Old age is reached in a reasonable proportion of the deaths. The Maoris prove what can be done through an intelligent policy of government. In this country, we have entered rather late upon a well-defined policy of the health conservation of our own Indian population. We have never done half enough and should do decidedly more than we are doing to protect what is largely a helpless element against the evils of a civilized environment.

Chapter VII

CIVILIZATION AND THE DEATH RATE

In all civilized countries the death rate has been diminishing during the last fifty years until a point has been reached which in the recent past was considered absolutely unobtainable. Fifty years ago the normal death rate of most countries was between 25 and 30 per 1,000, and it was thought a great achievement when the rate was reduced to 20 or 18 as the result of governmental or private agencies. The ideal sanitary index was looked upon as 18 to 15 per 1,000, while at the present time many countries maintain death rates as low as 12, 10 and even less. For the United States the rate at the present time is between 12 and 13 per 1,000, unless raised by widespread pandemics of influenza or other infectious or transmissible diseases. Most of the latter, however, are now in civilized countries so thoroughly under supervision and control that sporadic outbreaks are limited to small areas and not permitted to spread country wide. New Zealand holds the record for the lowest death rate or only 8 to 9 per 1,000. It is followed in the order of importance by other Australian States, which average 9.5 per 1,000. Next to these rank the Netherlands with a death rate of 9.6, the Union of South Africa with a rate of 9.7, the Dominion of Canada with a rate of 9.8 and the Kingdom of Norway with a rate of 11.1. After these countries come Denmark, Switzerland and the United States with rates below 12 per 1,000. This is the rate for Sweden which is followed by

England and Wales with a rate of 12.2 and Germany with the same rate. The Province of Quebec has a rate of 13 and Belgium and Prussia have about the same. Scotland has a slightly higher rate or 14.4, followed by Finland, Czechoslovakia, Austria, and Northern Ireland, which have rates between 15 and 16. The rate for France is 17, that for Spain and Hungary nearly 20, while Bulgaria and European Russia have rates of about 23 to 25. Finally there is Japan with a rate of 23, and the same rate for Rumania, while Ceylon has a rate of 31, and Chile of 33. For Mexico no very definite data for the whole republic are available, but the death rate may be estimated as 30 per 1,000. Similar death rates occur in most of the Central American Republics.

The outstanding and dramatic sanitary achievement of recent years is the sanitation of the Panama Canal zone. Health conditions at Panama have reached such a satisfactory state that they find no space for consideration in the last annual report of the Governor of the Panama Canal zone, beyond a brief notice of a financial nature. Panama is now looked upon as a health resort, while formerly it was a pest hole with a frightful toll of deaths and suffering. Yellow fever has entirely vanished and while malaria continues, it is of a mild form rarely causing death. It is a model illustration of what can be done when health matters are taken seriously. But even more encouraging and dramatic are the extraordinary results of the health administration of the tropical possessions of the United Fruit Company. That vast organization, through its admirable hospitals and local sanitary officers, now conserves the health of its employees to a remarkable degree. The deaths that occur from tropical diseases are few and far between. The hospitals maintained in different sections of the Central American tropics are an inspiration to similar efforts in other parts of the world. All large corporations engaged in trading operations in the tropics are taking the neces-

sary precautions, as best illustrated perhaps by the widely ramified work of the Standard Oil Co. Health of employees is today looked upon as an invaluable asset and a high sickness and mortality record are looked upon properly as a disgrace.

Civilization is a rather difficult term to define, but generally speaking, it represents the condition of an orderly society in which the objectives ministering to health and happiness are within the reach of practically the entire population. The civilization of the ancients was limited to a small proportion, while most of the people were in slavery or a condition of ignorance and bondage. Civilization also means the social differentiation of the population with a strong trend towards urbanization or the growth of large cities. A civilized government is primarily concerned with the prosperity of the people and its best maintenance under given conditions of health and physical efficiency. Modern populations are primarily industrious and the early evils of the industrial revolution are now largely a thing of the past. Every civilized government has a health administration primarily concerned with public hygiene or the control of infectious and transmissible diseases. Of late years, however, governments also have taken an active interest in the housing of the people and in many matters which bear upon industrial and personal hygiene. Modern factory legislation has done much to improve working conditions and the health of wage earners everywhere is improving. All this is reflected in a low death rate, which for this country now ranges usually between 12 and 13 per 1,000.

The Bureau of the Census, through its division of vital statistics, for a number of years has published a weekly index of mortality for some seventy cities which enables any one interested to note from week to week the essential facts of the existing health situation. The report brings out the wide variations in local death rates for, while the average may be 12 per 1,000, some cities may have rates as high as 20, while others may have

rates as low as 6 per 1,000. Many factors enter into the crude death rate which make comparisons of different localities largely a matter of conjecture. In the New England States, for example, there are many sections in which the predominating population is above the age of forty or fifty and therefore subject to a much higher average death rate than new communities in the West, which consist largely of young people. The only proper procedure is for each community to watch its own health index from week to week and make sure that the tendency is towards an improvement.

The effect of modern civilization on the death rate is measurable chiefly in three directions. First, increasing prosperity as the result of higher wages and greater certainty of employment has brought about better nutrition. The first result of this is a naturally increased disease resistance. Second, higher wages, which largely through the efforts of labor organizations have been accompanied by shorter hours. As a result, wage earners now have more leisure time and are less subject to the exhaustive effects of industrial fatigue. Hence there has been a further increase in disease resistance, which in many instances is of the very first importance. Third, modern civilization aims at the improvement of health conditions in industry and our wage earners are now much less subject to conditions injurious to health and life in the pursuit of their countless vocations. They have better light, air and ventilation and are now less subject to injurious dusts, which are the cause of some of the most serious afflictions which concern the industrial worker. While these conditions explain but partly the effect of civilization on the death rate, they constitute probably the major influences which account for the falling death rate during the last generation. Of supreme importance, of course, in this connection is the progress in medicine and surgery.

Aside from the direct benefit of better medical treatment and

hospitalization, there has been a vast improvement in the health education of the people generally, and the most modern trend is towards a periodic medical examination which in many instances results in prolonging life for many years. Thus regardless of many evils inherent in our so-called civilization, or rather the want of it, the progress which has been made during the last two or three decades is, on the whole, a most gratifying one.

Chapter VIII

THE HEALTH OF THE NEGRO

ALMOST forty years ago in my "Race Traits and Tendencies of the American Negro," I presented some rather dire conclusions which fortunately during the intervening years have not been quite fulfilled. At that time the negro death rate was increasing. Since the nature or causation of many diseases was at the time but imperfectly understood, the profound results of modern preventive medicine could not have been anticipated. The negro has benefited by the vast sanitary progress all over the country and the negro death rate has declined as much as has been the case for the white population in the same sections, but the disparity between the mortality of the two races remains about the same. In 1924, in the registration area, the adjusted white death rate from all causes was 10.63 per 1,000, while that of the negro population was 20.07. There is, therefore, an approximate excess of about 100% in the negro death rate or about the same as it was thirty years ago. The environmental conditions of the negro, broadly speaking, are on the whole less satisfactory than those of the white population. He still suffers much in many sections, if not everywhere, from poor housing conditions and often the results of precarious employment yielding an uncertain income. He is still backward in appreciating conformity to sanitary requirements, but willing to learn and often anxious to do his share. It goes without saying, therefore, that in part, the difference in the mortality rates is the result of

circumstances which in course of time will yield to a better understanding.

But much of the disparity in the mortality rates is unquestionably due to racial traits, chiefly apparent in a lesser degree of disease resistance. Even when treated in hospitals and under identical conditions the negro death rate is almost invariably higher. He falls an easy victim to tuberculosis, from which the death rate per 100,000 for the white population was 91.4, while for the negro population it was 232.5, an enormous difference, the origin of which lies in matters of race rather than of environment. From non-tuberculous pulmonary diseases the negro suffers much more than the white man. Even from typhoid fever he experiences a death rate about three times the rate of the white population, although the water and milk supply in most places is the same. For the white population the rate was 5.5 per 100,000 against a colored rate of 17.8. For some unaccountable reason also the negro is much more subject to acute and chronic nephritis, for which the rate was 140 per 100,000 against 79 for the white population.

The racial aspects of the mortality problem are profoundly interesting but it is difficult in most cases to arrive at safe conclusions. But such are the facts and they cannot be explained away. Progress is unquestionably being made towards a lower death rate, for forty years ago, it was nearly twice what it is at the present time. A large measure of solution lies with the negro himself. It may be questioned whether after all, it is the correct procedure to give negroes precisely the same medical treatment as the whites. It would have been much better if long since a sound system of negro medicine had been evolved. During slavery this was the case. Race pathology unfortunately is practically ignored in our practice of medicine, but many observing physicians throughout the South have made valuable contributions which indicate that there are profound differences which

should not be ignored. In diabetes, for illustration, the white population had a death rate of 17.5 per 100,000, while the negro had a rate of 12.1, a considerable advantage, due probably to dietary differences, and also to racial factors. One extraordinary fact not generally recognized is that parturition is nearly twice as fatal to the negro as to the white population. Puerperal fever, for illustration, caused a death rate of 11.0 for white women against 19.6 for colored. Other puerperal causes are responsible for a death rate of 17.5 for the whites and 35.5 for the colored. This cannot be explained entirely on the ground of maternal neglect, for the causative factors are unquestionably in part racial and manifest in a lower degree of disease resistance.

By way of contrast certain acute infectious diseases of childhood are less common among the negroes than among the whites. Thus, for illustration, the death rate from scarlet fever was 4.1 for the whites but only 1.0 for the colored. But the measles death rate was higher or respectively 11.2 for the whites and 16.8 for the colored. Whooping cough also was much more common among the negroes or respectively 9.1 for the whites against 27.3 for the colored, but diphtheria to the contrary was much less common among the negroes, who experienced a death rate of only 8.4 against 13.5 for the whites.

The problem will not be solved by heated and prejudiced discussions. The negro has never wanted to face the truth of the situation but continues to blame the white population for a condition which is largely inherent in racial predisposition. It is something very considerably to the credit of the whites that in their medical and hospital practices everywhere the negro should receive the same painstaking attention that is extended to the whites. It would have been well for the negro if in years past some strenuous efforts had been made to develop a larger body of negro physicians. In that direction lies much of the hope for the future. Progress is being made and quite

a number of practicing negro physicians have risen to a high degree of professional efficiency. Another indication of substantial progress is the extent to which negro nurses are being employed. They are admirable for this purpose when properly trained, as best illustrated in the practice of the hospital maintained by the United States Steel Corporation at Birmingham, Alabama. Any one who questions that negroes receive precisely the same medical, surgical and nursing treatment as the whites should visit this model institution. The same is true of the great hospitals maintained by the United Fruit Company in its tropical possessions. But regardless of the same methods of treatment the negro death rate is almost invariably higher.

Underlying all questions of mortality are some fundamental questions of body build. Broadly speaking the negro is overnourished rather than undernourished and in every series of observations negro children almost invariably weigh slightly more in proportion to height than white children. The negro diet is on the whole favorable to a low rate of mortality from organic diseases as best illustrated by the lower rate of mortality from cancer, which for the white population in 1923 was 84.6 while for the colored population it was 68.0. But cancer is as rapidly increasing, if not more so, among the negro population than among the white. Aside from cancer, negro women suffer considerably from uterine fibroids which are much rarer among white women. During the conditions of slavery, all forms of uterine tumors in negro women were very rare. Here again it is impossible at the present time to give a satisfactory explanation.

One very curious phase of negro mortality often misunderstood and misstated is the alleged rarity of malaria in the negro population. As a matter of fact, the negro is much more susceptible to malaria than the white. Accurate statistics are not available to clearly show whether this condition has been a development of the last half century, although there is some evidence to show

that during slavery the negro was apparently less liable than the white. Malaria among the plantation negroes is a serious hindrance to the negro's economic progress. He undoubtedly suffers a much larger measure of exposure to infection since his housing conditions are often such as to preclude adequate screening. Furthermore in this disease as in all others the negro is frequently inclined to neglect treatment, often, of course, for reasons of poverty. He is also much given to self-drugging or the use of patent medicines, which often drain his purse while they do not benefit his system. But looking backward it is safe to say that the negro is making progress and will continue to make progress, and but for a falling birth rate his numbers would have increased much more rapidly than has actually been the case. In 1920 the negro population of the United States was about ten and a half million. In 1900 the negro population formed 11.6% of the total, in 1910 it formed 10.7% and in 1920 but 9.9%. My prediction, made in 1896, that the negro would in course of time become by degrees a less important numerical factor in our American population has, therefore, been fully sustained by the facts of subsequent experience.

Chapter IX

THE DANGERS OF MOTHERHOOD

THE pathos of human life finds no more striking illustration than in the death of a woman in pregnancy. She has suffered much both by way of anxiety and actual pain in the hope of giving birth to a child, which often suffers death with its mother, a victim of ignorance, indifference and apathy. At the present time, it is estimated that some 15,000 mothers yield their lives in the pursuit of one of the greatest of all industries, and that is the perpetuity of the American people. Of these deaths about six to seven thousand are the result of puerperal fever which is an infectious disease, often the result of carelessness and unsanitary habits on the part of the attendant, whether it be a doctor, a midwife or some one else. Even in hospital practice such deaths will occur but they are apparently proportionately less common than in private practice or in home confinements. There are, of course, always bodily conditions or coexisting diseases which make the prevention of many of the deaths in parturition extremely difficult. But it may safely be asserted that two-thirds of the deaths which occur are preventable in the light of modern medical and sanitary science. There are, for illustration, many deaths resulting from the difficulty of labor due to contracted pelvis, or following a cesarean operation. But even in these cases timely and thoroughly qualified medical assistance often succeeds in saving a life that would otherwise be lost. Occasionally there are abnormal presentations which

occur in about 3 to 5% of the deaths and which call for the best obstetrical skill available. Since many pregnancies call for instrumental delivery the avoidance of infection is a very serious matter, but often neglected on the part of those who carry on a hurried practice or who lack the necessary understanding of the risk involved. According to Norwegian statistics published by the Children's Bureau, the ratio of confinements calling for operative interference has increased from 26% in 1900 to 40% in 1917. The modern woman apparently is physically less adapted to child-bearing than the mother of the past. During a period of years in Norway the proportion of deaths in cases requiring operative interference was about 1.3%. In Bavaria it was about the same.

The question often arises whether the maternal risk is greater in first confinements or in the order of births. According to investigations made in Baltimore the mortality of mothers within three months after their confinement was 5.4 per 1,000, but for mothers giving birth to their first child 6.2; their second child 4.3; their third child 1.9; their fourth child 4.2; their fifth to seventh 7.5, and to the eighth and over 8.2. In other words the risk is least during the second to fourth confinement and greatest for mothers having had a large number of children. These results based upon the Baltimore experience are fairly confirmed by a more exhaustive study made in New South Wales a number of years ago. The Children's Bureau has also revealed an extremely interesting fact that the ratio of deaths to mothers within three months after confinement was higher for those in families with small incomes, than for those with larger incomes. Thus the rate for families with incomes of less than $850 was 5.3 per 1,000, while for families having incomes of $850 a year or more, it was 3.3. By race the maternal death rate per 1,000 live births was 3.85 for the whites and 6.88 for the colored. It was invariably somewhat higher in urban than in rural sec-

tions. Of course, in the country where hospital facilities are as a rule not available this would readily explain the difference. By nativity it appears that while the rate was 6.6 per 1,000 live births for mothers born in the United States, it was as high as 9.1 for mothers born in Ireland and 8.1 for mothers born in the United Kingdom. The lowest rate was for mothers born in Russia or 5.0 per 1,000. For all foreign elements combined the rate was 6 per 1,000 or 0.6 less than for native United States mothers. Foreigners more frequently employ skilled midwives who have been trained in foreign countries, but they incur at the same time a very serious risk by employing women not qualified for the purpose. The best method of procedure is to go to a maternity hospital and look upon delivery as a business matter. A hospital is a place of record where everything that is being done is subject to check and counter check. The most admirable illustration of progress in this direction is the method of procedure followed at the Lying-in-Hospital of New York and the Women's Hospital of the same city.

The importance of the foregoing conclusions cannot be easily overrated. For the city of Newark information is available tending to show that of all the births in that city 30% were attended by a physician, 32% received hospital treatment, while 38% were attended by midwives, but the proportion attended by midwives was as high as 84% for Italian born mothers and as low as 10% for English born mothers. For native women the proportion was 17%. The proper regulation, registration and supervision of midwives is one of the most important public health questions of the present time.

The death rate from puerperal fever is increasing in this country rather than decreasing. According to the Children's Bureau, it was 5.7 per 100,000 in 1900 against 6.8 in 1921, while for other puerperal causes the rate increased from 7.6 to 10.1 during the years under review. In 1926 the rate, however, was 5.2

for puerperal fever and 9.1 for other puerperal causes, so that there has been a slight change for the better. As a matter of fact the Children's Bureau estimates on the basis of corrected returns that the puerperal death rate has increased 40% between 1900 and 1920. Comparing our rate with certain foreign countries, it appears that we hold a very undesirable position. On the basis of live births for 1920, our maternal death rate was about 8 per 1,000, while that of the Netherlands was only 2.4, that of Sweden 2.6, that of Japan 3.5, and that of Australia 5.0. The only countries which approach the United States in its waste of motherhood are Scotland with a rate of 6.1, France with a rate of 6.6, Belgium with a rate of 6.1, and Chile with a rate of 7.5. The situation is evidently one which demands decidedly more qualified consideration than it has received in the past. It is a question which involves proper prenatal as well as postnatal care of the mother, while at the same time, there is need of higher obstetrical skill on the part of many general practitioners and the need of a rigorous public inquiry into the circumstances affecting every death from puerperal fever, which is a recognized preventable disease and which being such should be prevented by all the means at the disposal of the authorities.

Chapter X

THE BAR SINISTER

IT is a dreadful thought to know that one has been born out of wedlock. If those who are responsible for the bar sinister could only realize the never-ending sense of shame and humiliation that has to be carried to the grave on the part of those who know their mother but cannot acknowledge their father. Whether this is right or wrong in the final sense of the higher ethics of human relations is offset by the fact that it is so by the customs and the laws of all civilized mankind.* Thoughtlessly, irregular sex relations are entered into and thoughtlessly children are born without regard to the after effects which fall with crushing weight upon the innocent. Many years ago, a writer on illegitimacy introduced his subject with the words, "Against the background of history too prominent to escape the observation from which it shrinks, stands a figure, mute, mournful, indescribably sad. It is a girl holding in her arms the blessing and burden of motherhood, but in whose face one finds no traces of maternal joy and pride." The number of such mothers even in this country is incredibly large. In 1923, in the birth registration area, 37,823 children were the result of irregular sex relations, equivalent to 23 per 1,000 of all the births during the year. The rate, fortunately, was slightly less than during the preceding year, but there are strong reasons

* Except Soviet Russia.

for believing that birth control practices are becoming more and more effective in keeping children out of existence, about to be born as the result of wrongful sex relations.

It is true that in comparison with other countries, our illegitimacy birth rate is not excessive, but it is nevertheless much too high for the moral welfare of the people. In New Zealand, for illustration, which is a highly civilized country, the proportion of illegitimate births is 4.8%, but this is placed in the shade by many areas with a large native population such as Jamaica or Mexico, where from half to three-fourths of all the births occur outside of legal marital relations. In this country, our colored population has an illegitimate birth rate of 12.3%, while the white population has a rate of 1.4%. The rate varies widely for different sections of the country. It is exceedingly high for the colored population of South Carolina, where it is 36%, for Virginia where it is 29%, and for Mississippi where it is 32%. It, of course, does not follow, particularly in the case of the negro population, that the persons concerned do not live together. They may not be legally married, but the ties often are none the less binding. In the case of the negroes, the bar sinister is an almost universal indication of the mixed blood type met with everywhere. Every mulatto bears the stamp of irregular sex relations on the part of a negro woman with a white man, upon whom rests a heavy responsibility. While such a negro would emphatically object to being called a "nigger" he would have every reason to feel proud of black face, if nature and man had not combined to deprive him of the origin of true racial pride. There is nothing more pathetic than the lot of the near-whites, who are despised and often ostracized by both pure whites and pure blacks.

We know little of the facts of illegitimacy in this country, which has never been made a subject of a thoroughly extended investigation. The Bureau of the Census published, however,

some extremely interesting statistics which prove that among the white population, according to the age of the mother, at ages ten to fourteen, 55.5% of all the births were illegitimate, diminishing to 7.4% at ages 15 to 19, to 1.6% at ages 20 to 24 and to 0.5% at ages 25 to 29. In other words, the illegitimacy problem among the white population at least is largely a question of the inexperience of youth, of a reckless mode of living, of a disregard of parental supervision and of a want of effective methods of moral training and emotional discipline. To a certain extent the same conclusions apply to our negro population. For negro mothers ages 10 to 14, the proportion of illegitimate births was 77.8%, for mothers ages 15 to 19 it was 33.6%, and for mothers ages 20 to 24 it was 10.8. After that the proportion remains about the same or at about 5% throughout the remainder of the child-bearing period.

The foregoing statistics are highly significant as indicating the direction in which an improvement is easily within reach. It goes without saying that far too many young women are wanting in parental control and discipline. Far too many young men are brought up with a disregard for the frightful consequences always involved in the spoilation of young womanhood. Modern society is much to blame for the laxity of manners and morals, which is tending towards worse rather than towards better. Drinking habits among the young have of recent years reached alarming proportions. Dance halls do their share, while certain types of motion pictures tend to make the minds of the young callous and apathetic towards high moral standards. The marriage institution, while still fundamentally sound, is certainly breaking down to an alarming degree on the fringe. It is a restless age, which seeks its satisfaction and pleasures in directions nearly always involving a serious risk. From another aspect the problem involves a more tolerant attitude of society towards the delinquent mother. After all she is a mother and the child

has a right to be born and to be as much as possible protected against the consequences of parental failure. What is being done by certain societies which minister to the needs of the delinquent mother is a phase of social welfare deserving of decidedly greater encouragement and financial support. The condition of the delinquent mother and her needs are the same as those of any other mother. Parents frequently assume a harsh and unrelenting attitude towards an erring daughter which is wholly unchristian and morally reprehensible. Many a delinquent mother ends her troubles in suicide, for which the responsibility rests largely upon an intolerant and uncharitable society. After all, it is better to have been born even out of wedlock in many cases than not to have been born at all and investigations which have been made by qualified authorities prove conclusively that in numerous instances persons of illegitimate origin have reached a high intellectual, moral, and useful social status. As has been said by Leffingwell, "The world could ill spare him, upon the accident of whose birth it puts its social stigma." Some of the greatest soldiers and adventurers of ancient and modern times from William the Conquerer of England to Pizarro the Conqueror of Peru might have borne the bar sinister upon their escutcheons. He mentions Smithson, the founder of the Smithsonian Institution as having been the natural son of an English duke. He speaks of Alexander Hamilton, one of the greatest of all Americans as having been of illegitimate birth. He refers to Erasmus, one of the greatest of names in philosophy and to George Sand one of the greatest names in literature, also to Alexander Dumas who was the illegitimate son of a still more renowned father, who himself was the offspring of a slave woman of San Domingo. Finally he mentions one of the greatest names in art and science, that of Leonardo De Vinci, and many more.

The problems involved in illegitimacy are vastly more than

the legal identification of the offspring. But social customs, manners and prevailing moral conceptions stamp the illegitimate child with the bar sinister and make his burden incredibly heavy and often distressingly sad.

Chapter XI

HEALTH IN THE TROPICS

AMONG the most maligned sections of the world are the tropical regious which are generally assumed to be unhealthful or unsuitable for the residence of people from northern latitudes. The conception rests upon the double fallacy of assuming that early conditions continue at the present time and that the accounts of explorers, travelers and adventurers are a fair index of normal life in tropical countries. There is the further illusion that the tropics are necessarily extremely hot. As a matter of fact, tropical regions are more or less warm during the daytime throughout the year, but they are seldom as hot as is the case with some of our northern cities during July and August. In the western world the tropics have an average climate, which seldom exceeds 80°, which is compatible with health and long life if common-sense precautions are observed. I know of no places in the South or Central American tropics which approach in excessive heat such sections as the Death Valley of California, or Yuma, Arizona. For that matter even the upper Sacramento Valley during the summer time will average higher temperatures than the Valley of the Amazon. The most trying effect of life in the tropics is, of course, the continuously warm temperature, which, however, in many sections is subject to decided weather changes during the evening and the night. In fact, in many tropical regions of the western world the nights are quite cold and often very trying unless

proper precautions are observed. Unfortunately there are few accurate weather observations for the night time, so that the essential facts of the situation are not a matter of accurate record.

Another error is to assume that the tropics during the summer are much warmer than during the winter. The difference is but slight and hardly perceptible if exposure during the noon hour of the day is avoided. The West Indian and Central American tropics are ideal for summer vacations and no one need apprehend serious inconvenience from the prevailing heat.

Of course, a continuously warm temperature gives rise to a much larger amount of parasitical life than the climate of temperate latitudes. This explains the more common prevalence of certain insect-borne diseases, particularly malaria, which, however, is not a tropical disease. Such infections are nowadays easily guarded against by intelligent methods of living and they are practically everywhere diminishing. They affect chiefly the native population which is not as yet subject to the effects of hygienic instruction. Malaria is probably the outstanding health problem of the Central and South American tropics. Hookworm is a close second, if it does not take precedence in many sections. When these two affections are under control, the health of the population approaches the normal. The so-called strictly tropical diseases rarely affect white people. They are due to unhygienic modes of living or lack of disease resistance, or to exposure common to the native population.

The most convincing illustration of the foregoing observations is the medical experience of the United Fruit Company, which covers nearly a million square miles of tropical country. The company, for example, in 1925 had a death rate of only 13.2 per 1,000 employees. For white employees only, the death rate was 11 per 1,000, but nearly 20% of this mortality was due to accidents. Strictly tropical diseases are of extremely rare occurrence in fatal form among these people, for most of them observe sani-

tary and other precautions obviously called for by tropical conditions of life. The employees of the United Fruit Company, however, have the additional advantage of exceedingly satisfactory methods of hospital treatment in the event of illness. Public hospitals in tropical countries leave often much to be desired, but progress is being made everywhere, and in no direction as much as in the gradual elimination of malaria. Where methods of drainage and mosquito eradication are not feasible, the quininization of the people often proves of very substantial assistance. It has been my own rule to take ten grains of quinine every day in the tropics of Central and South American countries and I have never suffered an hour's illness or the slightest attack of fever, regardless of a considerable amount of exceptional exposure.

The most important element of a healthy life in the tropics is sufficient employment. All those who represent substantial interests and have much to do enjoy generally the best of health. The danger lies in the misuse of idle hours, which are too often spent in drinking or reckless exposure. The second most important precaution is to protect the body against parasitical infection, and the third important factor is the absolute avoidance of venereal affections. When these three prerequisites are met, with an income sufficient to provide satisfactory housing conditions, and with a long leave of absence every other year, there are no reasons why life in the tropics should not be made to approach the normal and in many sections that is now the case.

The foregoing observations do not apply to certain ultra-tropical regions subject to a high temperature and a coinciding excessive humidity plus a general absence of wind force. Stagnant, highly saturated air is always injurious to health. Hot air in motion is endurable. This conclusion is readily forced upon one in ascending the narrow tributaries of the Amazon or the Madeira. In a strictly tropical forest, conditions are often very

trying, due to the absence of wind force and the presence of a high degree of moisture. Life in the tropics can be made much more endurable by abstemious habits of eating and drinking. It goes without saying that excessive alcohol consumption is often fatal, but one can go almost anywhere in the tropics and find persons who have lived there many years and have enjoyed practically continuous good health or freedom from disease. Hygienic modes of living otherwise, such as sanitary housing, proper sanitary facilities, etc., are a great advantage. One would not go barefooted in the Maine woods in the winter time and likewise one ought not to go bareheaded in the boiling noonday sun near the Equator. As has been said before the most trying time is often the night when sudden temperature changes produce chills which may lead to rheumatism and pneumonia. All ailments in the tropics demand the earliest qualified medical attention, but a few simple precautions will go a long way.

Chapter XII

WHAT CAUSES DEATH

PHILOSOPHERS have a habit of speculating upon causation and the general public insists upon knowing the cause of things without realizing that practically nothing in the world is due to a single causative factor. Every cause is complicated by other causes or a condition precedent. It is impossible in any matter to lay down a final cause which transcends our finite understanding. Thus, as the late Herbert Spencer said many years ago, we shall never know what time is, nor shall we know what space is, nor can we reach a point in the divisibility of matter in which we cannot assume a further possibility of divisibility, since our microscopically aided eyes have reached their limit. When it comes to the causes of death, obviously there must be a very broad compromise, for only rarely does any one die of any particular thing in the strictly limited sense of the term, but all parts of the body do not die at the same time. We speak, for illustration, of a minute organism as being the "cause" of tuberculosis, but millions of people inhale the same bacilli and suffer no injurious results. We speak of the "cause" of typhoid fever, but where a dozen people die in epidemics, thousands of people have drunk the same water or the same contaminated milk without harm. The "cause," in other words, is conditioned by other things, and in the case of human beings, chiefly by disease resistance or immunity, the nature of which also defies our understanding. In certain particular instances, such as

snake poisoning we, of course, may definitely say that the poison has been the cause of death, but in heart disease, for illustration, we cannot say with absolute accuracy that the cause of death was heart failure, for much depends upon the equally diseased condition of the kidneys. It is rare that a case of valvular disease of the heart is not complicated by nephritis. It is also rare that a case of pulmonary tuberculosis is not complicated by malnutrition. But for a large variety of purposes, it is absolutely necessary to arrive at a precise diagnosis of a single cause of death, yet upon examining death certificates, it will be found that probably half the deaths have been complicated by a cognizable number of other coexisting diseases.

An elaborate system has been adopted by international agreement which brings a fair measure of order to what might otherwise be complete chaos. Thus, for example, a woman suffering intolerably from cancer in its terminal stage, commits suicide. If she had not been of the mental disposition permitting suicide, she would probably have lived for some time longer. If she had not suffered from cancer she probably would not have committed suicide. But in either case, there is room for conjecture.

The so-called causes of death are innumerable but for statistical purposes, they have been reduced to 205, but these by no means exhaust the list, for many of the numbers have innumerable sub-classifications. A man may die of an acute abscess but there are any number of abscesses which may enter into this classification. A person may die of cancer but there are six recognized subdivisions and probably from 80 to 100 minor subdivisions, which cannot in general practice be dealt with in official statistics. Thus then the so-called "causes of death" represent a compromise, but a workable one, particularly on the part of those who are thoroughly familiar with the facts.

In 1920, for example, there occurred in the United States registration area 1,542,558 deaths, representing approximately

85% of the total mortality of the country, for certain states are still outside of the registration area on account of defects in the collection of vital statistics. The outstanding group of diseases causing most of the deaths was organic diseases of the heart, numbering 124,143 or 10.9% of the total. This was followed by tuberculosis of the lungs with 88,195 deaths or 7.7% of the deaths from all causes. The third most important group of diseases causing death was acute nephritis and Bright's disease, including certain other renal affections, numbering in the aggregate 78,192 or 6.8%. The fourth most important cause in 1920 was cancer causing 72,931 deaths or 6.4%, followed by pneumonia of different types causing 72,362 deaths. The next important disease was cerebral hemorrhage or softening with 71,618 deaths followed by influenza that year with 62,097 deaths. Thus, in other words, 32% of the mortality from all causes was caused by four specific causes or large groups of causes, which, if effectively guarded against, would aid materially in the further reduction of the general death rate. It is highly significant, for illustration, in the study of the so-called epidemic diseases that typhoid fever which years ago was extremely common prevailed during the year under review only to the extent of 6,805 deaths, equivalent to only 0.5%.

The cause of death as originally given in the death certificate is the diagnosis of the attending physician. It is regrettable that so many doctors should take their responsibility in this respect lightly, for there are grave reasons for supposing that the diagnosis is often superficial, if not inaccurate. If it is possible a complete clinical diagnosis followed by a supplementary autopsy should be made. There are often serious objections on the part of the persons concerned to an autopsy on the body of the deceased member of the family, but the public is vitally interested in having the diagnosis confirmed. To a large extent further progress in medicine depends upon a much larger pro-

portion of autopsies than are at the present time possible. Some hospitals insist upon an agreement that in the event of death, an autopsy shall be made, while otherwise admission is refused. This custom is quite common in Europe and should be more general in this country. An immense amount of valuable medical experience at present goes to waste and the progress of medicine is correspondingly hampered in the direction of its largest fulfilment.

These observations apply particularly to many of the more obscure diseases, for no physician can possibly know all about medicine no matter how hard he may try. It is, for illustration, becoming more and more difficult to diagnose latent malaria in the Northern States since malaria in its more active form is becoming very rare. To a lesser extent this applies to the early recognition of smallpox. Many physicians of large practice have never seen a case. The observations apply particularly to leprosy, which is now extremely rare in this country, although not as uncommon as is sometimes assumed to be the case. It applies also to lead poisoning which is frequently unsuspected in persons not engaged in the handling of lead products. In the case of relatively rare diseases, such as Hodgkin's disease and Addison's disease, a mistake in diagnosing is easily made. The general practitioner at best is confronted by a prodigious problem. He must not only know what has been known about medicine and what is known about it at the present time, but he must keep in close touch with new developments which are every day during the year being brought to the attention of the medical profession. He must know the effects of a countless number of drugs upon an ever varying human organism subject to varying disease conditions. But the general practitioner is a most useful person and for general purposes a better guide to the patient than a specialist who knows one affliction thoroughly, but often very little else. An honest general practitioner will quickly decide

in the case of a patient if the services of a specialist are desirable, as they very often are.

The cause of death in its last analysis represents a weak spot in the human organism which yields to the inroads of disease. It is of supreme importance, therefore, for the public to realize that general disease resistance is the best safeguard against ill health and premature death. The keeping of every organ in good working condition and the safeguarding of every part of the body against injury is the first step on the part of every individual towards his own life prolongation.

Chapter XIII

VANISHING MALARIA

IN 1926 the death rate from malaria in the registration area was only 1.9 per 100,000. It is the lowest rate which has probably ever been reached in this country for many, many years. In the northern states the disease has almost entirely vanished, although it was formerly fairly common along Lake Ontario, in northern Illinois, and in some of the New England States. In the Southern States, the disease lingers, particularly in certain low lying sections largely inhabited by a colored population. But in practically all the Southern States, the disease is now of negligible importance. With the vanishing of malaria, the general health of the population concerned has very materially improved. The fatality rate of malaria is relatively very low, while its case incidence is sometimes quite large.

The gratifying progress which has been made in malaria elimination is essentially the result of the epoch-making discovery of the cause of malaria by Sir Ronald Ross, who discovered that the disease was transmitted by the female of the anopheline species of mosquito and by no other agency. Previous to this discovery a multitude of causes or conditions were held responsible but chiefly the night air which explains the use of the term *"mal-aria"* meaning bad air. Many writers of the past had noticed, however, that malaria was common wherever mosquitoes were common, but they had not connected cause and effect. A large number of species of mosquitoes, however, are perfectly

harmless in this respect, although they may be harmful in others. A significant illustration is the Stegomyia mosquito which transmits yellow fever. It is only infected mosquitoes who spread the disease, for if non-infected the mosquito bite has no serious results. It is, therefore, of the very first importance that all patients having malaria should be carefully screened to avoid the infection of mosquitoes who may transmit the disease to other human beings.

Modern effort is being concentrated upon the elimination of conditions that breed mosquitoes. Nowhere has this effort been made more successful than in the Panama Canal zone and on the tropical plantations of the United Fruit Company in Central America and West Indies. But epoch-making results have also been achieved in the Federated Malay States under the original direction of Sir Malcolm Watson. In this country, Federal and State health authorities have for a number of years directed local campaigns which have been more or less successful, but to achieve the best results the whole-hearted cooperation of the population is essential. With the negro population, effective screening of houses is often difficult but wherever houses are screened the incidence of malaria is low. Precautions of this kind are particularly necessary in the case of little children who in proportion to their numbers suffer more from malaria than adults.

Aside from preventive measures, it has been known for a long time that quinine is practically a specific in the treatment of the disease as well as in its prevention, if taken previous to exposure to malarial conditions and systematically followed thereafter. In my own experience in Central America and South American tropics, I have never once suffered a touch of malaria, although frequently exposed in very serious outbreaks. The standard treatment of malaria as recommended by Dr. Bass of the National Malaria Committee constitutes about ten grains of qui-

nine taken each day for a period of variable length. In my own case, I took ten grains of quinine in two doses of five grains each morning and night, commencing several days before passing into the tropics and for several days thereafter. As I have said before, I have found this entirely satisfactory, but there are those who cannot tolerate quinine, while there are others upon whom it has not sufficient effect to warrant the expectations of either completely protecting or curing.

While malaria is nowadays rather of a mild type, it complicates almost every other disease if it is present and often accelerates death as a result. Malaria even in mild form should, if possible, be avoided and this is not difficult where there is an intelligent understanding of the essential facts of the mosquito problem. Whether one has malaria or not is easily ascertainable. An examination of a drop of blood will usually reveal the presence of a minute organism which is the plasmodium of malaria. There are different types characteristic of the different forms of malarial fever which may run into two- or three- or four-day courses as indicated by the temperature. It is well in all cases to take cognizance of earliest indications of infection and to commence at once to take quinine in sufficient doses to counteract the malarial poison.

Where malaria is present in the body, there is malaise and depression which diminishes labor efficiency. Those who have malaria cannot work as well as those who have not, even though the disease be present in rather a mild form. Malaria is therefore a disease of very considerable economic importance, particularly to southern planters where sometimes the labor force is materially reduced because of it.

The fact has been clearly recognized by some of the southern railways who now do much to diminish the frequency of the disease not only because of the humane grounds and on economic grounds, but also because malaria sections are much re-

duced in value from a real estate point of view. Formerly the New Jersey coast was also blacklisted for residence purposes because of the presence of large numbers of mosquitoes. As a result of indefatigable efforts to drain the country, the extent of mosquitoes is very materially diminishing, while land values have risen considerably in the meantime. In the South, the disease is still common in certain sections of Mississippi, Georgia, Florida, Alabama, Louisiana, and Arkansas. What is called the Yazoo Delta of Mississippi was formerly almost uninhabitable, but now most of it is being developed to the enormous advantage of all concerned. Wherever agriculture is introduced and with it the necessary drainage, malaria usually shows a tendency to disappear.

Malaria then is a vanishing disease, but much of it lingers that requires the attention of the government, the local authorities and the public. The problem cannot be solved by any of these agencies operating alone. The reduction of malaria and its gradual elimination is one of the greatest triumphs of modern sanitary administration.

Chapter XIV

LINGERING LEPROSY

THE tragedy of human life reaches the height of despair in the case of those unfortunates who find themselves affected with leprous disease. Suddenly out of nowhere the affliction strikes its unfortunate victims who have been innocent of any misconduct or for that matter of the neglect of ordinary precautions. Beginning usually with a small spot which at first is painless the disease gradually spreads to different parts of the body until medical aid is sought but usually too late. In its early stages the victim is generally ignorant of the true nature of the affliction and the failure to seek early treatment is readily understood. Despair and apathy follow in the fatuous belief that medical science is helpless and that the final outcome is a foregone conclusion. Unhappily in many cases the medical aid sought is useless for the doctor himself fails to recognize the disease in its early stages. Leprosy is fortunately very rare in this country, but in 1923, for illustration, as many as 24 deaths from this dreadful affliction have occurred in the registration area of the Continental United States.* In the beautiful Hawaiian Islands where the disease has been endemic for many years, the corresponding number of deaths was 55. †

It was in Hawaii that the first adequate effort was made to segregate lepers on an island more or less inaccessible. Molokai

* For 1924 there were only 15 deaths.
† In 1924 the number of deaths was only 46.

became famous throughout the world as the last refuge of a large number of lepers, reaching 660 about ten years ago. It was dramatized by the heroic sacrifice of Father Damien immortalized by Robert Louis Stevenson. The work in Hawaii, however, continues under the equally sacrificing ministration of Brother Dutton who has taken Father Damien's place. To the Government of Hawaii and the old royal administration belongs the credit for having been the first to realize its duty to provide adequately for the lepers' needs. In this country, nothing much was done, except in certain localities, until 1917, when as the result of the efforts of a small group of interested individuals the Federal government passed an act and appropriated $250,000 for the establishment of a leprosarium at Carville on the Mississippi in Louisiana, about sixty miles from New Orleans. That Institution is now in all probability the model establishment of its kind in the entire world. It took over a State Institution somewhat after the pattern of the settlement at Molokai, but never adequately financed proportionate to the patients' needs. It owes its origin largely to the efforts of the late Isadore Dyer and his faithful associate, Dr. Hopkins. When the matter was brought to the attention of the Federal Government, the statements regarding the wide distribution of leprosy throughout this country were discredited. But the evidence presented at the time was absolutely conclusive, not so much as regards the extent of leprosy which was partly known, but as regards the inadequacy of the treatment extended to isolated patients in different parts of the country.

The location in Louisiana was selected after painstaking effort to secure a more suitable one, by preference an island. Both the East and West coasts of the country were searched, and also the Gulf coast, for a suitable location, but a better one could not be found. The settlement in Louisiana at that time contained about eighty to ninety patients, for the disease had long been

endemic in the southern portion of the State, where apparently it had been introduced about two hundred years ago by Acadian refugees after their expulsion from lower Canada. It is a curious fact that even at the present time a small foci of leprosy survives in Tracadia in the Province of New Brunswick. Slowly the number of inmates at the Federal leprosarium has been increasing until on June 31, 1926, some 259 were in segregation. The number of new admissions during the year was 62. The number who absconded was 35, but 13 of the absconders returned. It is not an easy matter to induce a case of incipient leprosy to seek advice at an institution which includes all classes of patients. Some in the more advanced stages of the disease are a terrible sight to inexperienced eyes. Most of them, other than the natives of Louisiana, are foreign born. Of the 259 in 1926, Chinese numbered 17, Mexicans 13, and Greeks 11. Natives of Louisiana numbered 94 followed by 16 natives of Florida, which has also been a center of infection for many years, chiefly from Cuban sources. Another section of the country in which quite a number of cases occurred is Texas, represented by 12 inmates. Some have come from the Hawaiian Islands, others from the Philippines, Porto Rico and the Virgin Islands. The disease is widespread throughout the West Indies and most of the islands make some attempt at segregation, particularly Jamaica. The admissions to the Carville Institution include natives of Central America, Dutch Guiana and many European countries. But the natives of Louisiana outnumber all others, or 94 out of a total of 259.

Lepers frequently die from other causes than leprosy, for the disease is one of long duration, averaging from eight to ten years according to the condition at admission. Hence the returns of deaths from leprosy are by no means a satisfactory indication of the extent of the disease throughout the country. One pathetic aspect of the disease is the number of patients who

contracted leprosy while in service in the Spanish-American and the World Wars. Another sad side of leprosy is the extent to which eye affections to the point of total blindness are met with. A large amount of the work of the leprosarium is concentrated upon treatment for eye diseases.

Happily the treatment of leprosy has made substantial progress and to an increasing extent it is now possible to give patients who come in the early stages of the disease the assurance, if not of a cure, at least of an arrest of the affection to the extent that they may safely leave the Institution. The treatment is generally chaulmoogra oil and while according to Dr. Denney, the surgeon in charge, "no spectacular results have been obtained, it appears that definite improvement has followed in a sufficiently large percentage of cases to encourage the patient in the continuance of the treatment." In my own experience, I have been able to secure for a white patient suffering from leprosy in the earliest stages adequate treatment in England which has thus far been entirely successful. It is pointed out by Dr. Denney that an attempt "is now being made to increase the dose tolerated by the patient," but not enough data have as yet been collected to warrant safe conclusions. The improvements in treatment have made it possible for the patients to tolerate the oil, which formerly was often so objectionable as to preclude its administration.

The question is often asked how leprosy is contracted. The only honest answer that can be made is that we do not know. It is unquestionably an infectious disease for the causative microorganism has been definitely established. No case of leprosy ever occurs anywhere which has not come in contact with other lepers in the past. Years may intervene before the disease becomes apparent, but there is almost invariably a past history of exposure. Yet in the administration of leper settlements the world over but two or three instances have ever occurred in

which physicians or nurses in attendance on leprous patients have contracted the affliction. Leprosy manifests itself in two forms, one as an anesthetic or nervous form, and a tubercular or nodule form. In many cases the two types are represented in the same patient. One of the most certain evidences in diagnosis is the fact that the spots in leprosy are insensible to the touch. They are dead tissue in which the nerve cells have died. The disease usually begins in the nose which leads to the assumption that it is contracted by hand infection, but the mystery as well as the tragedy of the disease remains as one of the greatest of problems in modern medical science.

Chapter XV

WHEN THE HEART FAILS

DISEASES of the heart are the principal cause of death in this country, reaching approximately 180,000 per annum at the present time. The significance of this statement will be appreciated when it is realized that all forms of tuberculosis caused but 85,000 deaths or less than half this number. But the term "diseases of the heart" is a very comprehensive one, for in its last analysis, probably every cause of death is complicated by some form of heart affection. It nevertheless remains true that the heart is the most vulnerable organ of the body, although as a rule the most neglected until it is too late. Heart diseases are apparently on the increase in this and other countries, but some allowance must be made for new methods of classification and the transfer of affections, which in former years were otherwise classified, to the heart group. It is no longer permissible to use the term "sudden death" as a cause, for it is obviously only a condition, but a condition concerning chiefly the heart and circulatory system. Considerable progress has been made during recent years to discover the earliest indications of heart impairments. But too much reliance must not be placed upon instrumental findings such as blood pressure or heart murmurs, the importance of which may easily be exaggerated. Nothing is more trying than to have oneself pronounced as being in a serious condition when the functional disturbances are really of minor importance. There are count-

less persons who in early life were rejected for life insurance on account of some form of heart impairment, but who lived complacently to old age. Over-specialization in heart diseases accounts for much of the prevailing misconceptions. Modern instrumental examinations reveal often minor impairments which are easily exaggerated into impairments of major importance. It is, therefore, necessary for every person concerned to proceed with extreme caution in arriving at a definite conclusion.

The foremost authority on the heart, the late Sir James Mackenzie was also one of the most cautious and he never failed to emphasize the supreme importance of taking all the facts of bodily conditions into consideration instead of placing sole reliance upon a single suggestive symptom. Sir James Mackenzie was one of the first to emphasize the need of a new outlook in medicine. It has become the fashion to subject the body to periodical medical examinations. These primarily concern the heart, the lungs, and the urinary organs, all of which are closely related to each other. Such examinations are of the greatest possible value if made by a thoroughly competent physician, but they are apt to cause needless anxiety if made superficial for a small consideration. As Sir James Mackenzie has said: "The disease can only be recognized by the signs and symptoms which it produces and a diligent examination of the patient enables a great many of these to be recognized." But the real problem consists in the proper assessment of the value of the symptoms revealed. Hence, as has been said, "To assess the value of the symptom is to understand its relation to those vital processes upon which the life and health of the individual depends."

Modern life unquestionably imposes in many instances an excessive strain upon the vital organs. Much of what we call our civilized mode of living is really opposed to good health and longevity. We forget that the human machine, like a

mechanism, requires careful looking after and painstaking attention to often minute details. The body breaks down, not as a whole, but in part, and often in parts vitally affected by a condition which unless early recognized is apt to lead to fatal results. Most heart patients are advised to abstain from hard work, from overexertion, to avoid high altitudes, drinking, including coffee, and many other things. Much of this advice is good on general grounds, although not necessarily beneficial to the heart. Only a thorough examination and qualified treatment can produce results of lasting value.

Heart diseases vary in their incidence with locality, habits, occupation, mental stress, anxiety and any other abnormal experience. The mature heart never grows and is adapted to a normal body and to normal conditions of everyday life. We sometimes hear mention made of an athletic heart, of a tobacco heart or a coffee heart as the case may be. In all such cases the evidence of gross abuse is obvious. One of the most important strains to avoid is excessive weight. The heart simply cannot accommodate itself successfully to a vast increase in bulk without suffering some impairment which in course of time may prove fatal. Modern investigations have conclusively shown the evil consequences of an excessive weight accumulation in adult life. The heart works steadily from birth to death. It is like a pump that can do so much work and no more. Heart diseases increase with age and they are most common in fatal form after fifty and sixty years. It is at these ages that body weight is usually from twenty to often a hundred pounds more than is necessary for bodily needs. Hence the heart is perhaps the most abused organ of the body next to the stomach. Simplicity of habits, especially dietary, normal exercise and avoidance of excesses of all kinds will go far to keep the heart in good working condition.

According to the Association for the Prevention and the Relief

of Heart Diseases, which is one of the best of our health promoting agencies, investigations have shown that 2% of the persons examined for life insurance are rejected because of serious heart defects and that 2% of industrial workers are subject to similar effects, while from 1½ to 2% of the school children who are examined have serious heart lesions. In my own judgment, these are underestimates, particularly when applied to ages 30 and over. I believe nearer 10% of the adult population of this country is suffering from some form of heart impairment in need of careful watching and remedial methods. At age forty, about one-fifth of all the deaths are due to heart diseases of one form or another. Even in early life heart affections are more common than is often assumed. They are generally complicated by rheumatic affections which require careful watching. The Association referred to points out that rheumatism and syphilis are probably the most common causes of heart affections in early life. Then there are the so-called focal infections, chiefly of the mouth, nose, sinuses, gums, teeth, tonsils, gall bladder, colon, rectum, kidneys, etc., all of which it is said may be the real seat of the heart disorder, which can only be determined by a careful medical examination.

The most trying of all heart affections is angina pectoris. It is exceedingly painful at times and almost invariably fatal in the end. Some 12,000 people die annually from this affection of the heart as the center of a vast system of veins and arteries, any one of which throughout the body may be impaired by special conditions demanding often the most careful attention to painstaking details for their precise determination. The subject of arterio-sclerosis is one which will require separate consideration, but the hardening of the arteries is frequently directly traceable to some form of heart impairment. No one can judge of these conditions for himself, and there is always the imperative need of expert medical guidance. Yet hopeless cases do not always fail

and while at all times caution is necessary, fear and apprehension are perhaps the most serious complications. A courageous attitude of mind goes far towards producing a beneficial effect. Perhaps no organ of the body is today receiving more careful attention than the heart and in no direction are better results achieved than in the earliest possible treatment of minor affections which prevent the development of major affections in later years. The human system, fortunately, is one of many compensations and though a person may have a weak heart or a slight impairment, such a person may nevertheless live for many years. But there is always the need of avoiding extremes, most of all, in excessive eating, excessive drinking and excessive physical exercise. When these are avoided many a heart impairment will not prove serious.

Chapter XVI

THE INCREASING MENACE OF CANCER

IT is quite some years since I first called attention to the menace of cancer on the basis of incontrovertible statistical evidence. Somewhat later a National Society for the Control of Cancer became active in spreading useful information among the public at large. When my address was first made, the cancer mortality of this country was about 75,000. Regardless of an enormous amount of interest in cancer control, the death rate has steadily risen and is now at its maximum, causing a toll of possibly not far from 125,000 lives. All over the world, research laboratories are at work in a study of the underlying facts and conditions. Millions have been spent for research but the results have been largely barren of really useful conclusions. Hardly a week passes but some one announces a new cancer cause or a new cancer cure. But every new discovery is offset by another, leaving the situation more confused than ever.

Yet it would be unfair to say that no progress has been made. Surgery is unquestionably more effective than formerly and cases come earlier to operations while there is still a fair chance of recovery. Unfortunately, we do not know the real facts of the situation. The postoperative results in most cases are not ascertained or ascertainable. No extensive collective investigation into the after results of treatment has ever been made. The fragmentary data available are often encouraging but often, to

the contrary, decidedly discouraging. Little progress has been made in the medical treatment of cancer and the outlook in this direction is apparently not encouraging. Some progress has been made with radium but there are reasons for believing that the best results are often missed for want of the required skill in the administration of this extraordinary substance. But in radium, as well as in surgery, the outstanding fact of every investigation is the supreme urgency of the earliest possible treatment. Cauterization in some cases is useful and beneficial. It would probably be well if this method were more thoroughly considered by those who are qualified to use it.

But the fact remains that regardless of much deferred mortality from cancer as the result of better treatment, the death rate or the number of deaths, in proportion to the population, is constantly increasing. In 1926, the rate for the Continental United States was 94.9 against 92.6 for the previous year. But this rate possibly somewhat understates the actual facts, for owing to the nature of the disease, it is at times very difficult to arrive at a precise diagnosis of malignancy. The average death rate for the country at large, however, fails to reveal the true facts of the lamentable situation. There are cities and sections of this country in which the rate is 50% higher than the average. The Pacific coast in this respect and certain New England states appear to suffer most. Attempts have been made to explain a local excess on the ground of age and sex variations in the population. The same theories have been advanced in explanation of the increase in heart disease. But they are totally insufficient to account for the obvious excess in the death rate by normal standards. Even when every allowance is made for statistical inaccuracies and deficiencies, the fact remains that the mortality is enormous. The increased average age of the population, of which much is made, could not possibly have a material effect for years to come. In the light of my own investigations,

I am absolutely satisfied that the increase in the cancer death rate is real and not apparent and that the increase will continue for some time to come until a maximum has been reached resulting in a fairly stationary condition. Such a condition has apparently been reached in Switzerland, which has one of the highest cancer death rates in the world. About the same is true of Denmark. This country at the present time holds about a medium position in comparison with other leading civilized countries. For cancer is primarily a disease of civilization. Native races not in contact with civilization are practically free from malignant diseases. This is not a conjecture but a fact. My own investigations among the Indians of the Southwest and of Mexico, Central and South America all tend to prove that cancer among the aborigines, not in contact with civilization, is extremely rare, if indeed it occurs at all.

Now the one essential difference between civilized and non-civilized races is in the matter of diet. Non-civilized races live largely on a natural diet and are free from the irritating effects of a civilized environment. Modern urbanization has increased enormously the question of an adequate natural food supply. The food of modern city populations is largely modified in a variety of directions. It is modified not only for esthetic reasons to make it more palatable, but also for purposes of conservation, the food is refrigerated or otherwise manipulated sometimes to a serious degree. Modern food products are often deprived of certain essential elements indispensable to healthy bodily development. This is particularly true with regard to the mineral salts, which are removed in certain processes of food manipulation. There are, for illustration, strong reasons for believing that modern white bread is so completely devitalized that it serves no genuine food requirement whatever, while if it is consumed in large quantities there result obscure bodily ills, which by their reaction may possibly lead to a pre-cancerous condition. Sir

Arbuthnot Lane has called attention to the coincidence of intestinal stasis and cancer of the stomach and intestines. He is also of the opinion that cancer never occurs in a thoroughly healthy human being. This statement, however, has been violently disputed and the outlook for an agreement seems remote.

If modern civilized life involves the risk of a modified and possibly adulterated food supply, it involves the equally great disadvantage of diminished physical exercise. Sluggish bodily habits coincide with sluggish intestinal habits and produce a bodily condition most favorable to malignant growths. Cancer in its origins is always a local affection, not being a constitutional or blood disease in the accepted sense of the term. The growth in its origins is painless and continues so for quite a while, while the affected person may be entirely unaware of its development. Yet the hope of an effective cure depends chiefly upon its very earliest recognition and complete removal. If there are medical means of treating cancer, they have not gained the sanction of those best qualified to pass upon them. So-called cancer cures are largely a delusion and a snare. All sorts of mysterious means are suggested for the treatment of cancer but they do no more than delay the progress of the disease, while possibly hastening the certainty of a fatal result in the end.

Little can be done to prevent cancer except by the adoption of strictly natural habits of living. All excesses must be avoided, most of all, irrtating fluids and irritating foods. The food must consist much more largely of a vegetable diet than is generally the case. A sufficient quantity of water is always essential. Intestinal stasis must be avoided or corrected if known to exist. The best method of prevention is a thorough examination, annually or bi-annually, of all persons thirty years of age and over. This applies to both men and women. The latter for reasons of sex are more subject to cancer as a rule than men, but they

are less subject to cancer of the stomach and practically free from cancer of the mouth, tongue, lips and throat. Cancer of the latter organs and parts is chiefly fostered by the smoking habit. It is rare to find cancer of the lip in anyone who is not a heavy smoker and the same is true of cancer of the throat and oesophagus. Pipe smoking, in this respect, is much more dangerous than the smoking of cigars, while cigarette smoking is apparently the least harmful.

Of late years some evidence has been forthcoming to show that single women suffer more from cancer of the breast than married women. Again among the latter, those who have had children seem to suffer less than those who have had none. In other words, the non-use of the breast for maternal purposes is apparently a predisposing factor in cancer development. Cancer of the female generative organs causes a heavy mortality particularly among married women, due to neglected lacerations after child birth. Methods of birth control are in all probability a predisposing factor in a certain number of cases. Everything that irritates a vulnerable organ should be avoided. The modern habit of young women not to wear corsets is, for this reason, highly commendable.

While the status of the cancer problem is still one of profound discouragement, there are, nevertheless, many hopeful indications of future progress. The research which is being conducted in all parts of the world is gradually yielding results of accumulative value, which are bound to have a profound effect upon the understanding of those who are called upon to deal with the subject. In a general way, it may safely be asserted that vastly more is now known about cancerous processes than at any time in the past. But the progress, unfortunately, has not touched the main question and that is an effective cure for existing cancer in those who suffer from the disease. In the light

of my own investigations, I am more than ever convinced that the most hopeful progress will be made in the direction of profound reforms in habits of living, tending to reduce the manifold irritations to which the human body is subjected at the present time.

Chapter XVII

SOCIAL DISEASES

THE social diseases due to sexual misconduct are still an outstanding problem in public health and personal hygiene. The progress which has been made in the reduction of these diseases admirably reflects the vast influence of sound teaching upon the young, which has only become widespread during recent years. It is not easy to measure the extent of the evil because of unsatisfactory statistics which are difficult to improve in view of the natural reluctance of those concerned to reveal the facts. The medical profession also has been largely indifferent to the urgency of accurate and complete reporting where statutory requirements make it necessary. Social diseases complicate many other important causes of sickness or death to which the preference is given in the official nomenclature. There has long been, however, a need for a comprehensive assembling of the known information, which has recently been performed by a German, Dr. Hans Haustein, whose "Statistics of Sexual Diseases" has just been issued as a part of the handbook of Skin and Venereal Diseases edited by J. Jadassohn, which constitutes the 25th volume of a treatise which has not its parallel in the English language. Dr. Haustein, in more than a thousand pages, admirably covers an immense range of facts for every part of the civilized world. The evidence is not summarized, however, into a convenient form, but the book will prove invaluable as a work of reference.

Dr. Haustein introduces his subject by reference to the mortality from stillbirths, premature births and deaths in early infancy obviously affected by social misconduct. As has elsewhere been pointed out, in this country stillbirths in 1923 in the birth registration area numbered nearly 64,000 or 3.9% of live births, a large proportion of which unquestionably were the immediate result of venereal infections. This figure corresponds quite closely to the average percentage of stillbirths for German cities, which for 1913–1918 was 3.35%. For Berlin alone, the figure was 3.89%. According to investigations in the Netherlands for a period of years, 18.6% of the male stillbirths and 19.2% of the female stillbirths were complicated by syphilis. In Switzerland the corresponding proportions amounted to 22.5% for both sexes.

In the United States in 1926 the number of deaths from syphilis in the registration area was 16,466 or 15.7 per 100,000 of population. It was about the same for 1925. In other words, the mortality from syphilis was almost as high as the mortality from diabetes or from appendicitis, but the mortality records for syphilis are obscured by the transfer of many deaths to other causes complicated by syphilis to which in the international classification the preference requires to be given. In Prussia in 1924 the mortality from all venereal diseases was 4.3 per 100,000, for men and 3.3 for women.

The mortality from venereal diseases is always higher in the cities than in the country. In Prussia, for illustration, the city mortality from venereal diseases was 6.5 per 100,000 in 1924, while it was 6 per 100,000 in the rural districts. How far these figures are affected by imperfect classification or certification is not known.

For England and Wales, there are some unusually interesting statistics covering a period of years which may briefly be referred to. The death rate from syphilis for both sexes has

diminished from 5.5 per 100,000 in 1916 to 3.2 in 1925. For males the decrease has been from 7.4 per 100,000 to 4.2, while for females the decrease has been from 4.1 to 2.3.

In the United States the death rate from syphilis has increased from 3.3 per 100,000 in 1900 to 9.1 in 1920, diminishing to 8.3 during 1924. For 1925 and 1926 the statistics have not yet been published. The previous figures include for the two years deaths from tabes dorsalis and general paralysis of the insane. In 1924 the mortality from tabes dorsalis separately was 1.7 and for general paralysis of the insane 6.4, both these being generally considered the direct result of a syphilitic infection. When these two figures are included in syphilis not complicated, the total for 1924 was 16.4 or slightly higher than the previous rate given for 1926 as 15.7. (For 1925 the rate was 15.8.) But reviewing the evidence for a long period of years it would seem that during recent times the death rate from syphilitic diseases or complications, has been stationary. It had reached a maximum during the war, when the highest figure was attained in 1916 or 19.3 for the several affections combined. There is an extraordinary contrast in our American death rate in syphilis uncomplicated from England and Wales. In 1924 our death rate from syphilis was 8.3, while that for England and Wales was 3.3, but deaths from tabes dorsalis were practically the same or 1.7 for the United States and 1.8 for England and Wales. Our deaths from general paralysis of the insane, however, was 6.4 against a rate of 4.0 for England and Wales.

Haustein gives some interesting statistics of sexual diseases for Copenhagen, which for the five years 1920-24 are summarized as follows: The mortality from acquired syphilis was 2.13 per 100,000; from congenital syphilis 3.87; from aneurism of the aorta 1.90; from tabes dorsalis 1.89 and from stricture of the urethra 4.38. Unfortunately Haustein does not give the figures for general paralysis of the insane. But combining the various

sub-classifications as just given, the resulting mortality of the five groups was 10.17 per 100,000 of population.

For Switzerland 1916-20, he gives the male rate of mortality as follows: Acquired syphilis 1.21 per 100,000; congenital syphilis 1.18. For females, acquired syphilis 0.64 per 100,000 and congenital syphilis 0.92. He also gives statistics for Stockholm which for both sexes combined for 1925 give the following results: Congenital syphilis 2.0; acquired syphilis 6.3, a total of 8.04; tabes dorsalis 2.5 and general paralysis of the insane 2.3.

But the mortality figures in syphilis and other venereal diseases are of much lesser significance than the statistics indicating the prevalence of venereal diseases in the population at large.

The most useful statistics for this purpose are those of the United States Army and Navy, which though limited to a selected body of men, are unquestionably of great intrinsic accuracy. As pointed out by the Surgeon General of the Army for 1926, "It is gratifying to note the very distinct and constant decline from venereal disease incidence in the Army during the last number of years. There has been a decline in the rate each year since 1917, with the exception of 1922, when there was a slight rise." There were 6,614 cases of venereal diseases admitted to the sick report during the year involving a loss of 216,179 days. The average days lost per case from venereal diseases was, therefore, 32.69, while that from respiratory diseases was only 8.78. The admission rates for venereal diseases per 1,000 male military personnel since 1902 have been as follows: In that year the rate was 160.9, and it reached a maximum of 179.32 in 1909. It declined gradually and reached a minimum figure of 49.96 during 1926. Here then is unquestionable evidence of progress, although the figures are still higher than would seem unavoidable.

For the different types of venereal diseases, the following statistics will be of interest. A maximum rate for syphilis was reached in 1911 when the rate was 37.25 per 1,000 white enlisted men.

It had been reduced to 11.94 per 1,000 by 1926. But primary syphilis had increased from 2.39 per 1,000 in 1908 to 4.05 per 1,000 in 1926; secondary syphilis had decreased from 15.02 to 5.54, and tertiary syphilis had increased from 1.99 to 2.14. Here then is food for reflection and an indication that there are still many serious aspects of the venereal disease problem which require drastic measures.

Among the less serious phases of the venereal disease problem, it may be pointed out that the admission rate for chancroids has diminished from 25.96 per 1,000 in 1908 to 8 per 1,000 in 1926. The admission rate for gonorrhea had diminished from 108.30 to 34.48, so there has been a total diminution in venereal disease incidence from 153.65 to 54.42 within the period 1908–1926. Tabes dorsalis is of minor incidence and the same is true of general paralysis of the insane. The former in 1926 caused an admission rate of .02 per 1,000, while the latter had a rate of .28.

Significant in this connection are the admission rates for venereal diseases in the different areas of our army operations. The rate was highest among white enlisted men in China, where it reached a rate of 224.71. This was followed by a rate of 114.91 for white enlisted men in the Philippines and 64.94 for white enlisted men in Panama. For white enlisted men in the United States the rate was only 54.42, and among officers in the United States, it was only 1.21.

The Surgeon-General of the United States Navy in his Annual Report for 1926 observes that there has been a gradual decline in the venereal disease admission rate since 1924. The rate for 1926 was 6.1% less than the rate for 1925, which coincided with the average rate for the preceding five years. The venereal disease admission rate in 1926 was 118.8 per 1,000 of total personnel. For gonorrhea, the admission rate was 71.06 per 1,000 of total personnel in 1926; for syphilis, it was 22.00, and for chancroids 25.73. There was an increase over 1925 in the syphilis

rate equivalent to 12.2%. The number of sick days on account of venereal diseases per 1,000 of total personnel during 1926 was 912 for gonorrhea, 508 for syphilis and 200 for chancroids. It is pointed out by the Surgeon-General of the Navy that "There was a gratifying reduction in the number of sick days per 1,000 chargeable to syphilis. This is of more importance than the increase in the admission rate which was probably due, in part at least, to the recording of certain cases that would not have been discovered in previous years. It is interesting to note that the greatest decrease in sick days was recorded for chancroidal infections. This also suggests more complete and earlier detection of syphilis as well as more successful treatment of chancroids."

The relationship between reported cases of syphilis and gonorrhea does not appear to have varied much for a long period of years, although there are some significant variations. Thus in 1917, there was one case of syphilis to 5.7 cases of gonorrhea, while in 1926 the corresponding ratio was one case of syphilis to 3.2 cases of gonorrhea. There are naturally great variations in the admission rates of venereal diseases according to age. For all forms of venereal diseases, the rate was highest for men between twenty and twenty-six years of age, when it reached 181 per 1,000. It assumed negligible proportions at ages thirty and over, when, however, the numbers were too small for safe conclusions. There are also very significant variations in the venereal disease incidence for the different occupational groups. The rate was highest for the fireroom force or 193.22 per 1,000, followed by seamen, other than apprentice seamen, engine-room force and miscellaneaus artificers. For aviation artificers the rate was only 52.98 and for apprentice seamen it was 50.24. For officers of the Navy and Marine Corps, the rate was only 3.43, while for midshipmen it was 1.23. No cases appear to have occurred among the nurses.

Of unusual interest are the statistics of social diseases for Japan.

Without extending these observations too far, the following will be limited to 1925, when there were 539 officially recognized prostitute quarters in the Empire of Japan, with 490 health centers or clinics for the purpose of examinations. The total number of hospitals for prostitutes at the end of 1925 was 210. The average number of patients was 51,423, while the total number of examinations during the year reached the impressive figure of 3,174,994. The total number of cases of diseases found was 72,665.

Of these, 3,984 were cases of syphilis, 35,269 cases of gonorrhea, 4,627 cases of ulceration, 661 cases of contagious skin diseases, 6 cases of tuberculosis, none of leprosy, 3,008 cases of trachoma, and 9,455 cases of other diseases. The proportion of affected cases per 100 examinations was, therefore, 2.29%, varying, however, considerably for different sections of the Empire. Of every 100 affected cases, 5.48% were syphilis, 50.44% gonorrhea, 26.49% chancroid, 7.23% ulceration, and the remainder other diseases. Here again the figures vary considerably for the different districts of the Empire. The number of cases of venereal diseases per 100 examinations was 1.88% for all forms, 0.13% for syphilis, 1.15% for gonorrhea, 0.61% for chancroid, and 0.17% for ulceration.

Dr. Haustein gives some statistics for Japan covering the period 1909–20. In the last named year the rate of mortality from congenital syphilis was 10 per 100,000, while for all forms of syphilis, it was 15.9. For tabes dorsalis the rate was 2.3. The rates do not vary much for the different years. The total number of deaths from all forms of syphilis in 1920 was 8,910. The rate for 1919 as given by Dr. Haustein for congenital syphilis is evidently a printer's error. Dr. Haustein gives some statistics derived from insurance sources in Finland, according to which, out of 567 persons suffering from syphillis, 86 were expected to have died during the period under observation, while the actual

number dying was 149. Calculated upon the number exposed to risk the actual mortality was 26% instead of 15% as expected. In other words, the 567 persons under observation experienced an after lifetime of 1,289 fewer years than they would have lived had they not been infected, or in other words, they actually lived 34,034 years instead of 35,323 years, an average curtailed longevity of about two years. It would be easily possible to extend these observations into a volume, but all of it must be treated with extreme caution in view of the difficulty of making sure of the basic facts. But the data available clearly emphasize the continued seriousness of the situation which requires more drastic means for its suppression than has thus far been achieved. At the same time, it is only fair to point out that considerable progress has been made, reflecting an improvement in the morality of the population. It is an open question, however, how far precautions or preventive means in irregular sex relations affect the situation.

Chapter XVIII

RESISTANT TUBERCULOSIS

THE statement is often made that "the campaign against tuberculosis is showing results." Unquestionably there has been a very substantial reduction in tuberculosis mortality, not only in this but in practically all civilized countries. The reduction affects every element of the population. The reduction is often pointed to as an outstanding result of health promoting agencies aiming at the education of the public in methods of prevention. But the question always arises as to how far these methods are really the responsible cause or that coincident results are not seriously confused. But granting this, it seems to admit of no argument at least in one direction that the public is now much better instructed than formerly, and that is in the desirability of the earliest qualified treatment of the disease. The suggestion that a single cause is responsible for tuberculosis appeals powerfully to the average mind. But as a matter of fact, it is not one cause that is responsible but many. While the direct or important cause of pulmonary tuberculosis is unquestionably the invading bacillus, the nature of that invasion is often in doubt or uncertain. Some recent investigations seem to point conclusively to the fact that a vast majority of children and young persons are infected and have the disease in a very latent form, but for some reason or other do not develop an active tuberculosis in later life. Thus the cause of tuberculosis cannot be separated from conditioning circumstances, summarized in the three essentials of adequate nutrition, a lessening of fatigue and a de-

cided improvement in the environment, particularly as regards light and air. Any one familiar with the changes in modern civilized conditions of living will grant that nutrition practically everywhere has improved, that exhausting physical labor is very much less than formerly, while the environment among all the elements of the population is very much better as regards light, air and ventilation.

When the tuberculosis campaign was first initiated (and it was my privilege to be one of the founders of the National Association) there were those who intimated the practical extermination of the disease within twenty years. No such event has taken place, for even at the present time the annual mortality throughout the country is probably not far from 100,000. In the registration area the death rate from tuberculosis has now been reduced to 86.6 per 100,000 against possibly twice that number of deaths twenty years ago.* But the rate still continues high in certain sections of the country and especially among the negro population, which has about twice the death rate from pulmonary tuberculosis common to the white population in the same sections. The disease is also still very common in certain occupations, particularly such as are exposed to the continuous and considerable inhalation of mineral dust. In dusty trades, however, the primary infection is not one of pulmonary tuberculosis but of silicosis, which brings about an impaired condition of the lungs and a very high degree of susceptibility to subsequent tuberculous infections. The medical profession is, as yet, quite indifferent to this important distinction which lies at the root of an urgent problem in industrial hygiene demanding decidedly more qualified consideration.

The historical retrospect of tuberculosis mortality is one of profound interest and practical importance. Thus, for illustration, the City of Chicago had a death rate from all forms of

* For 1926 the rate, however, was 87.1.

tuberculosis as high as 281 per 100,000 of population in 1870. By 1899, the rate had been reduced to 181. Yet the true cause of tuberculosis during this period was unknown, or in any event, what was known about it was not practically applied in the direction of prevention. A still longer historical retrospect would show the same result on a larger scale. As a matter of fact, the incidence of tuberculosis had been decreasing, year by year, for half a century. It is probably true that the decrease has been on a more rapid scale during more recent years, but, of course, it is always easy to reduce a very high rate of mortality to more moderate proportions, than to reduce a moderate rate to a negligible quantity. The resistance to elimination diminishes in proportion to the lessening incidence of any disease. One of the few examples of control is the practical elimination of yellow fever, but even that disease still lingers and defies efforts at complete extermination. Another disease which could be completely prevented is smallpox which still remains an outstanding problem in public health administration.

From a tuberculosis death rate of 202 per 100,000 in 1890, the City of Chicago showed a reduction to 178 in 1910. Since that time the rate has declined to 97 by 1920 and to 83 by 1925. In that year the rate from pulmonary tuberculosis was 74 and from other forms of tuberculosis 9 per 100,000 of population. The latter forms of tuberculosis have never received the vast amount of attention which has been given to pulmonary tuberculosis, although, as indicated, the rate is by no means of negligible importance. Only those who are thoroughly familiar with other forms of tuberculosis know the heavy economic burden that those forms of tuberculosis often entail. It is only of recent years that the value of sunlight in the treatment of bone tuberculosis has been better realized and the outlook is now a decidedly encouraging one that this group of tuberculous diseases may be more effectively dealt with in the future.

Of the greatest possible importance in tuberculosis is adequate provision for the treatment of patients. It is now generally recognized that home treatment of the disese fails, as a rule, to prove productive of good results. One of the outstanding experiments in institutional treatment is that of the Municipal Tuberculosis Sanitarium for the City of Chicago, which is a model institution, suggestive of the best methods at present in vogue. This institution in 1924 was operating at an average weekly expense of $15.00 per patient, a total expense of more than $1,500,000. The report of that institution indicates that the number of cases of tuberculosis in the general population was about 29 per 10,000. The actual number is possibly now half of what it was six or seven years ago. It must not be overlooked that this period represents the most extraordinary advance in conditions of living throughout the country. Higher wages, shorter hours and better conditions of working are the underlying causes responsible for this gratifying diminution. But the disease still remains as one of the most important economic disease questions of the time. The economics not only involve the actual expenditure for the care of tuberculosis persons at home or in institutions, the loss in wages and the possible loss of the wage earner, but also the best possible means of restoring convalescent tuberculous patients to their former earning capacity. Some progress has been made in this direction, but as yet the agencies available for this purpose are far from adequate.

Progress has been made in the earlier diagnosis of pulmonary tuberculosis, but here also much remains to be achieved. Far too many advanced cases reach the institutions when satisfactory treatment is out of the question. The number of far advanced cases is a lamentable indictment of the medical profession, which often fails to inform the patient of his actual condition at a time when he or she might realize the true facts of a most serious situation. All the evidence, however, now available proves conclu-

sively the far reaching value of sanitarium treatment in incipient cases and the after results are showing a decided improvement. Pulmonary tuberculosis is nowhere more of a real problem than in certain industries, particularly the so-called dusty trades. Polishers and buffers, stone cutters, tunnel workers and many others exposed to mineral dust or dust otherwise irritating to the lungs, are invariably subject to an excessive death rate from tuberculosis, which falls most heavily upon the early productive years of life with often heavy family responsibilities. It is regrettable that the medical profession should never have seriously concerned itself with the industrial aspects of tuberculosis as the facts of the situation call for. In the last decade, however, progress has been made in this direction through industrial physicians who have been much aided by physical examinations required by certain plants as a condition precedent to employment. Such medical examinations should in all cases be insisted upon in trades known to be subject to a high death rate from tuberculosis, but in none more so than stone cutting, particularly the cutting or carving and polishing of stone containing a large proportion of silica. We are yet far from having reached a point of industrial adjustment where we are willing to pay the price of heavy neglect in industry, while granting adequate compensation to men injured through injurious dust, as the result of occupational conditions, which to a certain extent do not admit of being materially improved. A nation-wide agitation for compensation for silicosis would reflect a higher conception of social adjustment and aid substantially in the reduction of this widespread evil. What can be done in the way of preventing tuberculosis through proper medical plant supervision has recently been emphasized in an address by Dr. L. Hasslett of the Westinghouse Electric Manufacturing Co., East Pittsburg. At the plant of this company the number of tuberculosis cases requiring treatment had been reduced between 1921 and 1924 from 87

cases to 45 cases, while the number of deaths had been reduced from 12 to 6. By means of careful supervision of convalescent employees, it has been possible to enable 25% of the tuberculous patients to return to work. An organization which has also done excellent work in this direction is the Union Health Center of the Joint Board of Sanitary Control under George M. Price, the well-known authority on occupational diseases. This organization aims at the exclusion of new tuberculous members from the Union and during the last twelve years, some forty persons with active pulmonary tuberculosis have been rejected. Any one can estimate the harm that would have been done by allowing these forty workers to spread the disease among the non-infected.

Thus, while it will be many years before tuberculosis will reach a vanishing point from the category of present day diseases, the progress which is taking place is nevertheless most gratifying and suggestive of still further progress in the years to come. The war experience of European nations conclusively proves that undernutrition and excessive hours of labor with the inevitable neglect of proper medical attention and delay in treatment infallibly bring about a recrudescence of the disease to possibly alarming proportions. The widespread prosperity in this country is not only directly responsible for a lowering of the tuberculosis death rate as the result of better nutrition, shorter hours and better working conditions, but it also provides the means of more adequate medical treatment and the earlier treatment of infected cases. But the evil will not be dealt with most effectively until periodical medical examinations made by thoroughly qualified examiners are universal in American industries. Another line of prevention will be in the direction of vocational selection by means of which young persons unsuitable for certain employments will not be permitted to engage in a line of work unsuitable to their physique or physical condition. The occupations requiring a minimum degree of physical exertion are usually such

as involve sedentary labor, a stooping posture, indoor confinement, often exaggerated by poor ventilation, want of direct sunlight and an impairment of posture.

In all of these directions a vast amount of tuberculosis prevention is possible, for the chief objective should always be to prevent the onset of the disease rather than its continuation or its fatal termination.

The present toll of nearly 100,000 deaths from tuberculosis represents possibly not less than a million cases of active tuberculosis throughout the country. The mere cost of medical and institutional care is enormous. No mere optimistic assurances aid the cause of true disease prevention. The so-called Framingham demonstration, in the light of past experience, cannot be considered significant, or as pointing the way in which the best results are possible. That demonstration was based upon entirely too small an area of observation, while the conclusions rest upon the few deaths which mere chance might easily have affected. But the Framingham demonstration was sound in realizing that the tuberculosis problem can only be solved by attention to all the multitude of matters that concern good health and physical efficiency. But of these factors the most important are good nutrition, reasonable hours of labor, including the avoidance of all excesses, and the best possible conditions of work. American industry can point with pride at what has been achieved in this direction, but more can be done and more will be done as the facts are better understood.

Chapter XIX

NO DIPHTHERIA

A CHEERFUL optimist in health-promoting activities, Dr. Lee K. Frankel, is of record as having intimated the possibility of "No diphtheria in New York State in 1930." Dr. Frankel had much justification for his happy anticipations, although in the past such prophecies have usually come to naught. When the tuberculosis movement was started, Mr. Kingsbury was of record as prophesying "No tuberculosis in 1921," but an immense amount of tuberculosis remains and it is reasonably certain that a considerable amount of diphtheria will remain in 1930, but the facts in any event are suggestive of rapid decline. As far back as December 24, 1894, I contributed a brief letter to the New York Herald on "Diphtheria and Antitoxin" in which I dealt with the disease as a scourge. At that time I intimated that antitoxin would save many lives and that if prompt action was taken, possibly three-fourths of the lives of the victims of the disease would be spared, concluding with the remark "no more humane opportunity has ever been presented to the public and no more humane effort could be possible than the saving of from sixty lives a week in Manhattan to twenty-five to forty lives a week in Brooklyn." This was a crude statement, rather amateurish at the time, but justified by the facts available.

The diphtheria statistics of twenty and thirty years ago indicated the frightful toll of young lives sacrificed to a disease, the nature of which was then but imperfectly understood. Nothing

in the history of medicine is more suggestive of the immense value of the experimental methods, than the discovery of diphtheria antitoxin, which has brought about a veritable revolution in mortality experience. A typical illustration is the city of Chicago, where the mortality reached a maximum of 1,642 deaths during 1895, equivalent to a rate of 120.1, per 100,000 of population. But further back, in 1880, the rate had been as high as 290.7. Providence in 1887 experienced a rate as high as 257 and the same rate prevailed in 1887 in St. Louis. I will not enlarge upon the dismal facts of the situation but merely point out that in 1925 there were only 240 deaths from diphtheria in Chicago or a rate of 8.0 per 100,000 against a maximum rate of 290.7 in 1880. For the country at large the figures are equally reassuring. In the registration area in 1924, there occurred 9,316 deaths from diphtheria, but during 1926 the number of deaths was only 7,836. The rate had, therefore, been reduced from 9.4 per 100,000 to 7.5. For some unaccountable reason, the rates for England and Wales have generally been much lower than those for this country. For England and Wales, the rate has been reduced from 15.9 in 1914 to 7.7 in 1926. But there is every assurance that the disease is reasonably well under control at the present time, provided the known methods of prevention and treatment are properly employed.

Diphtheria for many years has been a notifiable disease practially throughout the country. It is, therefore, possible to arrive with approximate accuracy at the number of cases occurring, which is not possible for many other important diseases. The United States Public Health Service has tabulated the returns for 47 states giving a total of 119,831 cases with 9,755 deaths. The case rate per 1,000 inhabitants in 1924, was, therefore, 1.07, but upon the basis of the normal average for 1917–1923, the expected number of cases should have been 141,594 or at the rate of 1.34 per 1,000. There has thus been a saving during the

year 1924 of about 20,000 cases which, having passed the danger of diphtheria, may safely be expected to continue for many years.

While the actual case incidence and mortality from diphtheria have been measurably reduced, the case fatality likewise is now only 8.19%. In former years it was often as high as 25% and even more. The seriousness of diphtheria is best illustrated by comparison with measles, which has a case fatality rate of 1.64%, and of scarlet fever, which has a case fatality rate of 1.71%.

One of the most interesting studies of diphtheria with correlation data for scarlet fever and measles has been published by the Willard Parker Hospital, New York City, covering the period 1919–1923. During this period, the fatality rate of diphtheria was 16.2% while that of measles was as high as 15.7% and of scarlet fever 8.1%. The case fatality rate of diphtheria has not differed very much for the two sexes, having been 17.1% for males and 15.4% for females. The case fatality rate is highest, of course, during the very early period of life, reaching a maximum of 42% during the second half of the first year. This is about the same as for measles and scarlet fever. The percentage of secondary infections due to exposure prior or subsequent to admission to the hospital is a rather complicated factor regarding which much has yet to be ascertained before it will be safe to arrive at final conclusions. Equally involved is the incidence of complicated infections which represent 41% of complications in diphtheria compared with 76% in scarlet fever and 72% in measles. The percentage of patients developing complications before admission to the hospital was 31.8% for diphtheria against 14.2% for scarlet fever and 61% for measles. The principal complications in diphtheria are adenitis, albuminuria and bronchial pneumonia in the order named. These three complications represent about 75% of all the complications.

The economic aspects of the disease are emphasized in the statement that the average number of days' care for patients who

suffered from diphtheria was 17.2, of those who recovered 18.2 and of those who died 7.3. It is pointed out that the occurrence of many deaths within a few days of admission would give a low average length of stay, while it is suggestive of the delay in proper treatment that the care for patients who died should have been less than half of the days' care for patients who recovered. It also pointed out that 5.1% of the fatal cases of diphtheria patients were moribund on admission, while 36.9% had less than twenty-four treatments. The principal contributory cause of death in diphtheria cases in 1923 was pneumonia, accounting for 40.8%. It is said in this connection that "the frequency with which deaths occur during the first forty-eight hours after admission, especially from diphtheria, indicates the necessity of renewing the education of physicians in the earlier and adequate use of pre-diphtheria antitoxin in suspicious cases."

The evidence regarding the value of the antitoxin treatment has so often been dealt with in qualified discussions that it would serve no purpose to enlarge upon it. But it may not be out of place to quote from an article on "Antitoxin in Diphtheria" published by the Department of Health of New Brunswick, to the effect that "nothing in this world notwithstanding these curious perversions of mind, a few of which have been just cited, can be more certain than that antitoxin has cured and will cure diphtheria when properly given as respects time and method. Even with antitoxin well known in New Brunswick for many years, additional care through the educative efforts by the Public Health authorities in the more frequent and timely giving of this remedy for the past four years, has reduced the deaths from this disease by one half." Nor is it necessary to enlarge upon the value of the Schick Test, which is one of the many contributory factors in the reduction of the case incidence of diphtheria during recent years."

But there is an important phase which requires to be better

understood, and that is the frequency of carriers of the diphtheria bacillus, who are a serious menace to the community. In a report upon this subject by the Department of Public Health of the University of California, it is stated that "A survey of entering students showed that 3% examined harbored morphologically typical B diphtheriae, and that 11%of this group carried virulent organisms. The virulent carrier rate for the whole group was 0.3%." But this small group may easily be responsible for a disastrous outbreak affecting even students well advanced in years.

Reflecting upon the control of diphtheria by public health agencies or otherwise, the experience is one of the most illuminating in the history of preventive medicine, and while it is unquestionably premature to foreshadow "No diphtheria in 1930," it is certainly a foregone conclusion that the present toll of human lives from this dreadful affliction in early childhood will be further and more materially reduced in years to come.

Chapter XX

SMALLPOX AND VACCINATION

THERE are none so blind as those who will not see. The cheerful optimist in modern medicine triumphantly points to the extinction now of one and now of another disease, indifferent to the lessons of every-day experience that, though progress is being made, the ideal is practically never attained or attainable. Smallpox and yellow fever are generally thought of as the most obvious triumphs of modern medicine. But smallpox lingers and is a constant menace in many localities, while yellow fever also refuses to be exterminated. The facts of the smallpox situation are rarely visualized in their full significance. During the first eleven months of 1921, there were 21,233 cases of smallpox reported for the several states of this country. During 1924, the number of cases increased to 43,029, diminishing to 31,037 during 1925. For 1926 the data are not yet available. In the State of Minnesota between 1913 and 1925, there had been 39,250 cases of smallpox with 613 deaths. Thus the disease is both widely prevalent and relatively fatal in its results. Smallpox in 1926 caused only 377 deaths in the United States against 874 deaths in 1924. Every one of these deaths was preventible and their occurrence is an indictment of public intelligence. The evidence in favor of the value of vaccination is mountain high and known to every one. Yet the number of

unvaccinated persons is enormous. When an outbreak occurs, vaccinations take place by the wholesale and check the further development of a serious epidemic. Yet regardless of all precautions and statutory requirements in certain states, with reference to school attendance, etc., smallpox continues to prevail to the extent of possibly 50,000 cases a year or more.

The practical difficulty with vaccination is that the protective effect of the virus rarely extends over more than three or four years. Revaccination is, therefore, necessary for the purpose of a complete protection of the community. Of course, under ordinary conditions the risk of contracting smallpox is exceedingly slight. It is essentially a filth disease and chiefly met with among elements of the population indifferent to sanitary requirements and personal hygiene. But under conditions of modern urban life, contact with such people cannot be avoided and the disease now and then is carried into even the very best of homes. If it is recognized in its very earliest stage and proper treatment is applied, it is rarely fatal, but diagnosis occasionally is erroneous at the outset upon the assumption that smallpox is not likely to occur among the prosperous and well-to-do. Many investigations have been made to study the protective value of vaccination and invariably the results prove that those who have been vaccinated are practically immune. But the utmost care is necessary in vaccination to safeguard against untoward results due to spoiled vaccine. Every now and then an infection develops from an inoculation due to the lack of proper care in the operation, which should, of course, be absolutely antiseptic.

Of special significance are the smallpox statistics of Chicago, which go back to 1867 when the mortality rate from this disease was 54.7 per 100,000. It rose to 178 by 1872, declined for some years but increased again to 130 by 1882. After this, there was nearly a decade of low incidence, when suddenly the epidemic of 1894 raised the rate to 78.9. Since that time the disease

has apparently been brought under almost perfect control and during 1925 only 12 deaths occurred or at the rate of .04 per 100,000. This record shows conclusively what can be done in the way of prevention if a vigorous health administration supports the known theories of prophylaxis. During the year 1925, there were 70 cases of smallpox in Chicago, many of which were, no doubt, imported. Of the 70 cases, 55 had never been vaccinated while 15 had old or doubtful scars. In many of the cases the eruption had been known for six days or longer. The vigorous character of the health administration is best illustrated by the fact that against 11,574 vaccinations in 1923, there were 173,710 in 1924 and 110,842 in 1925.

There is an encouraging note in the recent report of the health section of the League of Nations which is to the effect that "Smallpox is becoming increasingly rare on the European Continent." The Scandinavian countries have remained entirely free from smallpox for two years. There has only been one case of smallpox in Switzerland. The most significant phase of the smallpox situation is that the disease to an increasing extent appears to be of a milder type than formerly. This observation applies to practically all countries where the disease is known to occur. Regardless of many learned observations as to the cause of smallpox or conditioning circumstances favorable to epidemic outbreaks, many questions concerning the disease remain unanswered, save the supremely important one that it can be prevented by vaccination and is being prevented on a colossal scale everywhere where vaccination is rigorously enforced. With very few exceptions, the statement may safely be made that practically all those who die from smallpox are persons who have not been vaccinated. In view of the universal experience that vaccination is a protection against smallpox, the State cannot yield in its position that in schools, at least, where children are obviously most exposed, compulsory vaccination must be rigor-

ously enforced. Like consideration applies to public gatherings generally, and to migration and intermigration, particularly in the case of countries in which smallpox is known to prevail on a considerable scale.

Chapter XXI

WHAT IS HODGKIN'S DISEASE?

IT is sometimes the practice in medicine to give the name of a disease to the doctor who first recognized it as a specific affection, properly described it and made his observations a matter of record. Thus we have Addison's Disease, named for Thomas Addison; Brill's Disease, which is a mild atypical form of typhus fever; Bright's Disease, named after Richard Bright, and Hodgkin's Disease, named for Thomas Hodgkin who was born in 1798. Hodgkin's disease is sometimes called Pseudoleukemia. It is, like Addison's disease, a rare but somewhat more common affection causing approximately 800 deaths in the continental United States during the course of the year. The frequency rate is about 0.8 per 100,000 which varies but little from year to year. It was in 1832 that Hodgkin first called attention to a disease characterized by progressive enlargement of the superficial lymphnodes associated in many instances with splenomegaly, which is but another name for affections of the spleen. It is generally held that Hodgkin's disease is inflammatory in nature and of infectious origin, but the true source of the affection has not as yet been ascertained. Opinion seems to lean towards the view that the disease is really a form of malignancy although it is not included in the category of cancerous affections. It is considered, however, to be capable of developing malignant properties and therefore constitutes one of the most serious affections that demand the utmost skill in treatment and atten-

tion. The statement has been made that Hodgkin's disease is most frequently met with between the ages of 10 and 35 years. In the United States registration area in 1923, there occurred 780 deaths from Hodgkin's disease, of which 20 were ages under 1; 47 were of ages under 5; 34 of ages 5 to 9; 29 of ages 10 to 14. The majority of the deaths occurred between the ages of 35 and 64, or not quite 50% of the whole. The former statement, therefore, of its age distribution has been contradicted by subsequent experience.

The disease is relatively very rare in the colored population, there having been only 14 deaths among colored males and 11 deaths among colored females in the registration areas of 1920 during the year 1923. Dr. Symmers who has written a fairly extended account of the disease, as observed in an extensive practice in New York City, had seen only a single case in a negro. The frequency rate of Hodgkin's disease is just double that of Addison's disease or 0.8 per 100,000. For England and Wales the rate for 1926 was 11 per 100,000. In that country the data extend further back and indicate an increase from 8 per 100,000 in 1913 to 11 per 100,000 in 1926. But no extensive study of its geographical distribution throughout the world appears to have been made. The rarity of the disease is perhaps best illustrated by the fact that during the war experience of the United States Army in the United States and Europe representing a mean strength of 3,700,000, there were only 61 admissions for Hodgkin's disease during the period April 1, 1917 to December 31, 1919. The corresponding figure for Addison's disease is much less and the outlook for successful treatment somewhat more hopeful.

Hodgkin's disease has been defined by Greene as "an infectious granulomatous process of uncertain origin, chronic, progressive and fatal, chiefly affecting male adults under 40 years of age, characterized by peculiar histologic changes in and marked

enlargement of the lymph glands associated with splenic enlargement and anemia of varying degree but lacking blood changes or lymphatic leukemia." This rather formidable definition may be summarized in a statement also by Greene that the essential clinical change is one of the enlargement of the lymph glands involving primarily limited areas, but tending to extend widely. Thus a swelling of the neck is one of the most certain indications but easily mistaken for other affections. There are different types of Hodgkin's disease which can only be accurately diagnosed with painstaking attention. When the disease extends inward into the abdominal cavity the prognosis or the outlook for successful treatment is extremely grave, but if attention is given to the first enlargement of the superficial lymphnodes of the neck, treatment is more often effective. Unfortunately the enlarged nodes are generally painless and easily movable beneath the skin which leads to the assumption that the affection is of no consequence. In this as in all other swellings and tumors the absence of pain must never be misconstrued as a favorable symptom. Another characteristic indicated is that fever occurs more or less constantly in Hodgkin's disease but varies in type. According to Dr. Symmers the temperature may reach 103° or 104° and not infrequently is accompanied by chilly sensations or by actual chills and sweats. There are several different types of this disease which cannot here be described.

As a rule Hodgkin's disease pursues a chronic course but tends to remain localized, only gradually spreading from one group of nodes to an anatomically related group, but sometimes to remote parts. Greene states that instances are not unknown in which the disease terminated fatally within a few weeks or months. But this statement was made long ago and at present the outlook is more hopeful. Operative treatment is at present sometimes successful. X-rays have been used and apparently with some success. All in all, it is a grave affliction which must

never be treated lightly, especially in its beginning, when the hope for successful treatment is of course at its best.

The foregoing observations are largely confirmed by one of the most recent discussions on Hodgkin's disease of the skin by Dr. Shelmire of Dallas, Texas, who makes the statement that many observers have reported beneficial results from the treatment of Hodgkin's disease of the skin with X-ray. He quotes Ziegler to the effect that 50% of the cases of Hodgkin's disease die within a year, but he gives a case of twenty years' duration and another of twelve years' duration. Skin eruptions are common in Hodgkin's disease and always suggestive, but regardless of much encouraging opinion concerning Hodgkin's disease, the medical profession is still in the dark concerning both its essential cause and its most successful mode of treatment.

Chapter XXII

WHAT IS ADDISON'S DISEASE?

THERE is nothing more terrifying to a patient than to learn from his attending physician that he is suffering from some obscure complaint, which seems to admit of no definite diagnosis. The trouble is frequently increased when the fact becomes known that the disease is of very rare occurrence and that the treatment is a difficult and prolonged one with a doubtful prognosis. Addison's disease is one of these afflictions, for the number of deaths in the United States rarely exceeds 300 or 400 during the course of a year. It is a disease of remarkable conformity in frequency for the rate during the last fifteen to twenty years has varied but little. In 1900, for illustration, the rate was 4 per 100,000 and it was practically the same in 1923. It has sometimes been as high as five and some times as low as three. In England the rate is slightly higher, averaging about 6 per 100,000. There it has been as high as 7 and as low as 5. The statement is sometimes made that the disease is much more prevalent in males than in females, but this is not correct. In the United States in 1923 in the registration area, there were 152 deaths from Addison's disease among white males and 165 among white females. In England during the same year there were 101 deaths among males and 126 among females. The disease is very rare below twenty years of age and most common between 35 and 75. No extended study has been made of its geographical distribution in different parts of the world.

Addison's disease derives its name from Dr. Thomas Addison who was born in Newcastle on Tyne, in April, 1793. He announced the discovery in 1855 in a work on "The Constitutional and Local Defects of Diseases of the Superrenal Capsules." Some earlier cases had been reported but they had not been clearly identified as a separate entity. His description of the disease was a masterful account which has become a classic in medical literature. Addison's disease is characterized by a peculiar bronzed discoloration of the skin, although this is not invariably present. It is in brief a profound disturbance of the adrenal glands. In a great majority of cases it is associated with tuberculosis in some form or other. The earliest characteristic symptom is a profound anemia associated with a languid disposition, debility, feebleness of the heart action and irritability of the stomach. But its chief characteristic is a bronzed discoloration of the skin which gradually increases until the entire complexion all over the body is changed.

One of the most recent contributions to the study of Addison's disease is by Dr. Leonard D. Rowntree of the Mayo Clinic, Rochester, Minnesota. He describes the so-called Muirhead regime which is followed at the Mayo Clinic. He mentions a record of 21 patients suffering from Addison's disease and points out with reference to 47 cases which had been treated at the Clinic since 1912 that they represent approximately one in every 6,600 patients or 16 per 100,000. This rate, of course, is four times the rate as it occurs in the general population, which is accounted for by the concentration of such cases at the Mayo Clinic, where the outlook for successful treatment is probably as good as anywhere in the country. At the Mayo Clinic males are more frequently affected than females which is another contradiction of the statement made some years ago by Dr. Frederick B. Henry who contributed an extended account on the disease to the Reference Handbook of the Medical Sciences. The reck-

less use of statistics in medical papers is unfortunately very common. The average age at onset, according to Dr. Rowntree, was approximately 40 years with age periods running from 14 to 68 years. In the United States registration area in 1923 one death from Addison's disease occurred during the first year of life, while two deaths occurred between ages 5 to 9, and three other deaths at ages between 10 to 15.

Of previous illnesses, Dr. Rowntree assigns first rank to influenza, followed by pneumonia and tuberculosis in the order named. Other complications are syphilis, malaria, typhoid fever, accidents and pregnancy. Out of the 47 cases, the onset was insidious in 35 cases and sudden in 12. There was a progressive course prior to admission in 38 cases and a stationary course in 2.

In the series of cases reported by Rowntree, pigmentation or discoloration of the skin was present in every case, though in varying degrees. He concludes that the exact nature of the early pigmentation in such cases is uncertain, that the distribution of the pigmentation in a general way is as it had been outlined originally by Addison in 1855. Many of the patients had pigmentation of the mucous membrane, mouth, lips, cheeks or palate, while that of the lips, as a rule, was most marked.

Of great importance is the fact early revealed by Addison that loss of weight was to be considered a cardial symptom. The average loss of weight in 21 cases reported by Rowntree was 32 pounds, but in 19 other cases it was 26 pounds. Gastro-intestinal complaints of one kind or another were present in practically all cases. While pain is not generally a symptom, quite a number of patients complained of a vague, dull, deep, aching pain, which must have been and probably was superrenal in origin.

The blood pressure was consistently low and usually more so in the early morning. The heart action was usually feeble. The respirations were also suggestive of profound disturbances. The

systolic blood pressure reached a maximum in one case of 154 and a minimum of 60 in another. All of these are matters readily within the understanding of any one. They are suggestive of a very serious shock to the system which precludes as a rule a hopeful prognosis. In the 47 cases reported upon by Dr. Rowntree, 29 died during the treatment, only 7 patients were known to be living, the remainder probably having been lost sight of. Thus, Addison's disease must be looked upon as a very serious affection demanding the earliest possible and best qualified treatment. In the words of Dr. Rowntree, "The prognosis in Addison's disease is extremely serious." Only in a certain proportion of the cases can marked or lasting improvement be expected or obtained. At best the treatment can only combat the functional insufficiencies of the superrenal gland. If this is the outstanding factor in the disease a form of substitution or complementary treatment may prove of decided value, while it is as true today as many years ago when Henry pointed out that "It may be said that there is no specific treatment." The treatment falls in the group of what is called organotherapy or treatment with adrenal extracts which is too technical for discussion. It requires exquisite care in its administration. It is based upon the theory that Addison's disease is chiefly due to suppressed functions of the adrenal glands. It offers a hope to the patient, but at best the hope is but a slender one.

Chapter XXIII

SUNLIGHT AND HEALTH

NOTHING is more amazing than the indifference of most people to the beneficial effects of sunlight exposure. In the summer time it is true many of those who go to the seashore are proud of their coat of tan, but rather for reasons of vanity than for reasons of health. Sunlight is the cheapest of all remedial agencies. In the case of children especially, the larger the sunlight exposure the more likely it is they will grow up in perfect good health. But the sunlight that passes through ordinary windows is deprived of its most beneficial ultra violet rays, which in the case of many serious diseases are often later applied artificially with excellent results. In other words, it is direct exposure to sunlight that alone produces its maximum benefits. It is hardly necessary to point out that reasonable precautions must be observed. Just as too much of anything is always harmful, so it is true of sunlight that excesses must be avoided. There is a peculiar idiosyncrasy in this matter which must not be lost sight of. Sun parlors should form a part of every home wherever it is possible and the sun exposure should be through the open window directly upon the body with as little clothing as possible, if any. One of the earliest scientific observers to draw attention to its value was Finsen, who has since become famous through the Finsen light. His work was brought to the attention of English readers largely through a volume on Sunlight and Health by Dr. C. W. Saleeby, who investigated the Finsen

light particularly in the case of skin tuberculosis. In 1921, Dr. Saleeby went to Leysen in Switzerland, where he studied the extraordinary results of heliotherapy obtained by Dr. Rolier a pioneer in the sunlight treatment of bone tuberculosis. Attention was drawn to the serious results of smoke pollution of the air and investigations clearly showed that cities subject to vast quantities of smoke suffered as a result from diseases traceable to this cause. It is amazing how the factor of sunlight has been ignored in the construction of hospitals, institutions, particularly prisons, and factory buildings. Of late years, however, this condition has undergone a profound change, but the important fact that window glass filters out the beneficial ultra violet rays is still largely unknown. The time will come when window glass will be prepared of a quality which will not be objectionable.

It was only in 1903 that Dr. Rolier opened his first clinic for the treatment of so-called surgical tuberculosis by sunlight. His work, unfortunately, was seriously interrupted by the war. Today his methods are being tried more or less the world over. Within recent years also the discovery has been made that rickets, which is one of the most serious affections of early childhood, is preventable and curable by sunlight exposure. Dr. Hess of New York has done much good work in this direction.

We may yet come to the conclusion that the early sun worshipers, particularly the Incas, were probably more wise in this respect than we have been for generations past. Nowhere in my experience have I derived greater benefits from direct sunlight exposure than in the highlands of the Andes and in the City of Cuxco, the old Sun City of the Incas. Were it not for the poverty of the people and the abominable conditions of housing and unsanitary habits, that section of the world would produce perhaps the finest race of people on the face of the globe. Some writers have drawn unfavorable conclusions with

regard to the tropics on the ground that the more direct rays of the sun near the Equator are destructive to the life of the cell. They are of the opinion that the continuous exposure to sunlight in the tropics is one of the causes of tropical neurasthenia. There is possibly something in the theory, but it has obviously been carried too far. As yet our knowledge of the differential effects of sunlight at different latitudes is very obscure. Certainly the people of the Southwest are as healthy and as relatively free from nervous affections as are the people in other parts of the country. The sunkissed lands of Arizona and New Mexico are perhaps the most invigorating regions of North America. What is needed is a modification of our habits to avoid direct sunlight on every possible occasion.

Finsen received the Nobel prize of medicine for his epoch-making discovery. We are only at the beginning of a wider conception that nature itself is one of the greatest of all healing forces. It is absolutely essential that the body itself be kept in good condition as an efficient mechanism to perform its normal functions without the countless interferences, irritations and what not common to our so-called civilized mode of living.

Chapter XXIV

THE HUMAN CONSTITUTION

WHILE we know about everything that is necessary concerning the nature and purpose of most of the machines by means of which our industry is carried on, we have only a vague conception of the much more intricate mechanism which constitutes the human machine of our bodily constitution. It has well been said "It goes without saying that an efficient body must in the long run be a body free from disease." But most of our bodies after forty years of age are in a woeful condition of impaired efficiency which lies at the root of the heavy mortality in middle age, which is only slowly being improved as the result of a better understanding of the principles and practices of personal hygiene.

It goes without saying that any mechanical contrivance would soon be out of order unless its make-up was thoroughly understood and its various parts were well cared for against the ever-present wear and tear. But in the case of our human body, we are indifferent to care and precaution during the years when the body is capable of withstanding an enormous amount of wilful or unintentional abuse. Infinitely more delicate in its make-up, the human machine requires a thorough understanding, but as to this only a beginning has been made, and most of the prevailing theories of body build rest upon mere conception and crude data inapplicable to the individual and his particular needs. In a monumental work on early adolescence, the late

Professor G. Stanley Hall has learnedly discussed the subject of growth in height and weight, amplified by much useful information suggestive of many facts which should be thoroughly understood. But it requires an immensely larger basis of data and information concerning body growth in adult life, as to which we as yet know little that is of real value and useful in the direction of the prevention of impairments. Thus it is generally assumed that weight must increase with age, but there is nothing in nature that justifies this assumption, however much the facts of overweight experience may prove to the contrary. Civilized human beings increase in weight in adult life primarily because of wrongful habits. When maturity has been reached, say at age thirty, there is no natural necessity whatever for any further increase in body weight in normal beings. If a person weighs two pounds to every inch of height, the weight is sufficient for all physiological requirements with the exception of certain special occupational conditions which do not bear upon the question. Increase in weight is not a physiological necessity in adult life, but the result of overfeeding and lack of exercise. Increase in weight with increasing age instead of being an advantage in the direction of increasing disease resistance is quite to the contrary a hindrance and a source of infinite mischief. Thus the tables of weight in proportion to height in common use and which are implicitly relied upon as an indication of good health are seriously misleading for ages over forty. They indicate what is a fact of everyday experience but they do not show what the facts ought to be if the average human being grew and developed normally in relation to the physiological needs of the body.

Nor is weight in relation to height necessarily suggestive of normal development. The question is essentially one of the distribution of weight over every part of the body and this can only be determined by accurate measurements of every essential part

of the body and its relation to the whole. The weight may be largely an abdominal accumulation of needless tissue and fat, while other parts of the body, such as the arms and legs are underdeveloped and undernourished. Or it may affect very largely the lower extremities, particularly the hips, in which case it is often pathological and a serious hindrance to normal activity. There are always three fundamentals of good health: fresh air, rational diet and wholesome exercise. These three must operate in close conjunction to each other to produce a body of the highest efficiency. But no overfed body can possibly perform its normal functions to the highest degree of attainable capacity.

It has been said that we do not die all at once but that some organs or parts of our body are in a dying condition long before others. It is likewise true that we are never quite normally developed all over, but to ascertain the facts of underdevelopment or overdevelopment requires accurate measurements which must be made by one trained for the purpose.

The modern human machine is called upon to perform totally different functions than the human machine of fifty years ago. We no longer have the opportunities for wholesome physical activities of the body but are largely confined in offices or workshops for the major portion of the day. We live in crowded cities, in small rooms and are often deprived of sunlight and fresh air. No mechanical contrivance would be expected to stand the vast amount of abuse to which the human body is subjected. The evil results of increasing prosperity are first manifest in overeating. It is perhaps the gravest of all our vices and the cause of a large number of preventable deaths in middle life and old age. We would not misuse our furnaces or our boilers to a fraction of the extent to which we constantly misuse our bodies, but of the effects of such misuse we are almost entirely ignorant or deliberately indifferent.

The new medicine which is slowly coming into being will

take the foregoing into serious consideration and make it the cornerstone of a true theory of personal hygiene which will enable vast numbers of people to add materially to their span of life. For only the earliest recognition of physical impairments can prevent serious mischief in later years. Of late we have heard much of blood pressure as an indication of normal or abnormal functioning of the body. Here again most serious errors underlie current tables of blood pressure which show an increasing pressure with increasing age. Blood pressure is closely related to excess in weight. Since most people increase their weight with increasing age, there is a corresponding increase in blood or arterial pressure. Blood pressure is the reflex of heart action. It is indicated by the pulse rate which measures the flow of blood through the heart in its rhythmic performance. It controls a vast arterial system of extreme intricacy. Any abnormalities are therefore highly significant, but ascertainable only by means of precise measurements. It is, however, but one of many factors which control the whole cardiovascular system. A standard table of blood pressure shows an increase from 120 mm. at age fifteen to about 140 mm. at age sixty. But there is no need why the blood pressure in adult life should exceed 120 if a normal weight and normal body conditions otherwise are maintained. A low blood pressure which for illustration usually coincides with tuberculosis and which is often indicative of diminishing disease resistance is nevertheless a less serious matter than a blood pressure much in excess of the normal. A reduction in blood pressure is usually obtainable by a rational diet, but its correction must be taken hold of early enough in life to preclude serious and far-reaching impairments of the whole arterial system. Thus in hypertension, though not the precise equivalent of high blood pressure, has recently been shown for officers of the United States Navy reexamined as regards their physical deficiencies, there is very little hypertension below the age of

forty, but it increases rapidly after that age, and at age sixty, about 27% of the officers were found in this condition precluding perfect physical coordination to their duties. If that is the condition in the Navy where physical activities are the rule, how much worse must the condition in civil life be, particularly on the part of office workers, including women, leading largely an inactive existence.

Modern civilization among many other ills, has brought about the almost universal employment of women. Instead of living normal lives in conformity to their nature, demanding the exercise of maternal functions, they are becoming human machines of a high degree of efficiency, meeting essential economic needs. Women more than men suffer from the effects of their confinement in offices and workshops, constrained positions, want of exercise, abnormal diets, etc. They, even more than men, require a periodical medical and physical examination if their bodies are to be kept in good working order to meet the exacting demands of modern life. In the case of women a premature physical breakdown is very much more serious as regards its economic consequences than in the case of men. Women owe it to themselves to leave nothing undone to keep their bodies in perfect working condition, to keep their weight down to normal, and to seek all possible opportunities for physical exercise in the open air as the best safeguard against an early breakdown in middle age.

It is very true that of late years there has been an immense publicity of suggestions as regards physical exercises, for which much is claimed, but which often do more harm than good. Physical activity is much preferable to athletics and sports, and walking, swimming, running and in the case of women a multitude of household duties are much more beneficial.

If the human constitution is to be kept in good working condition, its intake and outgo must be carefully studied. Most

persons over forty suffer from intestinal disturbances or from intestinal stasis, which is also a serious matter. The mortality from diseases of the kidneys is very high and apparently somewhat on the increase. Diabetes which is a nutritional disturbance is not diminishing regardless of the insulin treatment, which does not cure but merely inhibits processes which would otherwise lead to early death. The mortality from diabetes is higher at the present time than it ever has been in our history. The same is true of appendicitis which is also closely connected with irregular modes of life, improper diet and a lack of exercise. In many cases the fluid intake into the body is insufficient for its needs. A sufficiency of water of good quality is of the first importance. But a urinalysis readily discloses what is wrong and a periodic urinalysis is perhaps one of the most convenient as well as certain means of ascertaining the earliest indications of renal impairments. Much more might be said, but the foregoing will elucidate some of the fundamental principles of the new medicine which will bring the conservation of the human machine largely within reach of every individual concerned.

Chapter XXV

THE PRICE OF HEALTH IN INDUSTRY

MODERN industry is responsible for many diseases which affect the industrial worker as the result of occupational conditions. Strenuous efforts are constantly being made by public authorities, employers and organized wage workers to reduce these evils to a minimum and in many directions such efforts have been successful. But an immense amount of work requires to be done before the modern worker can feel secure that he is not paying a heavier price in illness and curtailed longevity than the wages are worth that he receives for his toil. Certain outstanding afflictions are now clearly recognized but many obscure afflictions defy present-day understanding. Perhaps the most important condition that requires constant supervision and energetic control is the dust evil inherent in a large number of industrial processes. In none is the evil worse than in deep quartz mining and in stone cutting where the worker suffers to a considerable degree particularly from serious lung affections, for which a special nomenclature has been evolved. What is known as silicosis is a lung affection resembling tuberculosis and often erroneously diagnosed as such, though it is due to fundamentally different causative conditions. What is known as anthracosis concerns the coal miners, but it is fortunately of a much less degree of seriousness to the health of the worker. Curiously enough limestone workers suffer little from the dust inhaled which contains but a small proportion of silica. Lime

dust is soluble in the lungs while quartz or silica dust is not. The best way in which to determine the extent of the harm done is to have an X-ray picture taken of the chest upon which a positive diagnosis can be made.

The first to write intelligently in the light of the then existing knowledge of the subject of occupational diseases was an Italian by the name of Ramazzini of Padua, whose treatise was translated into English as early as 1705. This writer enumerates a large number of serious affections, many of which are happily now things of the past, but many others still continue to the present day. Ramazzini, of course, had to limit himself mostly to personal observations for he had not the aid of modern methods of scientific study. He, for illustration, was one of the first to call attention to the diseases of painters, pointing out their usual sallow complexion and their liability to paralysis, the nature of which we now know is due chiefly to chronic lead poisoning. Yet he had occasion to say that the principal cause of their sickness was the colors that they had to mix and he refers to lead, mercury and other metallic poisons as the source. Painters still suffer from lead poisoning and more than men in any other occupation, but the evil has been decidedly diminishing during recent years as the result of sanitary practices and a clearer recognition of the dangers of inhaling lead dust or the fumes or becoming otherwise contaminated with lead substances.

Miners, especially those who work far underground, have always shown symptoms of occupational affections, chiefly, however, in the direction of lung injuries. One of the more modern writers who first dealt exhaustively with the subject was Hirt, a German, followed later by Arlidge, an Englishman, who wrote a voluminous treatise on the diseases of occupation, which though no longer in print, still constitutes an extremely valuable source of information. Arlidge considered nearly every phase of industrial life, such as indoor and outdoor employment, sedentary

labor, labor underground, trade customs, factory conditions, the air of workshops, etc. Today, it is clearly recognized that fresh air and ventilation are absolutely essential and modern factory laws aim at regulations and conditions, which unrestrained invariably lead to disease and early death. One of the foremost authorities on the question of ventilation is Professor Winslow of Yale who was Chairman of the New York State Commission on ventilation which followed an exhaustive study of the subject in Great Britain. But the oustanding authority on occupational diseases is Sir Thomas Oliver of England, who was the first to establish accurately the incidence of lead poisoning in British industries and who subsequently discovered the true nature of industrial phthisis or industrial lung diseases caused by the inhalation of silica dust particularly in the mines of South Africa. Sir Thomas Oliver has issued a small and convenient volume on the health of the workers in which he emphasizes what factories are and what they might be and discusses the nature and frequency of industrial illnesses, particularly with reference to dust on the health of the miners, concluding with excellent observations on industrial poisons. The subject of industrial poisons has been most exhaustively considered in this country by Dr. Alice Hamilton who is the author of a treatise on the subject which contains a wealth of useful information. She places lead in the foreground followed by arsenic, mercury and numerous other poisons such as carbon monoxide, methyl alcohol and benzyl. Her observations regarding the prevention of lead poisoning indicate the extreme complexity of a situation, which demands eternal vigilance if the risk of serious injury to workers is to be eliminated from modern industry.

The danger is everywhere. Every worker should make himself familiar with the conditions of his employment as it bears upon health and longevity. In one case it is the posture which may be unnatural and long sustained throughout the day, while

in another it may be compressed air or air highly contaminated by poisonous substances. Or it may be a heavy strain upon the vital organs but in nearly every occupation or employment the risk exists and it is upon the worker primarily that the burden of its ascertainment falls. Yet there remains a great responsibility on the part of public authorities and employers who are often indifferent to the needs of the worker. Many industries unfortunately are managed on a very narrow margin of profit precluding the installation of adequate ventilating and air conditions. Textile workers for illustration suffer much from a high humidity in the weaving sheds, which in northern latitudes particularly require artificial saturation to protect the cotton thread against breaking. What is done for the cotton thread is often fatal to the thread of life more precious to the worker than to the employer.

In many modern establishments there is now fairly adequate medical supervision of employees who are subjected to a thorough examination previous to employment. No one should enter upon a vocation or pursuit involving a special hazard without such an examination to determine his or her physical fitness for the work to be done. This applies particularly to the young who often undertake positions for which they are physically unqualified. Once that the harm has been done to the human organism, the damage is difficult to repair. Pulmonary tuberculosis which is very much more common among industrial workers than among the population at large is primarily the result of poor working conditions, or the want of adequate light and ventilation and often to exhaustive toil. Industry is becoming more and more monotonous and a shorter working day is called for by the insistent demands of industrial hygiene. Mr. Henry Ford has introduced the five-day working week and this innovation will unquestionably be followed by an improvement in the health of the workers who in the future will have more leisure time for

outdoor recreation and the repair of whatever damage was done to the system during the period of continuous work in years past. The so-called continuous industries demanding twelve hours of consecutive toil have now happily been done away with. The same arguments which were introduced at the time, that it was impossible to carry on the continuous industries on an eight-hour basis, are applicable to the five-day working week. Mankind has a marvelous power of adapting itself to changing conditions once that they are imperatively called for. But the employer who is indifferent to the health of his workers has no place in the modern industrial organization. If there were a clearer recognition of these principles, every employer would instal a system of records which would clearly emphasize by the physical condition of his workers that he was giving not only adequate wages and reasonable hours, but also as near to perfect conditions of work as are today within reach.

Chapter XXVI

LONG LIFE IN THE ARMY

THE United States Army personnel represents not only the most carefully selected group of men suitable for military purposes but it safeguards the health and long life of its officers by subsequent periodical medical examinations. While the average age of men in the Army is not accurately known, it is probably about thirty years. The mean strength of the Army during 1925 was 11,429 officers, 111,467 white enlisted men and 2,229 colored enlisted men, a total of 135,840. The number to register and the enlistments during the year was 69,254. The number is therefore sufficiently large for fairly trustworthy conclusions regarding health and mortality, for every man is as carefully listed and checked as if he were insured with an insurance company.

The admission rates for officers for the year 1925, by which is meant the admissions to medical treatment for all causes, was 551 per 1,000. In other words, one out of every two officers received treatment in some form, mostly ailments of minor importance. For white enlisted men the rates were higher or 724 per 1,000. In the Army a clear distinction is made between admissions for disease and for external causes, meaning accidents or casualties of all kinds. The latter in the Army assume as great, if not sometimes greater, importance than the former. For officers the leading cause of admission was bronchitis, followed by influenza, tonsilitis and gonorrhea. These four causes

together account for 165 per 1,000 of all the admissions. In the case of white enlisted men in the United States, the leading causes were bronchitis, influenza and tonsilitis, followed by gonorrheal diseases. While some success has been achieved in reducing the incidence of the latter, much remains to be done to eliminate this serious evil from Army life. White enlisted men in the tropics also suffer most from bronchitis, while gonorrheal diseases take third place. In the case of colored enlisted men influenza was followed by bronchitis and gonorrhea. While the combined admission rate for all forms of venereal diseases was 54.42 for white enlisted men, it was 58.26 for colored enlisted men.

A very interesting phase of the admission rates is the frequency of impairments resulting from athletic exercises. These represent 14.72 per 1,000 for officers, 26.47 for white enlisted men in the United States, 43.75 for white enlisted men in the tropics, and 26.28 for colored enlisted men. Here then is another factor which admits of material reduction as the result of greater care and more careful supervision, but athletic exercises are a part of the military training and certain risks are unavoidable.

While the admission rate for officers for diseases only was 486.7, it was 64.6 for external causes or accidents and casualties. For white enlisted men in the United States the admission rate for diseases was 586.4 and for external causes 138.1, while the admission rate for external causes in the Panama Canal Zone was 118.5.

In the total Army during 1926 there were 522 deaths or 10 more than in 1925. Diseases caused 301 deaths and external causes or accidents and casualties 221. Here then is an extraordinary reversal of the ordinary mortality experience in the population in which accidents and casualties constitute a factor of minor importance considering the vast number of deaths from a multitude of other causes. It is stated in the Surgeon-General's

Annual Report for 1925 that the death rate from diseases of 1.77 was the lowest recorded in the history of the Army, but the death rate from external causes or 1.99 exceeded the rate reported for 1924. If the leading causes of death are examined, they bring out some very striking results. Among officers, for illustration, the leading cause of death in 1925 was suicides numbering 42, followed by drowning with 40 deaths, and airplane accidents with 38. Tuberculosis caused 31 deaths, while automobile accidents caused 28 deaths. Lobar pneumonia caused 28 deaths, while homicides caused 28 deaths, also an extraordinary proportion. Appendicitis caused 18 deaths and cancer the same number. Street cars caused 16 deaths. Regardless of the very low death rate from all causes, it is apparent that of the deaths that occurred the larger proportion were in a strictly preventable group. The large number of deaths from drowning would seem to indicate that many of the officers did not know how to swim. The air casualties occurred largely among young officers while training, but the most amazing fact disclosed by the analysis is the high rate from suicide, while no less important is the high rate from homicide.

Among white enlisted men the leading cause of death in 1925 was drowning followed by homicide, airplane accidents, suicides, street car accidents and tuberculosis in the order named. Something must be radically wrong with Army life that a leading cause of death for several years should have been self-murder, while murder itself is unduly common among both officers and men. There must be a defect in character somewhere that accounts for this anomaly in mortality experience. While the sanitary departments of the Army and the medical supervision of both officers and men leave nothing undone to prolong life, valuable lives are wasted by self-murder, murder and accidents largely in a preventable group. It is certainly amazing to find that a group of men which has been improved in physical effi-

ciency and disease resistance should experience a death rate from disease among its officers of only 2.27 per 1,000, and among its enlisted men of only 1.71 per 1,000, while the death rate from external causes or accidents and casualties was 3.50 among the former and 1.69 among the latter (1925).

Of course in the Army, as has been said before, the personnel is the result of careful moral and medical selection. But it is also continuously kept in prime condition by a process of discharge of all who show the first definite indication of unfitness for military service. In 1925, 2,303 officers and men were retired or discharged from the service as physically unfit for military duty. It is curious to note that the principal cause of discharge in 1925 was dementia praecox or adolescent insanity which may possibly bear upon the question of the rigors of the military experience. It was followed by tuberculosis and constitutional psychopathic states, epilepsy and mental deficiency. Unquestionably the demand upon both the mind and the body in the Army sometimes imposes a heavy strain which can only be guarded against by most careful selection of those admitted. But in any event the figures presented are highly significant. The factor of sickness and accident impairment in their relation to physical efficiency are of no mean order of importance. The number of days lost by military and civilian patients in the Army during 1925 was 2,550,000, of which approximately 59% were for military personnel only. The hospital facilities provided for the Army are everywhere of the highest standard and the results of treatment are almost invariably of the best. No group of medical officers anywhere has a higher rating than our Army surgeons. The men are therefore assured of the best possible medical and surgical treatment in the event of sickness.

What is known as the non-effective rate is one of the most carefully watched of military medical experience. The rate has been about 24 per 1,000 during 1925, but it has been below 20 per

1,000 during 1913–1914. It is higher today than should be the case, and as would be the case if venereal diseases were under more effective control. These account for nearly 15% of the non-effective rates during the year. They are a sorry commentary upon the morale of the force which should be trained in character discipline as much as it is trained in physical discipline. The significance of the foregoing is brought out by the statement that each man in the Army in 1925, lost on the average 10.8 days from sickness, or 8.9 days from diseases and 1.9 days from external causes. It may be said in this connection that in Panama each man lost on the average 11.8 days from diseases and 2.0 days from external causes or a total of 13.8 days, or 0.8 days less than each white soldier lost in the United States. The evidence, therefore, proves conclusively that conditions in Panama are practically the same as in this country, all of which is a direct result of effective sanitary measures and qualified medical supervision and treatment. While the present situation regarding venereal diseases is the best that we have experienced for many years past, it is, nevertheless, much higher than it should be. At the same time, it is a matter of congratulation that the admission rate for venereal diseases for the entire military personnel should have declined from 180.03 per 1,000 in 1905 to 52.25 per 1,000 in 1925. This then is positive evidence of commendable progress which justifies the hope that further and better results will be secured in the future. Commendable progress is also being made in the elimination of malaria. The admission rate for this disease was for officers in 1916, 9.25 per 1,000, while in 1925, it was only 2.71. For white enlisted men in the United States it was 22.43 at the beginning of the period and only 1.87 at the end. In the Philippines it was reduced from 60.74 to 32.61, while in Panama it was reduced from a maximum of 109.52 in 1921 to 72.5 in 1925. While much has been done at Panama, more is required to reduce the malaria evil to its lowest attainable mini-

mum. Finally it may be said that only four cases of typhoid fever occurred among the military personnel of the United States during the year 1925, and nine in 1926, all of which recovered. This is the result of almost universal typhus inoculation, the merit of which requires to be better appreciated on the part of the general public.

The foregoing observations, therefore, fully justify that Army experience and a long life are not incompatible with military life, but quite to the contrary that perhaps under no conditions is good health and long life as secure as under those of military discipline plus military medical supervision or periodic examinations and re-examinations in adult life. The conclusions should also justify the statement that in military preparations nothing pays the nation better than the adequate support of the medical branch of the military establishment as a means of providing a body of men not only intellectually fit for military service but physically sound from the crown of their heads to the tips of their toes.

Chapter XXVII

HEALTH AND LONG LIFE IN THE NAVY

CLOSELY corresponding to the medical statistics of the Army are those of the United States Navy. They are an extraordinary indication of what is possible in the direction of health maintenance and life prolongation when rigorous attention is paid to measures of disease prevention. In both the Army and the Navy even slight ailments are treated seriously. This accounts for an admission rate which might otherwise seem excessive. Although operating under essentially different conditions, yet the Navy admission rate of 532 per 1,000 in 1925 corresponds to an Army rate of 518 for the same year. If it had not been for a number of serious disasters, the Navy rate, although the lowest in its history, would have been still lower, which of course is particularly true of the death rate. In 1925 the Navy death rate reached a figure of only 3.6 per 1,000 for all causes while the death rate due to diseases only amounted to 1.53. This is the death rate which would ordinarily be expected at about ages ten and eleven when it reaches its lowest point in everyday experience under the best conditions. The Navy death rate applies to an average daily strength during the year of about 103,000 and is suggestive of an extraordinary degree of efficiency in sanitary and medical administration.

The facts of the situation should attract the attention of all who seek for a material health improvement in civil life. They emphasize the great importance of discipline and rigorous attention to all matters which bear upon health and physical effi-

ciency. In the Navy, as in the Army, the officers are subjected to periodic physical examinations and during the examinations of the present year, for illustration, 39% were found to have some defect of minor or major importance. Many of these defects have only a slight bearing upon health and longevity, but they seriously concern the question of military efficiency. Thus, for illustration, the most important defect disclosed was erroneous refraction or impairment of eyesight amounting to about 11% of the whole. This was followed by defects in hearing representing 6% and by defects of the nasal system representing 5%. These three defects, which in everyday life are generally overlooked or not brought to light until it is often too late, amounted to nearly 22% of all the defects revealed by the periodical examinations.

Next in the order of importance was overweight accounting for 4% of all the defects, most of the men found impaired having excessive overweight of 20% or more. Of other defects of small medical importance, flat foot may be mentioned, although its seriousness in individual cases is often underrated. The same is true of hernia. Urinary examinations revealed defects in a relatively small number of cases and the same is true of heart defects, which accounted for less than ½%. Thus the strenuous life in the Navy on the part of officers involving frequently heavy physical exertion, was not apparently followed by serious results when practised with a due regard to the facts of the situation.

In the case of most of the defects, the percentage of such defects increased with increasing age. This is particularly true of refraction and overweight, but also true of urinary impairments, particularly the presence of albumen, which is usually, but not always, highly significant. An occurrence of special interest is the evidence of increase in excessive blood pressure with increasing age, clearly proving the great practical value of a periodical examination made by one thoroughly qualified for the purpose.

The admission rate for diseases had been reduced during the last six years, 1919–1925, from 718 per 1,000 to 462. But the admission rate for injuries has increased during the same period from 57 to 64. The death rate from diseases has decreased since 1920 from 5.1 to 1.5, while the death rate from accidents or injuries was practically the same, or in 1925, 2.06 per 1,000. The average number of sick days for personnel in the Navy has decreased since 1920 from 15 to 11. Here then is further evidence of health progress, but it is highly suggestive that while the death rate from diseases should be only 1.15 per 1,000, that from injuries and poisons should be 2.1. The death rate from injuries would have been less but for several very unfortunate disasters, resulting in the loss of 11 officers and 45 enlisted men. One of the worst of these was when the submarine S–51 was rammed by the Steamship "City of Rome," in which disaster six officers and 27 enlisted men lost their lives. All of these accidents combined represented 24% of the accidents from all causes.

There are great difficulties in the Navy in providing precisely the best living conditions on board ship compatible with the most rigorous requirements of modern sanitation. It is difficult to avoid overcrowding on certain ships and the ventilation and heating often fall short of the ideal, but on the whole, conditions in this respect are today decidedly better than in former years. A very important factor concerning the health of the men is the Navy ration, which during the year under review, has been made the subject of a special study, which it is hoped will tend to secure a better balanced diet for the average enlisted man on board ship in conformity with recent discoveries in the field of nutritional science. It is to be hoped that some time in the future the population at large will have the benefit of this investigation, for in no direction does modern life fall more lamentably short than in the proper attention which should be paid to the diet of the average man. What is true of the Navy is true

of every one, that the proportionate amount of milk and of green vegetables and fruit which are important sources of vitamines and mineral elements, are too low. Improvements in this direction will enormously affect the general health of the population at large.

Another difficulty in the Navy due to overcrowding or the confinement of a large number of men, always more or less in close contact with each other, is the prevention of communicable diseases. The prevailing diseases of this kind are catarrhal fever, tonsilitis, acute bronchitis, influenza and mumps. Measles, chicken pox, scarlet fever, and diphtheria were comparatively infrequent. There were only a very few cases of smallpox.

The admission rate for tuberculosis which had been 492 in 1913 had been reduced to 285 by 1925, while the death rate from tuberculosis which had been 45.5 per 100,000 had been reduced to 20.8 or somewhat higher than during the preceding two years, having been as low as 15.4 in 1923. Here then is further evidence of extraordinary progress considering the often very trying conditions of life in the Navy. Tuberculosis resulting from contact with other infected persons is now apparently extremely rare. Comparatively few of the men who suffer from tuberculosis have had more than ten years of service, but it is emphasized that the personnel is not subjected to predisposing influences by essential service conditions. As a matter of fact, life in the Navy on general principles produces the opposite effect. Malaria in the Navy was due largely to exposure on the part of the marine corps in Haiti and San Domingo, but in Haiti the admission rate for malaria had been reduced during the last five years from 934 to 248, while in San Domingo the rate during four years had been reduced from 243 to 60. There remains also the malaria problem at Guantanamo Bay, Cuba, and in the Panama Canal Zone. It is pointed out to be greatest at Coco Solo where the submarine base and naval air stations are located, but

the admission rate for malaria in the Panama Canal Zone during the last three years has been reduced from 89 to 49. But malaria is rather a disease than a mortality problem and during 1925 there were only 4 deaths from this affection.

The outstanding health problem in the Navy among enlisted men, as among enlisted men of the Army, is after all that of venereal diseases. Since these are the direct result of misconduct, they are a lamentable reflection upon the morality of the men in both branches of the service. The statement is made that "as must be expected the venereal infections continue to hold a leading position among all diseases with respect to the number of admissions and also to the number of days lost on account of disability." It does not necessarily follow that venereal diseases are more common in the Navy than in the civil population, for the former are a matter of accurate record, while for the latter they are largely a matter of conjecture. A new regulation has been adopted which it is to be hoped will lessen in some degree the amount of disability due to venereal diseases in the Navy. The number of sick days per 1,000, due to venereal affections in 1925 was 913 for gonorrhea, 515 for syphilis and 204 for chancroid, in each and every case slightly less than during the preceding year. The subject has been very carefully investigated by the Surgeon-General and the facts of the situation are gradually being better understood. They strike at the root of the whole problem of conduct and character, admitting of slow but persistent progress as the result of a more rigorous discipline in personal behavior.

Perhaps the most pathetic phase of life in the Navy is the frequency of casualties in naval aviation. In 1925 there were 145 admissions on account of aviation accidents and 31 deaths, which compares with 36 deaths during the previous year. The average daily flying strength was 1,241. The Navy made 120,431 separate flights extending over 83,000 hours or approxi-

mately 800,000 air miles. There was, therefore, a death rate per 1,000 flying hours of 0.37 during 1925, which compares with 0.67 during 1924 and 0.32 in 1923, but in 1921 the rate was as high as 0.98, so there is obvious evidence of progress. The death rate per 1,000 flight personnel was 24.98 in 1925 against 15.18 in 1921 or the highest during the last five years. For the officer flight personnel the average rate for the last five years has been 36.9 per 1,000, while during 1925 it was 33.3. As long as aviation continues in a more or less experimental stage such accidents are unavoidable, but the causative factors are gradually being understood and to an increasing extent safety precautions are employed suggestive of a decided reduction in years to come.

As is the case in the Army, suicides are relatively common in the Navy, there having been 26 deaths from suicides, or 23 per 100,000 of personnel (18 per 100,000 in 1926). The rate of 23 per 100,000 in 1925 was lower than during the two preceding years but higher than during 1922.

All in all, regardless of some disconcerting aspects, life in the Navy is obviously promoting health and longevity, offering special inducements to young men of vigorous type to serve the nation in one of its most important lines of duty. The record of the Navy, as well as that of the Army, is an inspiring experience to those who see the dawn of a better day when improved conduct and rigorous observance of hygienic rules will tend towards a further and material reduction in diseases and impairments which are still the bane of modern civilized existence.

Chapter XXVIII

LIVING UNDERGROUND

FAR beneath the surface of the earth live millions of people chiefly engaged in the mining of coal, metal or non-metallic substances. They work on the average probably at the present time nine hours, during which time they are deprived of sunlight and often of fresh air. From time out of mind the health of these men has been a subject of serious concern, and yet curiously enough no adequate investigation has been made to trace precisely the health injurious consequences of underground employment. One of the earliest observed effects was the high incidence of lung diseases. It is only of recent years that the true nature of this affection has been clearly established. The men do not die from tuberculosis, but from silicosis or anthracosis or lung fibrosis, caused by the inhalation of injurious dusts. The nature of the affliction varies with the nature of the material which is mined. The most serious consequences are met with in the mining of dry quartz or earthy or rock material which contains a large proportion of silica. The same affections, however, can be observed in stone workers who cut or carve granite and other stones containing a considerable proportion of silica. Workers in limestone, for illustration, are not subject to these affections. But underground work bears upon the affection only to the extent that confinement in small chambers increases the risk of dust inhalation.

Every effort has been made to attribute other effects of underground work upon the health of the workers, chiefly in the direc-

tion of anemia. Here again, it is only in recent years that the true nature of this affliction was determined to be a minute organism identical with the parasite which causes hookworm disease. It is met with chiefly in warm and moist mines and in this country in certain mines in California. Our coal mines seem to be relatively, if not entirely, free. Belgian and German coal mines are, however, very badly infected, and strenuous efforts are being made to combat the evil by sanitary regulations.

The want of sunlight unquestionably accounts for the often pale appearance of miners and underground workers. It seems unreasonable to suppose that being deprived of sunlight, considering its beneficial effects generally, should not be followed by some consequences to the human system, but as far as it is possible to observe, the results in most cases are of minor importance. Miners often suffer from rheumatism due largely to damp mines not being properly drained of surplus water. But even so, it is difficult to avoid dampness and an occasional wetting for which inadequate provision is made at change houses underground.

Coal miners, particularly, are also, in certain countries at least, known to be excessively subject to a curious eye affection known as nystagmus. This is apparently the result of improper lighting conditions which impose an undue strain upon the eyes. The affection as such has little to do with underground conditions but is frequently removed when proper lighting facilities are introduced.

Miners of quicksilver are subject to mercurialism or mercury poison, while miners of lead are sometimes subject to lead poisoning. But this affliction occurs outside of mines even more frequently than inside. Miners frequently suffer from the effect of poisonous gases and fumes produced by explosives. This, however, is an evil which also can be much guarded against by the observance of proper regulations.

Thus summarizing the foregoing, it would appear, as far as it is possible to judge, that the mere fact of working underground, and of being deprived of sunlight for the major portion of the working time, is not necessarily injurious to health, for coal miners, for example, enjoy a normal death rate, excepting in so far as it is occasionally increased to excessive proportions by disasters or a high accident frequency generally. There are, however, compensating features which are often ignored. The miner underground is not subject to weather changes which are often of serious consequence to workers in the open. He works steadily and systematically, and as a result the death rate frequently is close to normal except as stated for accidents, which however are everywhere slowly diminishing. A most important factor in this connection is the far-reaching improvement in the ventilation of mines, which is everywhere a matter of government concern. The difficulties in this respect are, of course, much more serious in small than in large mines on account of the cost of installing adequate ventilating devices and of providing a fresh air current to every portion of the mine. Some mines, such as the copper mines of Montana, which frequently go to depths between two and three thousand feet, may have an excessive temperature which makes it difficult to bear. The evil is further complicated by high humidity. But here again adequate ventilating devices can do much to improve the situation.

Investigations seem to show that the health of modern miners is very much superior to the health of the miners of old. This must be attributed primarily to higher wages yielding better nutrition and resulting in increased disease resistance. Miners of old were frequently badly underpaid and permitted to work and live under conditions barely above those of animal existence. No occupation is more entitled to adequate remuneration and reasonable working hours than that of mining, and the wide-

spread unrest in the mining industry is primarily attributable to low wages and unduly long hours. If anywhere, the five-day work week is justified in the mining industry. But miners in return must consider the economic conditions of the industry. All coal and metals are subject to international competition and many mines are operated at a loss. But be the conditions what they may, they are certainly much better than they have been in years past. It would be impossible today to reproduce the evidence given before an official British commission of inquiry many years ago showing women and little children required to slave in the mines like common beasts of burden. The miner of today has decidedly better housing and home conditions and enjoys a larger share of leisure time, and it is rarely the case that he works to the point of physical exhaustion. Furthermore practically all the larger mining companies in any event have adequate hospital facilities, often amplified by an efficient safety-first organization, rescue apparatus, first aid, etc., and social service department aiming at the betterment of living conditions. All in all then, underground work has largely been robbed of its former terrors.

Chapter XXIX

AMERICANS IN LIBERIA

IN a German statistical almanac of 1830 Liberia is mentioned as an American Colony on the west coast of Africa with 1,200 inhabitants. So much for German accuracy in geographical knowledge. For Liberia was established by the United States as an independent republic during the presidency of James Monroe for the purpose of furnishing a home country for liberated slaves. The first settlement occurred in 1822 and the first constitution was adopted in 1838. This was followed by a Declaration of Independence in 1847 and by 1849 the Republic had been recognized by most of the great powers. It has always been an alluring prospect to the negro population of America as the region in which large numbers of discontented colored people might ultimately find a haven of refuge. But the country has never prospered, partly because of the lack of capacity of self-government on the part of the negro, although in this respect the Republic might have fared much worse. As a matter of fact, the independence of Liberia was not formally recognized by the United States until 1862.

Liberia suddenly has come once more in the limelight on account of an immense land concession made to the Firestone Rubber Company by the Government of Liberia for the purpose of developing rubber and other tropical products. The extraordinary success of the United Fruit Company in the West Indies and Central American tropics will be sufficient to justify

the hope that the Firestone experiment will prove of great advantage to both Liberia and the United States. For there is the utmost need on our part to develop independent sources of raw rubber as an offset to the practical monopoly of the British companies which control both products and prices at the present time.

The best source of information concerning Liberia is the monumental work of Sir Harry Johnston, the well-known explorer and naturalist whose account of the country is an invaluable source of useful information. There is included in this work an abstract of the census of Liberia for 1843 which gives the population as 2,390 in 1820. In 1843 there had been 2,193 deaths and only 645 births, indicative of health conditions decidedly unsatisfactory. Unfortunately Sir Harry Johnston does not concern himself much with prevailing diseases or sanitary conditions. He has something to say about native doctors or devil men who suppose themselves "possessed of a demon or spirit in whose inspiration they act and give their responses." The outcome of native treatment under such conditions is a foregone conclusion.

The British Foreign Office in 1920 published a small booklet on Liberia in which there are some fragmentary observations on the climate suggestive of strictly tropical conditions both as to rainfall and temperature. March is said to be the hottest month throughout the whole country. In the savanna country during the dry season the maximum shade temperature varies from 86° to 91.5°. As regards sanitary conditions, it is said that Liberia seems to be a comparatively healthful country, especially in its northern part. The most unhealthful seasons are the beginning and end of the rains, September and October being the worst months. The commonest diseases are malaria, beri-beri, smallpox, conjunctivitis, rheumatism, elephantiasis and various skin diseases. The jigger and the guinea-worm are prevalent.

Sleeping sickness is known, but does not appear to give much trouble. Malaria is not of a virulent type, and is said to be much less common than might be expected. It appears that Liberians are as much subject to malaria as are Europeans, but that the indigenous tribes are more or less immune. Very little hygienic work has been done by the Liberian government.

All of this is suggestive of conditions which should not be difficult to bring under effective control. The hardships of an excessive temperature can easily be mitigated by well-ventilated houses and electric fans. Conditions favoring malaria can be brought under control by effective drainage preventing the breeding of mosquitoes. But strictly tropical diseases are practically confined to the natives and largely the result of unsanitary habits. The main difficulty will be an indifferent or apathetic native population, but it is a safe assumption that with improvements in health and the prospect of good wages, much of this will easily yield to persuasion and necessity.

The indigenous natives of Liberia according to Sir Harry Johnston include many specimens of exceedingly fine physique indicative of a considerable capacity for arduous toil. The Liberians of American origin or descent are apparently physically less impressive. They constitute, however, intellectually the superior type. But there are no reasons for apprehending that there will not be a sufficient negro labor supply available for the needs of the company which expects to effect a social and economic revolution as the result of its amazing enterprise.

White Americans in considerable numbers will be required for the development of the country. The outlook is very encouraging. With abundant funds the Firestone will start the experiment along improved lines and begin the sanitation before it starts actual development. If the enterprise should succeed, it would prove one of the most memorable in the history of American conquests of tropical countries by peaceful means.

What America has done in the Philippines, at Panama, in Central America and the West Indies gives positive assurance that if our knowledge is properly applied and if our understanding of what is necessary is rigorously carried out, the Firestone experiment in Liberia will prove another milestone in human progress, of lasting value.

Chapter XXX

HEALTH PROGRESS OF EAST AFRICA

THERE are few more illuminating contributions to the health progress of nations than the reports of the Medical Research Laboratory of the Colony and Protectorate of Kenya, East Africa. Formerly it was looked upon as an extremely dangerous area in which to live, but now, happily, the country is reasonably safe and the European population has increased from 9,651 in 1921 to 12,529 in 1926. Among this population during the year there occurred 209 births and 81 deaths, which may be accepted as suggestive evidence that conditions on the whole are reasonably satisfactory, for the death rate for the year was a trifle less than 7 per 1,000, although somewhat higher than during the preceding year.

For Nairobi, the principal city of the country, the crude European death rate was 10.3, the crude Asiatic death rate was 16.1, and the crude African death rate 18.3. The latter is practically the same as the corresponding death rate for our own negro population. The principal cause of death, curiously enough, was pneumonia, responsible for about 31% of the deaths from all causes. The disease, however, is apparently less common now than formerly. Plague was responsible for only 4 deaths against 61 deaths in 1924. Malaria was the cause of 19 deaths against 32 deaths in 1924.

While the foregoing is gratifying, it is, nevertheless, pointed out that there is still room for material improvement and that

the sanitary conditions of living among the Asiatic and African elements are such as to give rise to grave anxiety and the ever-present risk of outbreaks of epidemic diseases.

For the city of Mombasa which had a substantial increase in European population which now number 1,077, the number of deaths was higher than for any year since 1920, due to an outbreak of smallpox. The crude death rate, however, was only 21 per 1,000, and this cannot be looked upon as excessive for a tropical climate. It is probably increased by the local hospital which attracts non-residents.

Here also, pneumonia caused a large proportion of deaths or 13.2% of the deaths from all causes. This was followed by measles with 11.7% of the deaths and smallpox with 8.4% of the total. These returns are for the entire population. The number of male Europeans in Mombasa has increased from 653 in 1921 to 1,077 in 1925, with a European female population of 194 and 181 children. That conditions are as yet perhaps not what they might be, is indicated by the fact that during 1925 there was a malaria increase among Europeans who in 1925 numbered 1,433 against 1,190 in 1923. The average whole number on the sick list was 18 or 1.8% of the average number of residents, which of course is less than the total number given throughout the year. The total number of days on sick list for each patient was 7.6. The average number of deaths among the average number of residents was only 6, which must be looked upon as decidedly gratifying. Among the native population there were a number of epidemics, particularly yaws which was responsible for an enormous number of cases. It is a loathsome affection, closely resembling syphilis, responding fairly well to treatment if taken early. Syphilis was responsible for a very large number of cases, almost 14,000 in 1925. Leprosy prevailed to the extent of nearly 400 cases. Relative to other diseases, tuberculosis is not of serious importances. Plague pre-

vailed in a number of districts, particularly in one in which 527 cases were reported within a year. Anti-plague measures which have been adopted appear to be successful and the number of rats destroyed exceeds 2,000,000. The smallpox outbreak in 1925 must be attributed partly to neglect of vaccination during the four preceding years. Anthrax, which is a very rare disease in this country, was exceptionally common, 123 cases having been reported with 10 deaths, while most of the cases occurred in a single district.

The outstanding disease is malaria for which, in 1925, over 23,000 cases were reported. Blackwater fever of a dreaded type occurred to the extent of 39 cases with 10 deaths, fifteen of the cases being Europeans with 1 death. Sleeping sickness was much less common during 1925 than during 1923.

Summarizing the foregoing, it appears that considerable progress is being made and that on the whole, health conditions are much better than would be assumed to be the case. The whole administration of the colony and protectorate is typical of British efficiency, which indelibly imprints itself upon native races with far-reaching results. The Colony of Kenya is attractive to visitors and settlers from all over the world, for no one need have any apprehension of going there if reasonable sanitary precautions are observed.

Chapter XXXI

LIVING IN THE ARCTIC

IT is difficult for anyone living in a temperate climate to comprehend the conditions of life north of the Arctic circle where the temperature sometimes goes 40° or 50° below zero. When the Canadian Northwest was first settled it was thought impossible that people could live as far north as Edmonton, which is now a flourishing city of nearly 100,000 inhabitants, who enjoy the best health possible. The rate of natural increase in the entire province of Alberta in 1924 was 15.3 per 1,000 which compares with 13.6 for the whole of Canada, an extraordinary proof of the virility of the people of Alberta and the conquest of northern conditions of life by men and women from more southern latitudes.

But the cultivated area north of Edmonton is considerable. Further to the northwest lies the immense territory of Alaska and the adjacent territory of the Yukon. It is true that as yet but small beginnings have been made to bring this part of the western world under cultivation, but the indications of progress are unmistakable. The United States Department of Agriculture maintains five experiment stations in Alaska suggestive of far-reaching possibilities in the future when the world's need for food produce will force attention to this region. It has properly been pointed out in the last report of the Director of the Stations that the weather is the dominating factor. But Alaska weather is far from being as forbidding as is often assumed to be the

case. Sitka for a large portion of the year is a most delightful place of residence. It is situated at an altitude of 57° north and has a temperature which rarely reaches the zero point. In summer it is as warm as 80°, while in winter the minimum temperature in December goes down to 6°. Sitka has a heavy rainfall and most of the days are cloudy or partly cloudy.

At Fairbanks which lies at an altitude of somewhat below 64° north, the temperature in winter or in February may go down as low as 40° below zero, but in summer it goes as high as 84° in July. Fairbanks fortunately has fewer cloudy days than Sitka and has a much lower rain and snow fall. Going still further north to Point Barrow at a latitude of a little above 71° north, the temperature in winter, or in February, goes down as low as 50° below zero and is often below zero for seven months of the year. The warmest days occur in July when the temperature may reach 63°. Cloudy and partly cloudy days are common and clear days during the summer months are rare. These stations measure the extremes. The climatological observations are suggestive of hardships, which, however, are endurable by a virile race. The reports of the Agricultural Stations reveal amazing agricultural possibilities. I well remember at Skagway at the Pullen Hotel having eaten an all Alaskan lunch, including asparagus and fresh strawberries. I have never eaten more delicious strawberries than at Sitka. Nor have I anywhere met a healthier looking people than in Alaska. Much the same applies to Newfoundland and the Labrador Coast. Were it not for the poverty of the people and the backward state of agricultural development precluding an adequate and variable diet, health conditions would be much better. In Labrador and Alaska thousands of white and native people live a reasonably healthy life. They suffer from their ignorance of intelligent adaptation. Hardy explorers, such as Peary and Stefansson, suffered no ill effects of climatic exposure. Conversely, however, Eskimos who have

been brought to southern latitudes readily succumb to tuberculosis.

An admirable report on the health of Eskimos and on the effect of environment in its relation to health has recently been published by Dr. Samuel King Hutton, who spent much time among the Eskimos of Labrador. He divided these effects into climate, dietary and habits of life. He recorded a temperature as high as 101° in the sun on the 19th of July, 1908. He concludes that the climate on the whole may be regarded as a fairly consistent one changing from a well-established moderate summer to a prolonged and excessively cold winter. But Labrador is bleak and largely uninviting, although much of it remains as yet very imperfectly known. Dr. Hutton observes that the climate has its pleasant side, that the cold of winter is dry and bracing and has not the depressing influence of a damp, if milder, cold. In fact he points out that the atmosphere is wonderfully clear. Light mists may drift in from the open sea in summer and autumn but during the colder weather, fog is never seen, and fog is always a trying experience to those who are sensitive to its effects.

The chief difficulty, however, in far North regions is the food supply. The Eskimo, Dr. Hutton remarks, is a meat eater and the vegetable part of the diet is a meager one. They cultivate no plants and rarely make any effort at agriculture, although sometimes persuaded by Moravian missionaries, who have been at work in this region for generations. The Eskimo eats plain raw flesh, dried in the open air without salt, sometimes boiled or even rotten. It is no wonder that he suffers from various ailments, although it is said that the rotten flesh causes no illness in pure Eskimos, but does among Europeans and half-breeds. It is significant that the Eskimo should use no salt. It would be interesting to know more about the dietary results of a people who live almost exclusively on flesh and fish.

Their habits of life are those of activity and strain, but rather spasmodic and limited to certain seasons of the year. Brain power of a high order is not called for. The men and the women show considerable power of withstanding fatigue and they seem to be inured to weather exposure. They walk about and often sleep with wet feet and sodden boots, from early childhood. They wear very little clothing considering the severity of the weather. They often lie down to sleep in a snow hut with no other covering than the clothes they wear. Their shelter is often inadequate to protect them against exposure. But a large number survive and a fair proportion reach old age.

But the Eskimo is a dying race. The main factors are consanguinity, Europeanization, overcrowding, and immorality, all matters which admit of improvement and remedial measures in the direction of prevention. Dr. Hutton points out that Europeanization, especially in the matter of foods, is a detrimental influence of comparatively recent development, but an influence of great importance. Stefansson once told me that he never had the slightest trouble with the Eskimo diet of raw seal, blubber and fish. His dietary troubles returned when he came back to civilization.

Of profound influence on health and longevity is the prevailing immorality, which is referred to as a besetting weakness of the Eskimo race. It is naturally fostered by the concentration of the people in settlements and small houses. But progress in this direction in years to come is a foregone conclusion. Too much cannot be said of the brave missionaries who suffer untold hardships and isolation year after year while administering to the needs of these interesting people.

The foregoing observations are of practical application to the people of southern latitudes. Stefansson has pointed out the immense possibilities of raising a practically unlimited meat supply on the far northern plains. Explorer after explorer has

gone to the Arctic and returned in perfect good health. It is perhaps the most astonishing evidence of man's power of adaptability that so few casualties should have occurred directly attributable to climatic conditions. The recent extraordinary achievement of crossing the pole by airplane and airship indicates tremendous possibilities for the future. If an air route by way of the pole will save time in trans-world transportation, it will unquestionably be used on many occasions. Neither Byrd nor Amundsen suffered particularly from the cold of the extreme north. Conditions are probably more trying in the Antarctic but no one can foresee what the future has in store. Once that these regions offer a field for profitable development, countless people from southern latitudes will find a way to make life comfortable and endurable.

Chapter XXXII

THE ROCKEFELLER FOUNDATION

NOTHING is more inspiring in modern life than the extent to which men of great wealth devote their means to give furtherance to health promoting activities. A number of great foundations have been established for medical research, from which immense benefits may be expected in course of time. Others are devoting themselves by direct efforts to the advancement of the health interests of the population, foremost of which is the Rockefeller Foundation, an outstanding organization of its kind operating practically throughout the whole world.

A review of this work is contained in a huge volume on the plan and scope of its efforts, which extend back to 1913, having their origin in the plan to aid in the local eradication of hookworm disease, in cooperation with local authorities. This plan, however, has since been materially enlarged, chiefly in the direction of malaria eradication. In practically every locality where the International Health Board operates it has left a lasting foundation for better health service. It maintains a hookworm Field Research Station at Andalusia, Alabama, and also carries on hookworm research at the School of Hygiene and Public Health at the Johns Hopkins University, but the problems confronting it are of enormous proportions. They strike deep into the root of the life of the people, whose long ingrained habits have, in many directions, to be radically modified.

Most of the sections in which hookworm is common are areas

of relative poverty, which makes it difficult to obtain substantial financial cooperation. Good results are experienced in the Southern States, West Indies, Colombia, Paraguay, Spain, Ceylon, Mauritius, etc.

In malaria work it is even a larger problem. Much is being done with malaria control demonstrations in twelve states of the United States, in Porto Rico, Brazil, Argentina, Palestine, and the Philippine Islands. Malaria research is being carried on at the School of Hygiene of the Johns Hopkins University and at the University of Chicago. Extremely valuable work is being done in Alabama. Here also it is largely a question of local prosperity, for it has been recognized that "where the population is dense and land values high, permanent drainage and radical mosquito measures are practicable." The same conclusion has been arrived at by the Malaria Division of the Public Health Service. A special effort is being made to standardize the method of procedure and to establish a low ratio per unit of cost of operations, which, of course, must vary considerably with the nature of the problem to be dealt with.

The malaria work in Europe includes such isolated sections as the Island of Corsica, Poland, and the Island of Ceylon, south of India. The Foundation is also concerned, and very actively indeed, with yellow fever, which continues to linger in certain sections of the Western Hemisphere, particularly Brazil, Salvador, and certain parts of Mexico. In this section, however, no cases have occurred since 1922. The campaign has been extended to Peru and the Guianas, also to Venezuela and West Africa, which is probably the original foci of yellow fever in the Western Hemisphere.

An important work of the Foundation is its cooperation in rural health organization. This, in the long run, may possibly prove to be the most valuable of its many efforts. It is not generally recognized that a very large area of the United States

is without permanent health officers, giving all their time to local health questions. A certain amount of progress has been made, but a map of the United States showing the extent of full-time health departments indicates that less than one fourth of the total of the country is at present inadequately provided for with local health administration facilities. Here, also, the aim is to establish standards of procedure and much good has been done. The principles of this procedure should, in some cases, extend to the State Boards of Health, inadequately financed to give particular attention to vital statistics and sanitary engineering in the study of disease distribution. On general principles, the Foundation promotes health education and gives aid, particularly in the training of health officers in the United States. An admirable school for this purpose is maintained in Alabama in cooperation with the State Board of Health. Foreign health officers are brought to this country to study our methods, while various American health officers are sent abroad, at the Foundation's expense. This service extends to Alaska, Corsica, Poland, Brazil, Philippine Islands and Siam.

Laboratories have been established in Costa Rico, Nicaragua, Salvador and Guatemala, while assistance is rendered to laboratories in China, Philippine Islands and different sections of the United States. The Federal and International Health Boards cooperate with the different health commissions of the League of Nations which aim at the coordination and standardization of health activities throughout the whole world. This is a most important development in the history of medicine, which argues better for the future where so much good has been done and it is a safe assumption that some far-reaching results will be achieved in years to come. It clearly visualizes one of the blessings of great wealth for in no other way could such a project as the above have developed vision to justify the claims of the Foundation practically from its outset.

Chapter XXXIII

AMERICA'S BLOODY TRAIL

ALL over this vast land of ours regardless of a smiling landscape and abundant prosperity making for health and happiness, there runs the bloody trail of the murderer who spares neither old nor young, rich nor poor, intelligent nor ignorant, white nor black. The American murder record is the scandal of the civilized world. It is an outstanding indictment of our alleged civilization in conduct and character everywhere set at naught by the readiness of some monster in human shape to end a life in a manner always cowardly, often brutal and horrible in the extreme.

Our annual toll of murder deaths is probably not much less than 12,000 or almost twice the number of all the deaths from typhoid fever throughout the year and almost the same as the deaths from influenza in 1924. The law on the subject is brazenly disregarded, while to an increasing extent more skilful methods of crime are adopted that seem to defy detection. It is an open question how far this tendency to murder is fostered by an enormous output of so-called detective stories, which serve the purpose of suggestion, often no doubt carried into effect with disastrous consequences to those concerned. Apparently our machinery of government in dealing with murder cases has broken down. A large number of murderers are never discovered, while in many other cases the guilty person is convicted only after a long and costly trial. The death sentence which

operates in most of the states seems to have no deterrent effect. In my own judgment, it would be better to abolish capital punishment altogether, while there is the utmost urgency of increasing our police protection and the machinery of the state available for the detection of crime. We have learned to take murder lightly. Hardly has one brutal case passed off the stage, when another is announced. We have grown callous to the fact that murder is an everyday occurrence in our large cities, while we are indifferent to the fact that ours is the highest murder record for any large civilized country in the world.

Nothing is more discouraging than the complacent attitude of the public towards the murderer. It frequently happens that public sympathy is obviously with the offender, while it is indifferent to the victim. As a matter of fact the victim is rarely thought of, although the consequences to others may be frightful. Women are deprived of their support, children of their fathers, mothers of their children. Homes are blasted, careers are wrecked, and society is shocked if but for a moment by crimes which should be unthinkable in a country which calls itself really civilized. To an increasing extent the murderer butchers a family and then ends his own miserable existence. At the present time, there are probably 100,000 murderers at large in this country who have escaped the consequences of their actions entirely, or have been released from prison after a comparatively short sentence.

Murder differs from theft. While the former is almost invariably a matter of impulse, the latter often involves weeks and months of careful contemplation. The present tendency of declaring murderers, to an increasing extent, insane or mentally irresponsible, shows a weakening of our lines of self-protection. What is needed is a better machine for law enforcement to carry out the fundamental conception of all government which is primarily responsible for the protection of life and property.

We have drifted far away from our original moorings of government, which now concerns itself entirely too much with matters of personal conduct until personal liberty is in serious danger. The costliness of prolonged trials deters many a community from exerting itself to the utmost. But it would be well for us to keep in mind the marvelous precedent of the Canadian Mounted Police which rarely misses an offender once it gets on his trail. It is an open question whether the tendency towards murder is not becoming more common among women. They still rely to a large extent upon a sense of chivalry and the so-called unwritten law. Of late years, however, a few women have been executed and it is to be hoped that public judgment may change towards an attitude of greater severity. All over the land, there is a tendency towards taking the law in one's own hands whenever it suits one's purpose. But as long as we are crushed by an overburdening weight of needless legislations and statutory requirements interfering largely with personal freedom, there is no hope for material improvement. The courts are clogged with matters of a more or less irrelevent nature while major crimes go largely unpunished.

In the last analysis, murder is essentially a question of defect in character. We are not in this country concerned half as much as we ought to be with the development of good character, as we have been concerned with the development of good conduct. The two have little in common with each other. A man of irreproachable conduct may be a man of despicable character, although a man of good character rarely fails in the matter of good conduct. We take the appearance for the reality. There is need of introducing into the curriculum of our grammar schools an effective teaching of law and order, respect for life and property, which, if early inculcated, will have its influence upon character throughout the remainder of life. At present the trend of things is decidedly in the wrong direction.

Chapter XXXIV

TIRED OF LIFE

WEARINESS is a natural condition of the mind and body worked to a point where rest and change become imperative. Physical weariness is a readily understood symptom and easily cured by sleep. Mental or spiritual weariness is much more complex in its origins and infinitely more difficult to deal with. The mind seems to revolt at being put to rest and we cannot curb our thoughts, especially in matters of grave concern involving the deeper problem of our everyday existence.

Being tired of life is common, but the weariness soon passes and the love of life reasserts itself. It is often but a momentary depression easily curable by change of interest. It has been well said that we are really only tired of doing the same thing over again and that weariness is the reaction of monotony. There is much truth in this. When we brood over the same thing for hours, days and weeks, a state of mental depression is only natural. In such a condition one may come desperately near to yielding to the impulse of self-murder. Life has lost its value because we have lost interest and we have lost interest largely because we have overemphasized any one particular phase of our existence. Life is largely a succession of problems, which for their adequate solution demand a never failing faith in the future. However dark the day, the sun of our power to solve our problems will rise some time. The question is one of mental and spiritual strength to survive the momentary depression.

Countless are the instances of would-be suicides who were glad that their efforts had failed, but many succeed and the toll of self-inflicted deaths amounts to some 15,000 during the course of a year.

The suicide rate of this country has remained about the same for some years past. It now rises and falls but slightly. Suicides are most common during periods of profound business depression suggestive of the failure of individuals to adapt themselves to new conditions. To every three men that commit suicide there is one woman. This ratio also seems to be a very stable one. Suicides are most common in Central Europe where social and economic conditions are at their worst. Suicides are rare among primitive races, although there are some curious exceptions. Suicides are more common among Protestants than among Catholics and they are not uncommon among Jews. There are reasons for believing that suicides are more common than the available statistics indicate. To an increasing extent subtle means of suicide are involved to hide the facts of self-murder and such deaths are classified as accidents since there is no other alternative. Suicides have always been excessively frequent in the liquor trades or among persons addicted to habits of gross intoxication or alcoholism. The ordinary inhibitions fail to control the suicidal impulse. Suicides sometimes occur even among the very young down to the age of childhood. They are not rare among young students who fail in their examinations and who view their future with an utter lack of hope amidst an unsympathetic environment. Suicides are common among women who have been betrayed and who likewise suffer from lack of sympathy and patient consideration. But suicides occur most among those who have been guilty of criminal or otherwise wrongful actions and who by its means wish to escape the consequences of a nature too harsh to contemplate. Time and again even in prisons, men have ended their lives, unwilling to face the future. In all such cases there

is invariably on the one hand a lack of moral courage and on the other a lack of spiritual faith. Only a coward desires to escape the consequences of his actions, be they what they may. Only the brave resolutely face the future and await a rising dawn and a change in circumstances that justify the happiest anticipation. Life is always a succession of hopes and disappointments, but the fundamental of every suicide is a lack of faith in the future.

It is sometimes said that the suicidal tendency is inherited. It is not inherited but is one of the most powerfully suggestive of circumstances that can be introduced into family life. Unquestionably in many cases the son follows the father and the daughter the mother whose life ended in self-murder. Even more powerful is the suggestion of suicide by novel means. Recently a man jumped to his death from the Washington monument and a few days later another did the same. Society is largely responsible for not taking threats of suicide seriously. No one in a really rational state of mind ever gives utterance to the thought that life is not worth living. Only a diseased intelligence can arrive at so preposterous a conclusion. But there is the utmost urgency of patient attention to all cases in which the threat has been uttered. There is perhaps no more dangerous person than the one who contemplates suicide and murder. Such cases are apparently on the increase and often the crimes are of a revolting nature. Recently a man butchered his wife and five children and an innocent servant before he ended his own existence. Such crimes find their root in pure selfishness and lack of all restraint or inhibition to live a normal and rational existence. We are not here to live our own lives in our own way at the cost of other people. We are here primarily to work for our sustenance and to do our duty, as others do their duty towards us. The human system is one vast organism which can continue only by each and every part functioning as

perfectly as possible. The suicide stamps himself invariably as a failure. He may have grievous complaint against others. He may have suffered much without fault, but he is, nevertheless, a failure in the never-ceasing attempt of man to master the conditions of his existence.

The most pitiful suicides are those who end their existence to escape insufferable agonies from some incurable disease. They are practically no longer sane, but on the borderland of mental irresponsibility. Suicides are fairly common among cancer patients who unhappily waited too long to undergo an operation that would have relieved their suffering, while adding measurably to their length of life. Suicides are fairly common also among the insane. In all such cases the condition is not one of moral responsibility but largely one of responsibility on the part of those who are trusted with the care of patients largely helpless. Every now and then a suicide is reported of a person who escaped a watchful nurse. The responsibility rests upon the nurse or attendant who has no right to take his or her duties lightly. Every threat of suicide requires to be taken with the utmost seriousness. There is no class or condition of people exempt from its liability. The very rich commit suicide apparently as readily as the very poor. The most intelligent and gifted commit suicide as readily as the most ignorant and brutal. Suicides even among the clergy are by no means rare. But in each and every case the true cause of suicide is a vanishing faith in life's larger aspects and the ever-present possibility of a change for the better. But when all is said and done, suicide ever has been and ever will remain one of the mysteries and contradictions of human existence, which presupposes a love of life as the most precious of all possessions.

Chapter XXXV

DISEASE INHERITANCE

DISEASE in some form causes death in all but a fraction, possibly less than 10%, of human beings. The possible transmission of specific of a general liability to disease is therefore of profound importance in all discussions of longevity. But authorities are widely at variance as to the value which should be attached to heredity in contrast to environmental factors, often more than sufficient to offset its insidious influence. In every disease the fatal outcome is finally determined by bodily resistance, which essentially is the result of good nutrition, hygienic ways of living, and the avoidance of health-injurious habits. Thus the two factors of heredity and environment, using the latter term as expressing all that affects health and longevity through human control, are inextricably interwoven and often beyond the point of disentanglement.

Heredity has a language of its own which precludes intelligent presentation of all but the simplest questions. But it is these that the public is most seriously concerned with. First, there is the question of whether longevity as such is definitely inherited or inheritable, and second, whether specific diseases or bodily abnormalities are transmitted or transmissible from parent to offspring. The latter require to be sharply differentiated, for a bodily trait, or abnormality, or peculiarity is not a disease in the strict sense of the term. That the former are inherited is a

matter of everyday observation and needs no discussion. Stature, eye color, hair color, largeness or smallness of feet, largeness or smallness of ears, the Jewish type of nose, etc., are all traits which are obviously transmitted from parent to child. But in the case of specific diseases the problem is much more involved, and still more so in the case of a predisposition to certain diseases, which is a condition much more likely to be met with.

In a fairly stationary society the annual distribution of the principal, and even the minor, causes of death remain much the same. Profound variations are either the result of exceptional extraneous influences, such as climatic abnormalities, war, famine or pestilence, or the result of deliberate measures aiming at disease prevention and health control. The general inherited liability to a multiplicity of diseases would therefore seem to rest upon substantial evidence. Changes in disease distribution are in modern populations easily traceable to environmental alterations of a more or less far-reaching nature. Few, if any, diseases affecting man have been entirely eliminated. Even yellow fever still lingers here and there, though outbreaks are usually prevented from spreading by effective methods of public control.

The evidence of the foregoing assertion is furnished by the amazing similarity in the annual mortality returns from specific diseases. Thus in 1924, in the United States registration area, the number of deaths from pulmonary tuberculosis was 78,096. In 1925 the corresponding number was 78,103. The number of deaths from syphilis during the two years was 7,614 and 7,419 respectively. The number of deaths from rheumatism in 1924 was 4,548, while in 1925 the number was 4,003. The number of deaths from bronchitis in 1924 was 23,278 and in 1925, 23,090. Evidence of this kind could be multiplied indefinitely, but I will conclude by quoting the statistics for cirrhosis of the liver. In 1924 the number of deaths from this disease was

7,344 and in 1925 it was 7,549. It may be argued, of course, that environmental factors, habits of living, etc., are predominating influences more powerful than those of heredity. But if the term heredity is used as an equivalent for disease resistance to certain infections or certain organic impairments, the heredity factor is perfectly obvious. We die from these diseases because we have inherited a predisposition thereto, or a lack of immunity against them. For in a general way it may be said that we do not inherit specific diseases so much as we inherit a liability thereto or a predisposition, which naturally varies with different types of mankind or different constitutional conditions.

In a strict sense of the term, few diseases as such are strictly inherited. Even syphilis which is generally considered a hereditary affection is possibly directly transmitted from parent to offspring by means of infection. Tuberculosis, which was formerly held to be essentially an inherited disease, is now known to be an infection transmitted through contact from person to person. At the same time a predisposition to tuberculosis is certainly inherited and can be ignored only at a person's serious peril.

The heredity factor in cancer has been denied by nearly all the authorities on the subject, except on the basis of animal experimentation, which, however, seems to prove no more than that a high degree of susceptibility to cancer is directly transmissible under given conditions of mating from parent to offspring. Dr. C. C. Little in an address before the Second International Congress of Eugenics presented some impressive data based on the experiments of the Eugenics Record Office proving that the fact of inheritance in cancer in man could be statistically demonstrated beyond the question of serious controversy, but there is here confusion between the transmission of cancer and the transmission of a liability thereto. It seems to go without saying that if cancerous persons intermarry the liability to cancer in the offspring must be increased on the simple principle of the

Mendelian law. This does not prove that the disease itself is inherited but that the constitutional or nutritional peculiarities favorable thereto are overemphasized in the offspring. Certainly, considering the enormous mortality from cancer, the incidence of the disease in families should be greater than is actually the case, if the disease itself were directly transmitted from parent to offspring. It should also in that case occur much earlier in life than is generally the case. It is difficult to conceive how direct heredity of cancer can be transmitted by parents who contracted the disease long after the cihld-bearing period had ceased. This point of view has been well emphasized by Dr. A. Rabagliati in his classical essay on "Air, Food and Exercises."

The inheritance of mental disorders is more generally accepted. They include, of course, a wide range of neurotic affections. According to Dr. Aaron J. Rosanoff of Kings Park State Hospital, "Institutional experience shows that the constitutional mental disorders run in families, and special statistical studies point to heredity as being the origin of psychopathic constitutions. The latter fact is today no longer in question; but there is considerable difference of opinion as to the relative amounts of causation attributable to heredity and to other factors." That is precisely the problem in all questions of heredity complicated by environmental or other external conditions inherent in human life, that of necessity must be lived.

Epilepsy may be referred to as one of the affections, the inheritance of which is quite well established. W. A. Turner has recorded his observations on one series of 250 cases, in which there was a family predisposition in 32%, while in another series of 890 cases the predisposition to epilepsy was noted in 37%.

In diseases of the circulatory system, one of the most important affections obviously transmitted by heredity is hemophilia, which has frequently been described by authorities of outstand-

ing responsibility. Such evidence could be indefinitely multiplied but there is always left a doubt as to how much should be attributed to pure heredity and how much to pure chance and environmental factors. But, in a general way, it cannot be questioned that the transmission of disease is inherited and constitutes a general liability upon the human organism, the perfect control of which will tax the resources of the medical profession to the utmost.

Less difficult is the problem of inheritance of longevity as such. It is a matter of common observation that longevity runs in families. What is here inherited is a general power of disease resistance rather than any specific immunity, although this also may be the case. The subject has been adequately dealt with by Dr. Raymond Pearl in "The Biology of Death." He is of the opinion that from one-half to three-fourths of the death rate in man is selective in character and that the proportion is determined by hereditary factors. He therefore concluded that "Just in proportion as heredity determines the death rate, so is the mortality selective." This conclusion he supports by graphic charts based largely upon foreign data. He makes a brief reference to some of the work in this direction carried on by the late Dr. F. S. Crum assisted by Mr. Arne Fisher. He also quotes some conclusions from the record of the Hyde family dealt with in detail by the late Professor Alexander Graham Bell, which in his judgment demonstrate that there is a definite and close connection between the average longevity of parents and that of their children. Thus, for example, where neither parent lived to be eighty the percentage of children who lived to the age of eighty was 5.3; but where one parent lived to be eighty or above, the percentage was increased to 9.8; where both parents lived to eighty and above, the percentage was 20.6. These statistics have not been controverted and are apparently conclusive. They are sufficient for the purpose of emphasizing

that longevity is inherited in general terms, which may be accepted as the equivalent of increased disease resistance to the multiplicity of affections which curtail the duration of the human life.