

HEALTH

and a changing civilisation

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PREFACE

I AM writing this book for the increasing minority of thinking people who wish to make the best possible use of their mental and physical potentialities. In my experience this minority is impatient with the medical profession, because of its preoccupation with disease rather than health.

I shall try to show that the remedy lies to a certain extent with the public. The law of supply and demand must not be forgotten. Medical training and medical practice will continue to consider the study and treatment of disease as their main interest, as long as the public treats the doctor as a last resource to be called in only in an emergency or severe illness.

Far too many lay people who conduct their affairs with the greatest of intelligence, and who have a highly progressive and enlightened viewpoint on all other subjects, harbour an inexplicable misconception about the subject of health. They are quite satisfied with a negative conception, as a state in which the individual is free from gross disease or disability, and are shocked at the idea of visiting a doctor to ask for advice as to healthy living.

These same people, however, if they possess a motor-car, send it to a garage for periodic over-

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haul as a matter of course. They have accepted the principle of "prevention is better than cure" in the case of a complex mechanical device, which plays a relatively small part in their lives. Their inability to apply the same common-sense principle to their own infinitely more complex organism must be due to a fundamental misunderstanding as to the function of science.

While this attitude persists, science or scientific method will continue to be misapplied to the study and treatment of disease, rather than to the furtherance of individual efficiency or health.

Only when the majority, or at any rate a larger minority, is conscious of its birthright of health—I mean health as a positive conception, i.e., continuous wellbeing under all circumstances, or optimum adaptation of the individual to his or her environment—will it be possible to reorganise the medical services of a modern community, and create an Individual Health Service.

Starting from this point of view it would seem logical to postulate that scientific method will have to be applied in an intensive manner to the welfare of the community along two separate but converging lines:

- (1) A Public Health Service—dealing with those factors which affect the community as a whole.
- (2) An Individual Health Service—dealing with an infinite variety of factors which affect the health of the individual.

A Public Health Service is already in existence in every civilised community. I propose to deal with this service only in the most cursory and incidental manner. Few educated people are unaware of the enormous advances in social hygiene thanks to the purification of food and water supplies, and scientific methods of prevention and treatment of epidemic disease, etc. I advise readers interested in the history and present state of the Public Health Services, to consult Singer's *Short History of Medicine* (1) and Loebel's *Whither Medicine* (2).

An Individual Health Service does not exist. I shall explain why when I describe the organisation of present-day Private Medical Services, and I shall try to convince the reader of the urgent necessity for the initiation of such a service.

It must not be forgotten that it is only within relatively recent times that medical education and medical practice have adopted the scientific method of approach to their work. In so far that the "cure" of disease and the alleviation of suffering have a greater dramatic appeal to the imagination, they therefore seem more urgent than the less spectacular methods of prevention.

It is within still more recent times, in fact during the present century, that it has been realised that there can be no such thing as cure of disease. Disease means destruction of vital tissue—characteristic of youth—which can never be replaced except by inferior tissue—characteristic of old age.

Therefore, an individual who has had disease can never be cured, but can only be patched up to survive on a plane of diminished efficiency.

This realisation has brought about a reorientation of enlightened medical thought. This in due course will involve radical changes in the system of medical education. If at the same time enlightened public opinion insists upon receiving intelligent and positive advice as to health, it follows that scientific method will be applied primarily, as it should be, to the study and furtherance of health.

In Chapter VI I shall put forward a personal conception of a positive Individual Health Service for the future. Needless to say I do not claim that it is feasible in every detail, or that it could be realised in a short time, even under the most ideal circumstances. I do claim, however, that such a service would be a vast improvement over present private medical services. My main object, at present, is to put forward a concrete plan in order to stimulate interest and discussion.

Those readers, if there are still any, who believe in a policy of *laissez-faire*, will obviously disagree with any arguments which are put forward in favour of a positive plan for health. The old argument against interfering with the "freedom" of the individual will be used. Those, however numerous, who hold that point of view, have not been sufficiently powerful to prevent the development of Public Health Services. Equally it is to be hoped, that this attitude of negative obstruction-

ism will be unable to prevent the development of an Individual Health Service.

Public Health measures may, and almost certainly will, be considerably developed in the future, but they will never be sufficiently individualistic for the promotion of maximum efficiency of the individual.

We live in an age of incredibly rapid transition, as dangerous as it is fascinating. Science has revolutionised the environment in which man lives, in so short a period of time that the slow, natural process of adaptation has been unable to keep pace with the altered circumstances. If man becomes increasingly preoccupied with devising and attending to machinery, he may tend further to neglect his own machine.

The majority of the population now live in towns. Both from an anatomical and physiological point of view, the human organism was planned for a vigorous out-of-door existence. Under urbanised conditions, with a vertiginous rate of increase of nervous and mental stimuli, very few retain any semblance of positive physiological well-being or true health. Almost everybody over the age of thirty, and many even long before this age—when subjected to a sufficiently delicate and sensitive examination—show signs of dysequilibrium or maladjustment due to the excessive stress and strain of mechanised life. If we postulate an almost universal maladjustment of this nature, it follows that the spontaneous mechanism of

individual adaptation to the environment has broken down owing to the time factor. The environment has changed too rapidly.

Successful adaptation in the future will necessitate:

- (1) A rapid change, not only of function but also of structure, or
- (2) Assistance of an artificial nature on the part of medical men, or rather applied physiologists: the "Individual Health practitioners" of the future.

The first alternative is impossible, for this generation at any rate. The second alternative is dependent upon (a) more efficient utilisation of present scientific knowledge for this particular purpose, and (b) the acquisition of further knowledge which is not yet in existence.

We do not yet understand the detailed mechanism of the spontaneous process whereby each individual adapts himself to his environment. Within the last few years there has been a slowly growing consciousness of the acute need for more knowledge on this subject. From the writings of eminent men who have put forward a plea for a more intensive study of man in his new environment, I will give two quotations only, both taken from *Constitution and Health* (3) by the American biologist, Raymond Pearl:

" . . . The fact is, there has been a sad lagging behind the advance of science on the part of what may be termed the non-scientific world,

that is, the ethical and spiritual, and we might add, the political. There has been no preparing of the ground for the coming of the gifts of science, and the result is that much that should otherwise have been a benefit to mankind has simply led to social chaos." loc. cit., p. 89, quoted from W. E. Lishmann, "The Contribution of Science to the Future," *Nature*, Vol. 130, page 582, 1932.

". . . And furthermore there is a kind of moral necessity to go forward in the attempt to get a better understanding of the whole nature of man, lest he perish. The material, mechanised civilisation he has evolved may easily become a monster to destroy him unless he learns better to comprehend, develop, and control his biological nature. Somewhat belatedly it is beginning to be seen that inventions and discoveries that cannot be intelligently managed after they are made are likely to be a curse rather than a blessing." (3).

It does not follow that the full realisation of the danger should lead to pessimism. Many equally eminent, as well as less eminent thinkers, believe that the physical strain of, as well as the economic contradictions inherent in our present state of civilisation, are so great as to render an ultimate collapse inevitable. I do not believe that this pessimism is justified. I think it possible, in fact more than probable, that pessimism will one day be proved to be a symptom of ill-health. Be that as it may, my own belief is that the intellectual powers

of man, working with the instrument of scientific method, can accomplish greater wonders with man himself than they have with man's environment.

The need must first be widely and consciously felt. I believe therefore, that it is better at the present juncture to err on the side of excessive zeal on the subject of health, than to neglect its importance.

Reorientation of scientific and medical thought in the direction of the study of normal function rather than to the study of disease, is, as I have said, already taking place.

Those reforms which I shall outline as being necessary, should automatically come about as the culmination of present trends in medicine. As in politics and economics, however, the machine of medical and allied applied sciences has become so cumbersome in each country, that it is in danger of becoming unwieldy. Proper co-operation between workers in different fields of scientific activity—not only in different countries, but in each country itself—is becoming more and more difficult. Those who think as I do may render the world a service by pointing out, even if it be with over-emphasis, that not only are certain reforms necessary, but that large-scale co-ordinated planning is essential; also that the present dangerous period through which we are passing may not allow us unlimited time to bring those reforms and plans into being.

London, *September 1934.*

E. OBERMER. ,

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HEALTH

CHAPTER I

STANDARDS OF HEALTH IN THE PAST

'Plus ça change
Plus c'est la même chose.'

"In fine, the lesson of the unity of primitive medicine, which is only a corollary to the general proposition of the unity of folk-lore, is that certain beliefs and superstitions have become ingrained in humanity through space and time, and can be eradicated only through the kind of public enlightenment which teaches that prevention is better than cure."

Garrison History of Medicine, W. B. Saunders,
4th Ed., p. 44, 1929.

ACCORDING to one's temperament, and of course according to one's degree of health, it is either depressing, amusing or fascinating to realise how fads and fashions have recurred at intervals ever since the dawn of history.

It is probable that standards of health for the fortunate few have varied extremely little. The urge to potentialise himself is as basic to man as the urge to reproduce. Placed in a favourable environment, or even often making a favourable environment for themselves, the few have followed their instincts and have lived long and healthy lives in direct proportion to their hereditary advantages.

From early times there have been wise and stupid physicians. The wise ones have done little to interfere with, and sometimes a good deal to help their patients to live in an efficient manner. The stupid ones have been shunned by their wise patients.

In the limited space at my command, I do not propose to attempt a systematic survey of medical history. Once again I would refer readers who wish for details to Singer's *Short History of Medicine* (1). The enlightened point of view which animates his book is exemplified by the following quotation:

“. . . Turning from the physiological laboratory to the living being as a whole, it is just the indwelling purposiveness that is, before all things, the most worthy of consideration. Every function, every structure, every instinct, habit or reflex, every mental activity that is related to health—and which is not?—may throw some light thereon. It appears to the author that the scientific method is by far the mightiest weapon that has as yet come within man's grasp, for the illumination of these multitudinous entities.”

For my purpose it is possible to divide the past into two distinct periods:

(1) *From Remote Antiquity up to the Industrial Revolution.*

During this period isolated thinkers and workers had the scientific attitude of mind, but facilities for the application of scientific method were lack-

ing, hence the exact sciences were still in a rudimentary state.¹

(2) *From the Industrial Revolution to the Present Time.*

I shall deal briefly with both these periods:

(1) *Before the Industrial Revolution.*

This period is characterised by the fact that leisure and opportunities for mental and physical culture were enjoyed by a very small minority. All the resources of the society in which they lived were concentrated on this minority. The majority lived in a state, first of actual, and later of wage-slavery. The standards of all but a fraction of this majority were of necessity extremely low.

They worked incredibly long hours and their conditions of life were appalling. With regard to the minority however, a great deal of thought had obviously been lavished on social hygiene even from the earliest times.

According to Neuburger (6) the standard of social hygiene existing in Egypt for example, about the time of pyramid building, i.e. 2900-2250 B.C. must undoubtedly have been based on the foundations of an experience derived from the remote past.

The Egyptians devoted great attention to the care of their children. Infants were carried about wrapped in large soft cloths and after weaning only

¹ The implications of this fact have been developed in a most clear and fascinating manner by John Langdon Davies in his book *Man and the Universe* (4), and also by H. G. Wells in his *Outline of History* (5).

cows' milk was given at first, later on vegetable food and water to drink. The children lived mostly in the open air and completely naked up to the age of five years. They went barefoot to the age of ten, and physical exercises including swimming, completed an all-round education.

They had very stringent rules for guarding against epidemics. According to the same author they are said to have recognised the fact that prevention of disease is easier than cure.

The opinion was commonly held that most ailments were derived from over-feeding. It was also a common custom to employ emetics and enemata for three consecutive days each month for prophylactic reasons.

It is of interest that during this period the ibis was said to be the particular god of medicine. To him was ascribed the discovery of the enema, founded upon the supposed observation that the ibis injects sea water into the rectum with its long beak. Some of our present-day fads, including that of intestinal stasis and the rage for high colonic irrigation, seem to be a little less "scientific" in the perspective of these facts.

Similarly high standards prevailed in India during the Vedic and Brahmic periods from 1800 B.C. onwards. The Vedas contained an elaborate hygienic code: their dietetic regulations varied with the seasons, no little attention being paid to climatic conditions.

Once again we read that the apparatus for the

administration of an enema consisted of a clyster-bag (an animal's bladder or leather bag) and pointed metal horn or ivory tube. The frequent accidents which the use of this apparatus occasioned do not seem to have deterred the ancients any more than they do our modern cranks.

Their prophylactic measures consisted of an emetic once a week, a laxative once a month—such moderation could only be possible before the invention of newspapers with unlimited facilities for the advertisement of purgatives.

The same authority (6) gives interesting details of the old Jewish hygienic laws, derived mostly from the periods of Egyptian and Babylonian captivity many hundreds of years B.C. The commands concerned prophylaxis and suppression of epidemics, suppression of venereal disease and prostitution, care of the skin, baths, food, housing and clothing, regulation of labour and sexual life. Many of these commands are, in view of the conditions of time and climate, surprisingly rational, even in the light of modern science.

About the same period of history Chinese physicians were responsible for the most extraordinarily elaborate code of medicine which has ever existed. Measures of dealing with their patients were based on a fantastic philosophy, characteristic of the Chinese temperament. Many hundreds of years B.C. these Chinese physicians freely used substances of animal origin: liver, lung and kidney were given to strengthen the function

of the organ in question. Young men's semen, nerve tissues and testicles of animals were given for weakness and impotence, as was placental substance to assist childbirth. It is not, of course, legitimate to compare these practices with those which have arisen in modern times with the true science of endocrinology. It is unfortunately true, however, that the catalogues of manufacturing chemists do but to a very small degree reflect the activities of scientists even to-day. Perusal of these catalogues is more than a little reminiscent of the habits of ancient China.

The Chinese physician of this period also investigated the nature of the excreta. He examined the amount, colour and consistency of the nasal mucus, sputum, urine and fæces of his patients. Those who are interested in the new science of medical biochemistry should bear this venerable precedent in mind.

The intelligent and proper use of biochemistry, as I shall point out later, will be of the greatest assistance to the individual health practitioner of the future. Multiple chemical examinations, however, are sometimes even now made without any real purpose, and are merely an expression of another recurrent fashion.

Medicine and the standards of life during the period of Hellenic culture rose, as would be expected, to a still higher level. Even before the period of the great Hippocrates, the cult of Asclepios, God of Healing, flourished from 700

B.C. onwards. This cult flourished mostly in places which through climatic or hygienic advantages were natural health resorts. Altars and sacred fountains were erected in the neighbourhood of health-giving springs. To these later, magnificent temples were added, together with gymnasia, in which bodily ailments were treated by physical exercises, baths and inunctions. The supplicant for aid had to submit to careful purification; to bathe in sea, river or spring, to fast for a prescribed time, and then abjure wine and certain articles of diet. This lengthy and exhausting preparation, partly dietetic, partly suggestive, was accompanied by a solemn service of prayer and sacrifice. The priests of Asclepios had visions which they interpreted as an injunction to cures which were mostly rational, such as diet, exercise in riding, hunting or fencing. They also used so-called "psychical" or what we should call "psychological" methods, such as listening to a song and seeing a play. All these measures, which at first sight seem ridiculous, had a highly suggestive effect. In the very best orthodox tradition, success was always ascribed to the credit of the God, failure to the fault of the patient.

All this is more than a little suggestive of present-day Spa treatment. Only the jargon differs: we talk of "mineral salts" or "radium emanations" instead of the sacred Asclepios. It is doubtful, however, whether we possess more knowledge about the intimate mechanism of the

action of waters or climate on the individual than did the Greeks.

In the fifth century B.C. the famous school of medicine of Cnidos, with Euryphon as its most distinguished exponent, considered the causes of disease to be insufficient evacuation of waste products of digestion and their determination to the head. This doctrine is still held by many to-day, although the idea of determination of waste products to the head is replaced by that of the determination of bacterial waste products to the brain.

As with the arts, ancient medicine entered the Golden Age with Hippocrates in the fourth century. Hippocrates combined the very highest ideals with a dispassionate, objective and truly scientific point of view. As he had no scientific knowledge, and in particular no knowledge of anatomy or physiology, he had to depend for his methods upon observation and the healing power of nature.

On the other hand, he taught his followers to observe the individual and the sick person as a whole, instead of concentrating solely upon the seat of disturbance or disease. Only in very recent times has medical thought returned to this procedure, which seems to be the only logical one.

As is well known, Hippocrates postulated the existence of four essences or elements: earth, air, fire and water, corresponding with black bile, yellow bile, blood and phlegm. From these the

Hippocratic school derived the four basic temperaments or types of humanity: sanguine, phlegmatic, melancholic or choleric. Again, it has taken twenty-three centuries to complete the circle. Only within the last few years have we returned to the study of constitutional types, which is already bearing fruit. Study along these lines is helping us to detect and forestall the special ailments to which each type of humanity is most liable.

The Græco—Roman period of medicine was made notable by two figures; first that of Asclepiades of Prusa, born about 124 B.C., who did much to naturalise Greek medicine in Rome. He denied the purposefulness of the vital forces, and is the most important early representative of the mechanistic attitude of mind in medicine. If reincarnation were possible it would be interesting to see how this thinker from antiquity would conduct himself in the war of mechanism versus vitalism which is still raging among scientists.

The second and outstanding figure of this period was Galen, who lived from A.D. 131-211. His incredibly voluminous writings bear witness to a ceaselessly inquiring mind. He stressed the overwhelming importance of diet in the prevention of disease. In his writings he enumerated a large number of useful food materials which coincide remarkably with our present-day experience. He enjoined all forms of bodily exercise, and laid down detailed rules as to water-bathing, as well as steam, sun, sand, mineral and herbal baths.

Thanks to science it is now possible to measure the wave-length of rays emitted by the sun and lamps used for artificial sun-baths. It has also given us a greater understanding of the exact nature of many other physical methods of treatment. Nevertheless, wholesale application of these methods may still be premature until we understand the mechanism of their action on the human subject.

In his precepts upon hygiene, Galen showed himself a true Hippocratist. He set forth in utmost detail the necessary conditions for the acquirement and maintenance of health at every age. In view of even Galen's abysmal ignorance of physiology it is extraordinarily interesting to note that in the incidence of disease processes he assigned a far more prominent rôle to the qualitative and quantitative anomalies of the blood than to abnormal conditions of the other humours. This view again foreshadowed by some eighteen centuries the trend of thought of a powerful school of medical biochemists of to-day.

After the decline and fall of Roman civilisation, the world was plunged for centuries into the Dark Ages, during which the standards of health were as low as the standards of reason.

With the Renaissance in Italy we come to the origin of modern experimental medicine.

In the fifteenth century Leonardo da Vinci first carried out dissection of the heart and vessels. In the sixteenth century Vesalius founded the science of anatomy at the University of Padua.

Early in the seventeenth century Galileo devised the first telescope and microscope, and first laid down the axiom that science is measurement. Later on in this century Thomas Sydenham investigated the natural history of infectious diseases, and Harvey discovered the circulation of the blood. Needless to say this discovery had the greatest difficulty in surviving against almost universal ridicule.

I do not propose to give a catalogue of other important names and dates of this period. It is sufficient for my purpose to point out that the awakening of the human intellect during the Renaissance led to the development of the exact sciences. The exact sciences led to the Industrial Revolution.

(2) *From the Industrial Revolution up to the Present Time.*

This period is characterised by two new factors:

(i) Machinery, which has altered the character of manual labour for a large proportion of the populace. More and more the hectic life of the towns tends to predominate over the peaceful life of the country.

(ii) Industrialisation, which has involved a gradual levelling up of the standards of life. After a relatively short period of unfettered wage-slavery, the growth of humanitarian ideals, together with the rise of Public Health Services, improved the conditions of the average worker to

such an extent that the population increased at an unprecedented rate. Singer (1) gives a most interesting table of increase of population in England and Wales since the Industrial Revolution.

These two factors together could not fail to have a most important bearing on the standards of individual health. As we approach the present day, the standards of the majority continue to rise, whilst the standards of the few continue to fall. It is no longer possible for the few to have unlimited slaves, and it becomes increasingly difficult for them to have sufficient leisure to devote to physical culture. I will not labour this point here, as I shall have a great deal to say about it further on.

A few names and dates will not be out of place. Those of us who tend to be impatient with our lack of knowledge, are apt to forget that scientific medicine with its allied sciences is a very recent phenomenon. For example Albrecht von Haller, who died in 1777, was the first to lay the real foundations of the science of physiology¹ which is of primary importance to health as it is to medicine.

Lavoisier discovered oxygen towards the end of the eighteenth century. Up till this time the most fantastic theories were held about the composition of the air and about respiratory processes.

The science of vital statistics was not systematised until the first half of the nineteenth century by Quetelet.

¹ The function of physiology is, of course, to study the mechanism of normal bodily functions.

Scientific method first became applied to public health as a result of the activities of Thomas Southwood Smith (1788-1861) and Edwin Chadwick (1800-1890). The soil thus prepared was fertilised by Pasteur (1822-1885), Koch (1843-1910), Ehrlich (1854-1923), and Metchnikoff (1845-1916).

Jenner performed the first vaccination in Great Britain in 1796.

Darwin published his *Origin of Species* in 1859. We are not even yet in a position to assess the ultimate consequences of this revolutionary re-orientation of biological thought.

Liebig the chemist (1803-1873) initiated the application of chemical knowledge to physiology.

Claude Bernard (1813-1878) the great French experimental physiologist, can be considered the father of modern endocrinology, or the science of the glands of internal secretion, which I shall examine later.

Roentgen (1845-1923) discovered X-rays.

Gowland Hopkins founded the modern science of nutrition in 1906 with the discovery of the "vitamins."

The typhoid bacillus was discovered in 1880. The tetanus bacillus in 1889, and the plague bacillus in 1892. I have singled out these latter dates, as everyone knows the number of lives that have been saved, both in peace and war time, by the application of knowledge as to the cause of these scourges to rational preventive medicine.

I have purposely omitted any mention of the application of scientific method in recent times to the understanding and treatment of disease. I must restrict myself to the discussion of those factors which have a bearing on individual health, and therefore on the prevention of disease. I have made no mention of the many advances in surgery; of the discovery of insulin and the elucidation of an important part of the mechanism of diseases such as pernicious anæmia.

On principle it is wrong to make rigid divisions of a subject. It is obvious that scientific knowledge of disease processes will directly or indirectly facilitate the study of normal processes. In the same way, public health measures, by improving general conditions and providing a healthier environment, are the indispensable concomitants of an Individual Health Service. Considerations of space, however, make it necessary for me to separate off my subject in an arbitrary and rigid fashion. It is also a fact that public health measures and recent progress in scientific medicine have already come in for at least their fair share of attention from the educated public. I need make no further apology therefore, for laying what might seem to be undue stress upon the importance of scientific method, and in particular scientific physiological method, applied to the positive furtherance of individual efficiency.

During the early and middle machine age which I have been surveying, it is extremely doubtful

whether the individual man has been as healthy or as happy as his predecessor. He may enjoy clean food and water. He may be relatively free from epidemics. On the other hand he is harassed and worried by the incessant movement and noise around him, by excess of leisure without peace to enjoy it. The old ordered standards have collapsed. The old beliefs have been discredited. No new standards and no new beliefs have been forthcoming. He is bewildered and lost, all too often at the mercy of the unbalanced fanatic, the quack and their exploiters who shriek at him from newspapers, hoardings and cinema theatre alike. At the mercy of fear and uncertainty as to his future, it is but small consolation to him that he has a greater chance to survive a severe illness or a major operation. I believe I am speaking for the majority when I claim that the average person wishes most of all to learn how to live more healthily and more happily when he is not ill.

CHAPTER II

THE PRESENT POSITION

Scientific Method Applied to Public Health and the Study of Disease

“It is a curious and at the same time highly disappointing fact that a decrease in appreciation of the medical profession must be recorded in a time of unprecedented efflorescence of medical science.”

Professor H. Burger: “The Doctor, the Quack and the Appetite of the Public for Magic in Medicine. *Proc. of the R.S.M.*, December 1933, page 171.

IN the passage from which the above quotation is taken, this distinguished Dutch professor voices an undoubtedly common opinion, based on personal experience, that there is impatience, and often dissatisfaction, with the medical profession on the part of a large section of the intelligent lay public. Is this attitude of mind justified? If so, what is the cause of this unsatisfactory state of affairs and what is the remedy?

It is an undoubted fact that “we are living in a time of unprecedented efflorescence of medical science.” Many eminent medical men point out that science applied to curative medicine and the alleviation of suffering has progressed at such a rapid rate that we should be satisfied with our

present lot. On the other hand, the rate of change in other fields of human activity since the Industrial Revolution has been at least as, and probably much more, rapid.

Before we can answer this question we shall have to examine in more detail the manner in which present-day medical science caters for the needs of a modern community.

Although scientific method has to a varying degree already permeated the practice of both private and public medicine, how far has this process resulted in an improved service for the individual?

I am most familiar with the organisation of medical services in Great Britain. Conditions in this country are fairly representative of those prevailing elsewhere in the more civilised countries in the world, with the exception of Russia.

I shall first give a brief outline of the organisation of medical services in Great Britain, and then describe any salient differences in other countries. Soviet Russia, which is experimenting with an entirely different system, will be dealt with in another chapter.

In Great Britain, as in all other so-called "Capitalist" countries, there are:

- (1) A Private Medical Service.
- (2) A Public or State Medical Service.

It is difficult to give a clear definition of the exact province of each of these two services and their relationship to each other.

Public Health Services in Great Britain, originated with the passing of the first Public Health Act in 1872. The State compulsory sickness insurance originated with the passing of the so-called National Health Insurance Act in 1911.

These are encroaching more and more upon the older type of private practice, which still remains in its essence individualistic and competitive. There has not been time for the establishment of harmonious co-operation and equilibrium between these two services. For some purposes there is too much overlapping, in other instances no provision at all is made by either service. Nevertheless, I shall have to deal with them separately. I shall discuss briefly:

- (a) Medical Education in Great Britain.
- (b) Private Medical Services in Great Britain.
- (c) Public or State Medical Services in Great Britain.

Medical Education is the factor common to both Services. The medical "personnel" is the product of the same educational system. Some understanding of this system, therefore, is an indispensable preliminary to a discussion of any medical organisation, present or future.

In order to become enrolled as a medical student, a matriculation certificate or its equivalent is necessary. The prospective student must also have at his disposal sufficient means to support him for the five or six years of his student life. Beyond this no qualifications of character or experience

are demanded. Only in the rarest instances are subjects such as logic, psychology and philosophy included in the curriculum of general premedical education.

The average student has seen nothing of life outside his school or university, and has no conception of the general conditions of life of the majority of the population. A large proportion of students take up medicine because they show no particular aptitude for any other calling, rather than because they feel an urge to devote themselves to science, to alleviate suffering, or to increase the welfare of mankind. In recent times families from the so-called "middle classes"—the small shopkeepers for example and even artisans—enrolled their sons as medical students in order to ensure social advancement for them. A "profession" was held to be more dignified than commerce. For practical purposes these considerations no longer apply. An increasing number nowadays take up medicine because of their leaning towards a profession which involves scientific training: it is unfortunately true, however, that many promising young people who have scientific leanings, take up one of the branches of pure science rather than medical applied science, owing to the greater opportunities for research which pure science offers.

The duration of a medical course is five to six years. Only a minority of students take the whole course at a teaching hospital. The first one, two

or three years are usually spent at a university. The students are transferred to a teaching hospital for the remainder of the course.

The first year is devoted to the so-called "preliminary" sciences, i.e., physics, chemistry and biology. The real importance of these sciences is now beginning to be realised. The teaching of an enormous amount of detail for examination purposes is, however, still common in many schools. Attempts are now being made to inculcate the student at this stage with a general biological or scientific view-point. The older generation of students had no idea how these sciences linked up with, or could be applied to, the more purely medical subjects which they were to learn later.

The second and third years are occupied with anatomy and physiology, including biochemistry or chemistry applied to living processes.

The anatomy course is still too often a process of cramming the student with an enormous amount of detail. Also too much of the teaching consists of dissection of dead bodies and long hours of reading from text-books. As is pointed out by the American Commission on Medical Education in their final report (7):

"Overcrowding in anatomy could be corrected in part by confining the early training to a reasonably complete survey of the entire field in the nature of an introduction, with particular emphasis on the major structures . . . it will give the student an orientation in the

field. . . . Teaching should emphasise the anatomy of living structures, not the inanimate structures seen after death.”

The teaching of physiology and biochemistry in the didactic and old-fashioned manner, lays itself open with even more force to the same criticism.

In its Report (7) the Commission again points out that:

“Many of the early laboratory experiences in these subjects are almost meaningless, and much of the physiology can be done on living subjects. If the amount of time devoted to the assigned laboratory work in these courses were reduced to permit the student to read and think about the subjects, better results should follow.”

As it is, far too few students finish this vital part of their course with an adequate conception of the importance of applying this knowledge to their future study of medicine proper.

The remaining years are devoted to “clinical” subjects, which in their essence constitute a study of disease, i.e. the theory and practice of general surgery and medicine, and an elementary course in special subjects such as obstetrics, gynæcology, the diseases of children, diseases of the eye, ear, nose and throat, the use of drugs, insanity, and the legal aspects of medicine.

During this time the student is taught pathology. By this is meant the naked eye and microscopical appearance of diseased tissue, bacteriology and

pathological chemistry—the detection of abnormal substances in the body fluids.

In view of what I shall have to say later, it is of interest to note that psychology is not yet a recognised subject in the medical curriculum, though there is a short course on the recognition of the more common forms of insanity.

All these subjects are taught in wards or the out-patients departments of general or special hospitals. Thus there are two factors which perforce govern the orientation of the students' interests.

Firstly, both teachers and students are obsessed by the bogey of examinations. The students have to memorise vast chunks of text-books. Medical text-books are perforce filled with tabulations of diseases and disease symptoms. The student too often, therefore, has to think of bodies as possessors of one or more diseased organs, all nicely divided up into separate water-tight compartments.

Secondly, they learn exclusively from hospital patients. Hospital patients usually do not go to hospital unless they are too ill to work or are suffering from such long-standing or crippling disease that they can no longer be treated by the facilities available to the general practitioner. In fact they are often past treatment altogether. From this human material the teaching staff select such outstanding cases of advanced or rare—usually incurable—disease, as best illustrate text-book descriptions.

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Even with the best-intentioned teachers, the curriculum is so overcrowded that the student can never expect to be given the facility for examining a healthy person, still less often has he the opportunity of seeing or investigating persons suffering from the initial disturbances of function which lead up to disease. For the same reasons, the student has to concentrate his attention on the disease or the diseased parts of the individual patient to whom he is allotted. There is no time for any attempt at investigating the "background" or assessing the importance of those sociological, physical and psychological factors which have played on the patient in the past.

The *Private Medical Services* in Great Britain can be divided up under the following headings:

- (i) Private Practitioners:
 - (a) General practitioners.
 - (b) Consultants and specialists in all branches of diagnosis and treatment.
- (ii) Private Nursing Homes.
- (iii) Private Nursing facilities.
- (iv) Voluntary Hospitals and Dispensaries.
- (v) Auxiliary charitable services.

The newly qualified medical student who intends to become a *general practitioner*, either does so immediately after qualification, or after one or two years of hospital internship as house physician or house surgeon. Even after qualification the economic factor is of importance. Only a very small minority of intending general practitioners settle

in a district, put up their plate and slowly build up a practice of their own. The majority either buy the practice of a retiring practitioner or a partnership in an established practice. To do this, many have to mortgage some years of their future. All this tends to introduce the commercial factor to a disproportionate degree.

For reasons which emerge below, the possession of considerable means is even more necessary for the intending specialist. The latter requires elaborate and expensive instruments and laboratories. This has already led to a considerable increase in specialisation, and the lack of these facilities in general practice has led to its diminution in professional prestige in the eyes of the younger generation of newly qualified doctors.

Nevertheless, economic pressure forces a vast proportion of the profession into general practice.

The would-be "consultant" or "specialist" must spend a number of years exclusively engaged in unpaid or poorly paid hospital posts.

Even after a number of years of post-graduate work, the general consultant cannot expect to earn more than a very small sum in private practice until he succeeds to a senior post by the resignation or death of a senior hospital consultant.

As competition becomes more acute, and scientific methods increase in complexity, only men of exceptional skill and character can expect to become financially successful in a large city. This system involves many disadvantages. Every

specialist during the most actively creative years of his life has to spend a large part of his time as a member of the honorary staff of one or more hospitals. This involves arduous practical or teaching duties which make it difficult, and in some cases impossible, for him to indulge in research work. The possession of such an honorary post is, however, considered indispensable. It confers a prestige upon him without which he cannot expect to acquire a remunerative private practice. Further, it is bad economics. After years of exercising his skill as a "junior" for nothing, it is only natural that he should charge excessive fees when his opportunity comes. Such abuses, now happily rare, as fee-splitting—the general practitioner receiving a percentage of the fee charged by the specialist to whom he refers a patient—arose as a result of this unsound system.

Private Nursing Homes in Great Britain are in most instances reminiscent of the most lurid pages of Dickens. They provide the minimum of comfort and convenience for the maximum expenditure. It is difficult to understand the anachronism of their survival in a modern community, and it is to be hoped that circumstances and public pressure will soon force the present ones into bankruptcy. New and larger ones should then be built on the modern and efficient lines already laid down in the U.S.A. and elsewhere.

Private Nursing facilities are controlled by teaching hospitals, nursing homes, and the nurses co-opera-

tives—all of course purely voluntary organisations.

The training of nurses takes place almost exclusively in hospitals. From a physical point of view the training is so arduous that only girls of exceptional physical endurance can hope to survive. Coupled with these hard conditions, the pay both during and after training is so poor that the nursing profession attracts few but the hardy and unimaginative.

After qualification nurses have one of two courses open to them. The first alternative is to work on the indoor staff of a hospital or nursing home. With regard to the latter, the nursing staff is underpaid, grossly overworked, and usually badly fed. The second alternative is domiciliary nursing. Here, of course, the conditions vary with the type of patient. The hours are still often too long, and the conditions are much like those of domestic service.

The drawbacks of this system are now fully realised, and it is to be hoped that in this also, the example of the U.S.A. will be followed. In that country the status of the nurse is incomparably higher, and her psychological and physical welfare are considered throughout her career.

During the course of training the nurses are given special hostels. These have facilities for physical culture and all forms of entertainment, including special facilities for entertaining their friends. If the standard of the nursing profession

in Great Britain is to be raised, a similar system will have to be initiated.

Voluntary Hospitals and Dispensaries. The majority of the larger general and special hospitals, i.e., obstetrical, eye, orthopædic, ear, nose and throat, etc., are subsidised to a small extent by the State, but the major part of the running expenses is covered by voluntary donations and legacies.

The administration is in the hands of governing bodies, usually consisting of well-to-do "philanthropists," and is carried out by full-time paid administrators.

Treatment, both in the wards and in the out-patients department, is free in the case of the completely destitute. Other patients are expected to pay according to their income.

In most hospitals there is a lady almoner, whose invidious task it is to assess the patient's capacity to pay.

Some admissions to the out-patients department, and all admissions to the wards, are conditional to a letter of recommendation from a doctor.

In the larger teaching hospitals, medical work is divided into units. The care of the patients in each unit is supervised by the senior honorary staff, whilst most of the routine is entrusted by them to juniors.

Of recent years, a few full-time research and teaching units, with a whole-time paid senior as well as junior staff, have been introduced. In

some, another innovation is being experimented with in the shape of accommodation for well-to-do private paying patients.

Auxiliary Charitable Services. I group under this heading such special facilities as are provided at the initiative of progressive private people, which are not included under the Public Health Services.

The more important of these are the Infant Welfare Centres, Child Guidance Clinics, Psychological Clinics for children and adults, special treatment centres with facilities for massage, electrical treatment, medical baths, etc.

These enterprises are financed by private contributions, supplemented by payments from patients, as in the case of hospitals.

The medical staff usually give their services free, either from altruistic motives, or for the sake of the special experience.

The *Public or State Medical Services* in Great Britain can be divided into:

- (i) Poor Law Medical Services.
- (ii) Public Health Medical Service.
- (iii) Compulsory State Sickness Insurance.

The *Poor Law Medical Services*, which are under the control of the municipal or local boards of guardians, provide:

(a) Domiciliary treatment at the hands of parochial medical officers.

(b) Infirmary treatment in Poor Law Hospitals or Infirmaries.

Both these services are financed out of the rates payable by each householder.

The *Public Health Medical Services* provide:

(a) Hospitals for the chief epidemic infectious diseases, and nurses for some patients treated at home.

(b) A pathological service, which comprises free bacteriological and chemical laboratory service for each county.

(c) Maternal and child-welfare service.

(d) Tuberculosis service, with tuberculosis dispensaries, usually equipped with X-ray plant, nurses for home visits and sanatoria, hospitals for the observation cases, and for cases of non-pulmonary tuberculosis.

(e) Venereal disease service, including facilities for advice and home and hospital treatment.

(f) School medical service, which provides for medical inspection of all pupils in council schools and such special treatment as may be necessary.

All these services are under direct governmental control, and are answerable either to the Ministry of Health or to the Ministry of Education.

The medical staff are mostly full-time health officers, with a sprinkling of part-time health officers, all paid by the State.

Compulsory State Sickness Insurance. Under the National Insurance Act, every employed adult earning a salary of less than £250 per year, is compelled to contribute a weekly sum, as is the

employer. The money is paid to the local Insurance Committee. The individual should then enrol on the "panel" of an insurance practitioner.

Any general practitioner can engage in insurance practice; some do partially, and some do exclusively. For each patient the practitioner receives an annual capitation fee.

The insured person is entitled to free medical treatment from the practitioner, either domiciliary or at the surgery, free medicines and various "benefits."

These "benefits" consist of money in lieu of wages for periods of time during which he is incapacitated from work—actually 15s. for men and 12s. for women a week, for a period not exceeding twenty-six weeks—and contributions towards the cost of maternity and dental and other special treatment.

In theory a panel practitioner is called upon to keep detailed records of each panel patient. This clause is, however, more honoured in the breach than in the observance. The majority of panel practitioners have no time to keep records. If a medical man makes his living entirely out of his panel practice, he has to enrol such numbers that he has no time for anything but urgent medical attention. He is paid 8s. per annum as a capitation fee, and especially if he enrolls the maximum number of 2,600 allowed, it must be remembered that people are much more likely to abuse the

right of "free" service. Many panel patients call in a panel doctor more often, and for more trivial causes, than they would if they had to pay for every visit.

It is rather startling that the compulsory sickness insurance service is the only one of all those which I have described that had at any rate the intention to provide a service for the furtherance of health. In actual fact, these excellent prophylactic intentions have not been put into effect. I cannot do better than quote Sir Arthur Newsholme (8):

"The Act passed in 1911 had a National Health Insurance section . . . this in the main has failed to justify the inclusion of the word 'health,' except in the sense that all extensions of and improvements in the treatment of illness, conduce to improved communal health. Provision was made in the Act for investigation into excessive sickness in districts or occupations, but this has remained a dead letter."

I shall now consider certain aspects of the present organisation, first from the point of view of the medical man, and then from the point of view of the patient.

The position of the *general practitioner* in this complicated system, is becoming more and more difficult. If he engages in a mixed private and panel practice, he is apt to be divided between loyalty to duty and self-interest. It takes a very exceptional man to resist the temptation to give

preferential treatment to his private patients who pay him more.

His province as the family physician is being invaded on all sides. He is hampered by an increasing number of regulations and restrictions emanating from the Medical Officer of Health and his panel committee. He has to fill up innumerable forms. His territory is encroached upon by voluntary clinics, welfare centres and hospitals. Furthermore, when he refers his cases to specialists, hospitals or clinics, he is liable to lose touch with them for long periods at a time, at the end of which no adequate reports are forthcoming.

The growth of specialised scientific diagnosis and treatment, for which he has to refer most of his patients, is progressively restricting his scope. He spends most of his time dealing with accidents, minor surgery, rheumatism, and the milder infections of the upper respiratory tract, such as influenza and bronchitis.

Further, there is an increasing degree of competition, quite apart from the unofficial competition of the full-time paid state servants, such as Medical Officers of Health, Tuberculosis Officers and others.

The number of medical students is increasing in most countries year by year. A vast majority of these students when qualified become general practitioners. In some countries the increase has been such that the number of people per physician has decreased to under a thousand. The most

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recent figures are given in the following table taken from the Final Report of the Commission on Medical Education, 1932 (7):

TABLE I

POPULATION PER PHYSICIAN IN 1932

U.S.A.	1 Physician per	780
Austria	,,	880
Switzerland	,,	1,250
Denmark	,,	1,430
England and Wales	,,	1,490
Germany	,,	1,530
France	,,	1,690
Norway	,,	1,760
Netherlands	,,	1,820
Belgium	,,	1,850

It would seem that under the present system the general practitioner's opportunities, either for making a comfortable living or for congenial and useful work, are progressively diminishing. It is probable, therefore, that a large proportion of general practitioners would welcome a complete reorganisation of the medical services.

I have already pointed out the anomalous position of the *private consultant or specialist*. He has insufficient opportunities for co-operative work with his colleagues in allied fields. The economic and competitive factors which dominate his position, often force him into a position of jealous isolation.

It is probable, therefore, that many specialists

would welcome a complete reorganisation of community medical services, which would give them enhanced facilities at once for research, co-operation and adequate remuneration.

The *working classes* are commonly held to be in the most favourable position from a point of view of medical attention.

They are entitled to the services of a panel doctor, or a Poor Law doctor at home, and also to many free benefits, either under the Poor Law public health services, or National Health Insurance Acts. These have been outlined above.

It is certainly true that they receive, in theory at any rate, more comprehensive services when they are ill than any other section of the community. They can also take advantage of the most modern and up-to-date scientific methods of diagnosis and treatment, at the hands of the honorary medical and surgical staff at the large teaching hospitals.

This privilege may in part be counterbalanced by the many disadvantages attached to hospital attendance. In many hospitals out-patient departments, sick patients may have to stand in queues in all weathers before they are allowed to sit on forms outside the doctors' rooms. Even then there is often a long delay before they receive medical attention. Time is the working man's vital saleable commodity. After hours of waiting only a small proportion are seen by the senior staff.

In-patients' treatment in large wards, presents

obvious disadvantages, particularly from the point of view of the sensitive subject.

In surgical wards, when a major operation is necessary, these drawbacks may be less serious. The operations are performed with the highest degree of technical skill by the senior surgical staff.

The general complaint that is most frequently heard from those who have attended hospitals, is that the general atmosphere is depressing and degrading for a self-respecting worker. These people get the impression that they are not considered as human beings, but merely as "material" for teaching doctors to earn money from them later.

It is not my function to express an opinion as to whether these criticisms are justified, and if so whether they can be avoided under present circumstances. My main interest in examining these conditions is to ascertain whether any real positive health facilities are available for this section of the community.

Except for the advice offered to them at Infant Welfare Centres, Child Guidance and Psychological Clinics, there would seem to be no concerted effort to provide such facilities.

For all these reasons it is probable that the more intelligent members of this section of the community would welcome a complete reorganisation of medical services.

At the other end of the social scale, the "affluent"

section of the community is in a less favourable position than is usually supposed.

I am constantly hearing loud complaints from *well-to-do people*, that medical charges have not decreased in proportion to their dwindling affluence. They feel that they are caught both ways: on the one hand they contribute to hospitals, pay rates to support the Poor Law medical activities, and are also called upon to pay fees to specialists high enough to compensate for their gratuitous services to hospital patients.

Science to the sick person with means, has not proved an unmixed blessing.

It follows that special fees have to be paid to the general practitioner, to the consultant, to the X-ray specialist, to the bacteriologist, and to the chemical pathologist, before a diagnosis can be made.

Treatment is equally expensive: if surgical, it means a special fee to the surgeon, the surgeon's assistant, the anæsthetist, the nursing home for the operating-theatre, for the room, and for special nurses, and also the chemist.

If medical, the number of specialists in scientific methods of treatment, whether physical or chemical, involves almost as great an expense.

Apart from the economic aspect, it is doubtful whether all these scientific methods have improved the quality of the medical service which the wealthy citizen can buy. There is often incomplete correlation between the different specialists. The degree of correlation and the efficiency of the

service, depend at present entirely upon the quality of the general practitioner, who is the family physician.

When, as is often the case, he has sufficient knowledge and judgment to utilise the scientific tests and expert opinions to best advantage, the end-results may be satisfactory.

The function of the general practitioner as sole and confidential adviser to the family on health matters, is in too many cases no longer possible of fulfilment.

I have indicated above the increasing difficulties of the general practitioner's position. Both in England and elsewhere, the general practitioner is complaining that he is hard put to it in these times of rapid transition, to protect his patient from the latest scientific or pseudo-scientific fad or fashion.

From the point of view of health, which primarily concerns me, this section of the community is very poorly provided for. It is only natural, therefore, that this section should be most conscious of the lack of an organised positive health service which will teach them how to keep fit and prevent the onset of disease.

The so-called "*middle classes*," who are not poor enough to enjoy the "benefits" of the National Health Insurance scheme, nor rich enough to buy the services of experts, and too proud to enjoy them in hospital, share all the disadvantages of these sections of the community I have already

discussed, and very few, if any, of their advantages.

It is probable, therefore, that a large proportion of both the affluent section of the community, and the middle classes with their restricted incomes, would welcome a complete reorganisation of medical services.

The general organisation of the medical services in other European countries differs to a very small extent only from the services available to the community in Great Britain, as described above.

In no country except Russia, with which I am dealing separately, has there been any concerted attempt to provide a positive health service.

Such differences in detail as there are, refer particularly to:

(1) *Medical Education*. Several countries, in particular Scandinavian countries, insist upon a rather higher standard of premedical education from the prospective medical student. In these countries some knowledge of logic, psychology, and philosophy is demanded. Also the medical training proper, is spread over seven years. The extra time is accounted for by longer preparation in the preliminary sciences, somewhat more thorough grounding in medical theory, and increased facilities for a more thorough study of obstetrics.

(2) The *Voluntary Hospitals* are financed by the State or Municipality in most Continental countries. The senior members of the medical staff, therefore, instead of being honorary physicians or surgeons,

are paid State servants. As such their primary responsibility is teaching and research. It follows that in many Continental countries, in particular Germany and Austria, the professor of medicine spends the major part of his time organising research work in his department, and only a small part of his time increasing income by private work. In general this leads to increased scientific activity on the part of these professors, and in medicine at any rate, has tended to lead to a higher scientific standard.

The field covered by State medicine varies enormously from country to country. It is probable that Great Britain occupies the middle position.

At one end of the scale there is Germany, which was the pioneer in the field of compulsory insurance. A compulsory State Sickness Insurance Act was passed in Germany to cover workers in industry in 1883, to cover workers in commerce in 1885, and to cover workers in agriculture in 1886. There are now innumerable State medical functionaries in every portion of the German Reich.

The Netherlands represent the opposite pole. In that country, doubtless owing to the extremely high level of individual prosperity, there is a minimum of State interference in medical affairs. There is no compulsory sickness insurance. Almost every member of the community belongs to some club or private insurance society. The subscriptions to these institutions cover domiciliary and in- and out-patient hospital treatment.

The field covered by the Public Health Services proper, varies to only a very small extent in all the more "advanced" countries.

In each country there are Medical Officers of Health whose function it is to supervise housing, food and water supplies, restriction of epidemics and the control of tuberculosis and venereal disease. Either voluntary or State organisations cater for the welfare of the expectant and nursing mother, child-bearing, and infant and child welfare.

In the United States there is an extremely efficient Public Health Service proper, but all other activities are left to private initiative. Among these activities two call for special description.

The first is the system of *group practice*. This has developed extensively in certain sections of the country. It has grown up because of the inability of single physicians to master all fields of practice. It provides a means by which the patients can secure the opinion, advice, and treatment of several specialists at one place and time. It permits the pooling of operating expenses and equipment of the individual physician. It also gives each physician more opportunity for study. This practice has developed in response to public demand that complete scientific study and treatment should be more widely available to larger sections of the community.

The group practice system of diagnosis and treatment, is best illustrated by the Mayo Clinic

in Rochester, which is probably the most efficient organisation in existence for the diagnosis and treatment of actual disease.

The disadvantage, or rather the dangers of this system, is that the responsibility for the care of the patient becomes dispersed rather than centralised. It seems certain that if medical services are rendered by an organised group, it is necessary that one physician should assume the direct responsibility for the care and treatment of each given patient.

It is probable that the future development of this system also lies with the general practitioner. Groups of general practitioners, each with some specialised knowledge and each responsible in the capacity of family physician for a certain proportion of the patients attending the group, would overcome the only disadvantage of this system. This step is undoubtedly in the direction of adapting medical services to current conditions.

The other American innovation is one which is of particular interest from a point of view of health. It is the first organised attempt to provide a positive health service for a section of the community. The Metropolitan Life Insurance Company of America, has organised and runs a so-called "Life Extension Institute," which arranges for periodic physical examination of policy-holders. Those who avail themselves of the services of the Institute are allowed certain rebates.

It is to be noted that the medical activities of

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this Institute are confined to careful history taking and physical examination, and those accessory methods in common use for the detection of disease. They have not yet elaborated a technique for the investigation of minor disturbances of function, nor do they carry out true physical efficiency tests.

Nevertheless, using such ordinary methods of examination, they find a very large percentage of defects which can, to a certain extent, be remedied by treatment.

The following tables taken from the published statistics of this Institute, are extremely suggestive from the point of view which I am endeavouring to express in this book:

TABLE II

ANALYSIS OF TYPICAL INDUSTRIAL GROUPS¹

(Figures derived from more than 10,000 cases, males—average age 34)

	<i>Per cent.</i>
Class 1. No physical defect or impairment reported. No modification of living habits required	0
Class 2. Slight physical impairment or defects requiring some form of hygienic guidance	10
Class 3. Moderate physical impairment or defect requiring some form of hygienic guidance or minor medical, dental or surgical treatment	41

¹ Eugene Lyman Fisk, *Health Building and Life Extension*.

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	<i>Per cent.</i>
Class 4. Moderate physical impairment or defect, medical supervision or treatment advised in addition to hygienic guidance	35
Class 5. Advanced physical impairment or defect requiring systematic medical supervision or treatment	9
Class 6. Serious physical impairment or defect urgently demanding immediate attention	5

TABLE III

SPECIFIED ERRORS IN HYGIENE AND MINOR COMPLAINTS
AMONG 16,662 MALE POLICY HOLDERS AS REPORTED IN
A STUDY BY THE METROPOLITAN LIFE INSURANCE COMPANY¹

<i>Personal Habits and Conditions.</i>	<i>Per cent.</i>
Too high protein diet	37.6
Too little water consumed	36.9
Too much tea and coffee	40.7
Other errors in diet	46.6
Tobacco, excessive	33.1
Hours of work too long	26.4
Lack of exercise	60.8
Overweight (20 per cent. or greater)	12.9
Defective vision, corrected	25.4
Defective vision, uncorrected	29.5
Enlarged, septic or buried tonsils	26.2
Heavy dentistry—X-ray advised	41.8
Constipation	39.7
Hæmorrhoids	12.3
Frequent or severe headaches	15.4
Frequent colds	17.7

¹ Louis I. Dublin, Eugene Fisk and Edwin W. Kopt: "Physical Defects as Revealed by Periodic Health Examinations." *American Journal of the Medical Scientists*, October 1925.

CHAPTER III

AN URGENT NEED

The Application of Scientific Method to the Promotion of Individual Health

“. . . Up to the present time medicine has almost wholly avoided the burden of measurement. . . . A time will come when an exact and exhaustive numerical exploration of the facts of disease will have to be undertaken. When we contemplate the practical success, and the continued progress of medicine, we are apt to overlook the fact that it is without precise data. Consider merely the distribution of health and disease in relation to topography, climate, race, sex and age. Our knowledge of these fundamentals is a series of the vaguest approximations. If we really had exact knowledge of them, it is quite probable that many problems of causation, now insoluble could be solved by inspection. A similar lack of real exactitude is present in our knowledge of normal functions such as the pulse rate, temperature, sleep, appetite, right-handedness, weight and muscular strength, and above all in our knowledge of the extent to which these functions are capable of adaption.”

W. Trotter: “De Minimis,” *Pharm. Journ.*

January 21st, 1933, p. 44.

I INTENDED the previous chapter to be an objective survey of medical organisation in a typical modern community. I did not intend to criticise or to draw conclusions. I was not strong-

minded enough to live up to my good intentions. I could not help implying that scientific method was not adequately or economically harnessed even to the diagnosis and treatment of disease.

If this is true, the causes, as I think emerge from my survey in chapter II, lie partly within and far more outside the field of medicine proper. As all these causes are really outside the scope of this book, I shall dismiss them in a few words. The intrinsic causes do not concern me primarily in this book, as they have to deal with the diagnosis and treatment of disease. I cannot, of course, avoid giving some idea as to the relationship of a true Individual Health Service to the diagnosis and treatment of disease also. I shall therefore in some measure have to revert to this subject in my last chapter.

Any discussion of the extrinsic causes is bound up with economics and politics or political philosophy. These subjects are also outside my province. The future of medical organisation, however, cannot but be intimately bound up with social organisation. I must be allowed to hope, therefore, that economists and politicians will soon suffer a change of heart. It seems to me that every field of human activity to-day is suffering from a lack of large-scale co-ordinated planning on scientific lines. I hope that the inexorable pressure of circumstances will before long force economists and politicians alike to emerge from the shelter of theory and grapple in a practical and synthetic,

that is to say scientific manner, with actuality.

At the end of my survey of existing medical services, I described the Life Extension Institute and I stressed the fact that it was the only organisation which has made a real attempt to institute individual health measures. This successful experiment is the outcome of enlightened self-interest on the part of a large financial corporation. The same applies to the medical services provided for their employees by some of the more progressive industrialists. Many factories and multiple shops have free periodic medical and dental inspection of their employees.

I have no intention of decrying these attempts, which are obviously in the right direction towards individual health, and have almost certainly been found successful from the point of view of preventing absence owing to sickness and increasing the efficiency of workers to a certain extent; but if these preliminary private experiments in preventive medicine have been truly successful, it is rather surprising that their example has not been followed by other insurance companies and by the majority of large commercial or industrial enterprises. In part this may be due to innate conservatism or lack of the progressive spirit. The real reason, I believe, however, is a different one—the lack of a new technique of examination. To take the Life Extension Institute as the best organised example: I have already pointed out that their methods of examination are the current ones used

for the examination of sick people. It is true that their medical examiners spend more time and take more trouble in ascertaining the detailed past and family history and the present habits of the individual under investigation. It is also true that periodic examination, even by these methods, has resulted in detecting a considerable number of remediable defects—see Tables on pages 42 and 43. The real objective of these health services should, however, be to promote health in a positive manner, i.e., to promote physical and mental efficiency and to ward off the more serious disturbances of function and disease by detecting the very earliest signs of strain and dysequilibrium. This is a new objective for a medical organisation. A new objective demands a new technique. This is what is lacking. This, I believe, is the real reason for the fact that such private preventive medical enterprises are hanging fire.

A satisfactory new technique can only be evolved from the knowledge at our disposal now, when we have a clear conception, not only of the objective, but of the new conditions which have to be studied. As I have already pointed out, we do not possess sufficient knowledge of the mechanism whereby the human organism adapts itself to varying conditions and in particular, conditions of modern mechanised town life. Before such a system of prophylactic medical health examinations can be extended to the community at large, we must therefore possess:

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(1) A clear understanding of the basic problem of adaptation which confronts us.

(2) More detailed and sensitive methods of examination of the individual.

(3) Methods, first of research, then later of practical application of the results of research, into the mechanism of faulty adaptation to civilised life.

A clear understanding of the basic problem presupposes some general knowledge of physiology. The reader who does not also possess a smattering of biology and comparative physiology should read H. G. Wells's *Science of Life* (9).

I must, however, make an attempt to give a brief resumé of the principal physiological facts involved in the process of adaptation to the environment.

Adaptation used in this sense really means securing stability of the internal environment and therefore independence of the external environment.

From a biological point of view, the essential primary functions involved are:

(1) The ingestion, digestion and assimilation of food products.

(2) The excretion of waste products.

Unicellular marine plants or animals such as the amœba fulfil these functions by a simple chemical process of diffusion. More complicated marine plants or colonies of cells are still bathed in the nutrient medium—the sea—but need channels

or primitive vessels for circulating the medium demand an extra function. The primary functions now become three in number.

- (1) Ingestion.
- (2) Excretion.
- (3) Circulation.

Higher up in the scale of evolution even the simpler land animals assume a far more complicated structure. The cells and tissues of the body become differentiated and separated off from the nutrient medium. The nutrient medium in its turn becomes separated off from the external environment and circulates in the form of blood. In land animals who need oxygen a further primary function now becomes necessary:

- (4) Respiration.

When the primary functions are confined to two, no regulating mechanism is necessary. As the other functions are added and more complex processes of digestion and respiration demand the formation of an alimentary tract and lungs, some system of central correlation and regulation becomes necessary. Also the skin is no longer a semi-diffusible membrane through which water and chemical substances dissolved therein can pass. It now becomes a barrier between the internal and the external environment, and has to be provided with a system of defence and inter-communication. The need for a regulating and defensive mechanism is answered by the central nervous system, which consists of a brain, a spinal

cord and the insulated nerves which run from it to the skin and to the other organs.

With increasing complexity of structure as we reach the higher animals, and still more man, direct nervous control becomes insufficient. A more sensitive and efficient regulating and defensive mechanism is called into being in the shape of the *neuro-endocrine system*.

A simple analogy will illustrate the need for and the significance of such a system.

In a small cottage or a sailing-boat it is easy for one person to arrange for and supervise food supplies, heating, lighting and movement. We can visualise the rooms or the cabins as cells. The householder or the sailor can be visualised as the nervous system and the blood stream. He can simultaneously watch the outside world and circulate through the passages or companion-way to adjust the temperature or other internal factors to the external conditions.

In a modern skyscraper or a mammoth liner, on the other hand, a simple unified system of control is impossible. The human body can well be compared to such a complex organised structure, in which all the essential functions are governed by electricity. The brain and central nervous system can be compared to a mammoth dynamo, say in a super-liner which supplies power for movement, power for heat, power for light and power for inter-communication between the different cabins and groups of cabins. In order to correlate this

central electrical system with the outside world, to determine upon speed, direction of course, provide against dangers and to ensure adequate feeding of the passengers, and getting rid of debris, it is necessary to have not only an executive staff such as captain and officers, but they have to be interconnected by an internal telephone system. They also have at their disposal "look-outs," sailors and stewards, who circulate through the passages like red and white corpuscles through the vessels of the body, and carry food to and fro. In the human being just as in the liner the same four essential functions have to be regulated.

(1) Respiration.

(2) Circulation.

(3) Ingestion, digestion and assimilation of food.

(4) Excretion.

These functions, which have become infinitely complex in the human being, are regulated by the neuro-endocrine system or the ductless glands (endocrine glands) and the autonomic (automatic) nervous system, just as the similarly complex functions of the sailors and stewards in the liner are regulated by the officers through the intermediary of an internal telephone system or speaking-tubes.

Glands, which are solid groups of cells, are of two varieties: (1) *endocrine*, as the chemical secretions which their cells manufacture are delivered direct into the blood stream without the inter-

mediary of a duct or channel: (2) *exocrine* glands, such as the liver or salivary glands, which secrete through channels or ducts into the alimentary tract or mouth.

The secretions of these ductless glands have been given the name of hormones, or chemical messengers.

The more we know about these endocrine glands and their secretions, the more we realise their importance from the point of view of heredity, as well as successful adaptation to the environment. In a book called *The Glands Regulating Personality* (10), the American endocrinologist, Berman, quotes Lewellys F. Barker:

“More and more we are forced to realise that the general form and external appearance of the human body depends to a large extent upon the function during the early developmental period of the endocrine glands. Our stature, the kind of faces we have, the length of our arms and legs, the shape of the pelvis, colour and consistency of the integument, quality and original location of our subcutaneous fat, the amount and distribution of hair on our bodies, the tonicity of our muscles, the sound of the voice and the size of the larynx, the emotions to which our exterior gives expression, all are to a certain extent conditioned by the productivity of our glands of internal secretion.”

The reader who wishes for a popular presenta-

tion of the new science of endocrinology can do no better than read this book of Berman's.

To assist the endocrine system, which can be compared to the staff of officers, in its task of correlation, the so-called autonomic, automatic, or vegetative nervous system, has been developed to act rather like the system of internal telephones or speaking-tubes, which I refer to in my simile of a liner. It consists of a network of fine nerve fibres which do not possess an insulating sheath as do the voluntary nerves. It is called autonomic, automatic or vegetative because this system is more or less independent of the will and regulates those functions such as respiration, circulation and digestion, which continue throughout unconsciousness or sleep. The nerve fibres of this system travel from the spinal cord to practically every cell, and certainly every organ in the body. There is a particularly rich supply to the cells of the endocrine glands.

The endocrine glands, together with this automatic nervous system, constitute the *neuro-endocrine system*.

I must point out one very important fact before proceeding to describe the system in a little more detail. Although this system is automatic, it is anatomically connected with the central nervous system. Though unaffected directly by conscious will, it is affected by all states of the conscious, subconscious and unconscious "minds."

Stimuli arising from the brain, but not arising

from the conscious will, and passing through the fibres of the automatic nervous system, can exercise an extremely powerful stimulating effect on endocrine secretion. This effect is both direct via fibres to the secretory cells of the glands, and indirect via fibres to the heart and the blood vessels, thereby increasing circulatory efficiency and blood supply per unit time to the glands themselves. This, of course, explains the extreme importance of the psychological factor for efficient adaptation.¹

The *neuro-endocrine system* consists of (a) the endocrine glands (ductless glands, or glands of internal secretion) such as the pituitary in the cranium at the base of the brain, the thyroid, parathyroid and thymus in the neck, the internal secretory part of the pancreas in the upper abdomen, the suprarenal glands just above the kidneys, and the internal secretory portion of the ovaries or testicles; and (b) the automatic nervous system. The latter can from a functional point of view be sub-divided into two sections: (i) the parasympathetic portion, and (ii) the sympathetic portion.

As pointed out by Langdon Brown (II) and many others, the relationship of these two subdivisions of the autonomic nervous system to a similar sub-division of the endocrine glands into

¹ "The legitimate function of experimental psychology lies in this field. It is to be hoped that the psychologist will in future cooperate more closely with the applied physiologist to elucidate the mechanism of correlation and interrelation between the various strata of the 'mind' and neuro-endocrine reactions.

two groups can be summarised as follows: (a) The parasympathetic portion of the autonomic nervous system which is anabolic, i.e., it helps to build up or store potential energy from the blood. It therefore co-operates with the digestive system, which obtains energy for the body from the food. It also diminishes the amount of sugar in the blood, storing it in the tissues working in conjunction with this portion. The pancreas and the parathyroids for instance, are clearly anabolic in function. (b) The sympathetic portion of the autonomic nervous system is katabolic, i.e., it furthers the process of breaking down and produces kinetic and dynamic energy. It co-operates primarily with the suprarenals, thyroid, and pituitary. It raises the amount of sugar in the blood to provide energy for defence against (i) external foe by flight or fight, and (ii) the internal foe of bacterial invasion by fever.

The functional division of the other known endocrine glands, such as the thymus and the sex glands, is not so clear. It is probable that the thymus is anabolic as it enjoys full functional activity only during the years of growth, and that the sex glands are katabolic and co-operate with the sympathetic. The latter controls emotional response. I need hardly stress the large part which sex plays in emotional life.

The cells of all the organs of the body have branches or fibres from both portions of this system, which in turn are connected with the

endocrine glands. The fibres from these two divisions when distributed to the same structure always have an opposite action. For example, when food goes into the stomach, there is first a reflex stimulation of the sympathetic. The sympathetic fibres to the stomach are stimulated and produce relaxation of the muscle wall, and a closing of the ring of muscle called the pylorus at the end of the stomach. This prevents the premature passage of undigested food into the lower part of the gut. Almost immediately there is a reflex stimulation of the parasympathetic, which produces first increased secretion of acid from the glands of the stomach, and later contraction of the wall of the stomach and opening of the pylorus.

It does not follow that these two sections are in direct antagonism. Although their actions are opposite, their true function is to co-operate and predominate alternately. The rhythm of life largely depends on the fluctuating balance between these two. The greater the physical or emotional activity, the more the sympathetic predominates, whilst during rest and sleep the parasympathetic gains control.

I will now proceed to examine the relationship of this neuro-endocrine system to the primary functions.

In my statement of the primary functions involved in the process of adaptation in lower animals, I have enumerated:

(1) Circulation.

- (2) Digestion and assimilation.
- (3) Respiration.
- (4) Excretion.

In the higher animal, as in man, it is desirable to add another function:

- (5) The capacity for abstract thought and the generation of power for nervous energy and nervous co-ordination.

A clear conception of the process of adaptation to the environment can be arrived at at this stage, if I explain the paramount importance of the circulation of the blood in linking up these functions. In fact I would prefer to describe adaptation in man in the following terms:

He possesses an "adaptational" mechanism which I shall now call the neuro-endocrine-circulatory system. My meaning will be clear if I explain the relation of the circulation of the blood to the four other primary functions.

(1) The Blood stream and Digestion. Before food is introduced into the stomach, a copious supply of blood is shunted to the salivary glands and the glands of the stomach, for the manufacture of saliva and gastric juice.

When food is introduced into the stomach, more blood is needed: (a) for muscular activity of the stomach wall, (b) for the glands which produce digestive juices lower down in the alimentary tract, and (c) for muscular movements of the intestines.

The products of digestion are carried by the

blood stream to the liver, and then to the tissues.

(2) The Blood stream and Respiration. Oxygen is absorbed through the cells of the lungs into the blood stream, and is carried by the blood stream to the tissues. The tissues give up their waste gaseous products (carbon dioxide) to the blood, and this is carried by the blood back to the lungs, and discharged into the air through the cells of the lungs.

(3) The Blood stream and Excretion. The excretion of useless or harmful waste products, is carried out mainly through the kidneys. These waste products are picked up by the blood from the tissues, and carried to the kidneys. A certain amount of extra blood is also needed for the movements of the bladder in expelling the urine.

Some excretion also takes place via the lower gut. Chemical products are carried by the blood stream to the lower bowel and extra blood is needed for the movements of the gut, in expelling fæces.

(4) The Blood stream and the Brain. Thought, and the generation of nervous energy in the brain, also demand greatly increased blood supply.

This account of the circulation in relation to the primary functions, leaves out other important demands for blood on the part of:

(a) The heart muscle, which needs a constant supply of blood proportional in magnitude to the demands put upon the circulation as a whole.

(b) The limb and trunk muscles, which

demand diversion of an enormous quantity of blood during active exercise.

(c) The skin and the tissues just under the skin. The blood content of the vessels varies greatly according to temperature and other factors.

When these functions are efficiently carried out by the intermediary of the blood stream, adaptation is satisfactory. That is to say, the chemical composition of the blood, tissues and tissue fluids is continuously adjusted to within the required limits of chemical constancy or stability.

Efficient circulation for this purpose is ensured by the neuro-endocrine control. The amount of blood available for all these purposes, is of course limited. The amount to be shunted at the appropriate time for each function, is determined according to the biological law that the functional efficiency of the amount of work that can be performed by any cell varies in direct ratio to the blood supply per minute.

In a perfectly healthy or physiological body, the neuro-endocrine mechanism so controls the circulation to the various parts of the body that the chemical exchanges through a gaseous or liquid medium are effectuated in such a way that the chemical composition of the internal environment remains constant under all possible circumstances.

Inasmuch as the neuro-endocrine mechanism itself is an electrical or electro-magnetic system, with electrical excitability, planned to respond

smoothly to internal or external stimuli only within a narrow range of chemical reaction, the process of adaptation can only be normal or physiological under such circumstances of chemical constancy.

From this it can be inferred that the neuro-endocrine system cannot function normally under any of the following circumstances:

Constitutional circulatory inadequacy, with so-called low blood pressure and inefficient circulation. These factors exert:

(a) A direct detrimental effect, as the glands themselves are not provided with an adequate blood supply.

(b) An indirect detrimental effect on the neuro-endocrine system, as there is inadequate blood supply to the alimentary tract and also an inadequate pressure head¹ to the kidneys. This does not allow of adequate digestion or assimilation of food, or excretion of waste products via the kidneys. The chemical composition of the tissues and tissue fluids then becomes abnormal. This in turn involves an alteration of the electrical excitability of the nervous system, in particular the autonomic nervous system.

Temporary or permanent circumstances of an environmental nature, which interfere with efficient respiration and circulation. These upset the chemical equilibrium in a similar manner to that described above.

¹ Force with which blood is driven to the kidneys.

Conversely, if the neuro-endocrine mechanism itself is fragile or unstable from birth, or if its delicate equilibrium is disturbed during the years of growth, it cannot carry out its duties as a circulatory or chemical regulator with the necessary efficiency, and a vicious circle is constituted which may often be extremely difficult to break.

The result of this disturbance of equilibrium, whatever the cause, is the same.

As I have explained, the degree of electrical excitability of nerves passing through the tissues, is altered by any abnormality in the chemistry of the body. The most common abnormalities are changes in acidity or alkalinity, and in the proportions of the basic mineral salts.

Such chemical changes bring about a diminution of the so-called "threshold" of stimulation, i.e., the nerves respond to a smaller stimulus than they should, and respond to a normal or greater stimulus in an abnormal manner.

This in part explains the mechanism of "neurasthenia," the neuroses, and the various minor or major psychological instabilities and disturbances so common under conditions of "civilisation."

I am now in a position to examine some of the effects of sedentary life on the human organism in the light of our knowledge of the neuro-endocrine-circulatory system.

For a sedentary life the tendency on the whole is for less use of that part of the adaptational mechanism which regulates physical activity—also physical

changes such as temperature—and more or excessive use of that part which regulates mental or psychological activities.

In towns innumerable stimuli impinge on consciousness per unit of time, whether through sight or sound. Town dwellers also have to increase the tempo of their nervous reactions owing to the greatly increased rate of living.

Further, increasing competition between brain workers necessitates more intensive and more rapid thought.

I have already pointed out that there is not enough blood in the body to allow of shunting large amounts simultaneously to different parts.

Everybody knows that it is not possible to direct extra blood to the muscles for violent exercise, during the process of digestion—which necessitates the diversion of much blood to the vicinity of the alimentary tract.

Before considering the salient effects of civilised conditions on the circulation, I must explain one further aspect of circulatory physiology.

Apart from voluntary stimulation of the neuro-endocrine system, there are two ways in which the general rate of circulation and rapid shunting of the blood can be influenced. These are:

- (1) Violent physical effort.
- (2) Violent psychological stimuli, by which I mean fear, anger, excitement, or any other violent emotion.

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Physical effort acts directly on the mechanism of the circulation. The latter can, therefore, be speeded up in this way and involves extra physical work but no nervous stress or strain on any part of the nervous system.

Violent emotion on the other hand, acts through the katabolic group of endocrine glands, and the sympathetic portion of the autonomic nervous system, and involves both nervous and neuro-endocrine stress and strain.

Mental effort, if mild and continuous, has no effect on the circulation beyond involving an increased demand for blood to the brain.

It follows that adaptation of the human organism to civilised sedentary life, involves a complete alteration of neuro-endocrine-circulatory conditions. The degree and magnitude of this alteration is made clear by the following tables.

TABLE IV

	<i>Savage Life.</i>	<i>Civilised Life.</i>
Type of existence	Vigorous outdoor.	Sedentary.
Physical effort	Violent and prolonged.	Slight and infre- quent.
Mental effort (sustained)	Limited and infrequent.	Almost continuous.
Blood supply to brain	Limited demand for.	Continuous demand for— increased.
Blood supply to muscles and abdomen	Continuous demand for— increased.	Limited demand for.

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TABLE V

<i>Mode of life.</i>	<i>Quantitative Action.</i>	<i>Physical Strain.</i>	<i>"Nervous" Strain.</i>
<i>Outdoor life,</i>			
Exercise	Continuous.	Considerable.	Nil.
Sleep	Prolonged.	Nil.	Nil.
Sudden emotional stresses	Infrequent.	Slight owing to infre- quency.	Slight owing to infre- quency.
Noise and vibration	Practically nil.	Nil.	Nil.
<i>Indoor—Sedentary.</i>			
Exercise	Practically nil.	Insufficient.	Nil.
Sleep	Often in- sufficient.	Slightly excessive.	Grossly excessive.
Sudden emo- tional stresses	Frequent.	Somewhat excessive.	Grossly excessive.
Noise and Vibration.	Constant.	Nil or slight.	Grossly excessive.

Such a bald tabular statement of affairs is obviously incomplete, but it does bring into prominence the basic problems of adaptation which confront us to-day and are likely to become more acute as "civilisation" progresses. Unless there is a complete collapse of civilisation, it is unlikely that there will be any large-scale migration back to the land. It is much more likely that communal large-scale farming, with increasing use of machinery, will further depopulate the country-

side and that increasing industrialisation will further increase the number of town dwellers.

I have already postulated that the spontaneous mechanism of adaptation of the human organism has been unsuccessful in adapting itself to these altered conditions within a relatively short period of time. I have also indicated one of the main causes, if not the main cause, for the partial success of such organisations as are in existence to remedy the ill-health which arises from this maladaptation. The cause is, partly, that applied physiological methods of a sufficiently delicate and sensitive nature are not yet available for the use of the preventive physician, and partly that available methods are not utilised in the proper way.

The science of physiology has taught us the basic facts of the adaptational mechanism of the human body, which I have summarised above. This knowledge, however, is so new that there has been barely time for it to be assimilated by current medical thought. In this field of applied science almost more than any other, knowledge has as yet only been applied to pathological and "disease" medicine. Physicians have learnt to detect gross disturbances of function or disease of the neuro-endocrine system. For this purpose the ordinary routine methods of medical examination have proved to be sufficient. Current methods of investigation consist of:

- (1) History taking: details of family and past and present condition.

(2) Clinical examination, i.e., inspection and palpation of the surface—auscultation or listening to the internal organs, usually by the stethoscope—measurements such as height, weight, and blood pressure.

(3) X-ray examination: The bones or various internal organs, after the swallowing or injection of substances which are opaque to X-rays.

(4) Bacteriological examination of normal and abnormal secretions and excretions.

(5) Biochemical examination. This is at present almost entirely restricted—this is even true of the Life Extension Institute—to the detection of abnormal substances in the urine and abnormally high or low figures and constituents in the blood.

Conscientious and intelligent use of such methods can certainly yield information as to the presence or absence of disease or gross disturbance of function.

This avowed objective, however, presupposes an entirely static point of view, i.e., a concentration on isolated phenomena. All these methods are static with the exception of history taking. If sufficient time is taken for this, the process becomes dynamic. To be so it must incorporate an investigation into all those physical and psychological factors in the individual's past and present environment which have a bearing upon the state of equilibrium or "adaptational" efficiency of the moment.

These methods are not delicate enough to reveal

the earlier effects of stress and strain, minor disturbances of function, dysequilibrium and early lapses from an optimum condition of adaptation. Methods or technique for this purpose will have to be dynamic, i.e., with a realisation of reciprocal correlation between isolated phenomena, rather than static and constitute a method of investigating the individual as a neuro-endocrine-circulatory complex in relation to his particular environment and mode of life.

Those of us who are interested in elaborating a special technique must in part evolve entirely new methods, and in part adapt existing scientific methods to this new purpose.

A routine technique or method of individual examination would be necessary, which would consist at least of:

(1) History taking, involving every detail of the family and past history, as well as personal idiosyncrasies, peculiarities, seasonal and daily habits.

(2) The usual clinical examination supplemented by far more so-called "anthropometric" measurements, which among other things allow of deductions as to endocrine make-up.

(3) Radiological examination of the bones from an entirely different point of view, which would allow of a reconstruction of past endocrine history, i.e., the history of the balance between the various endocrines during the years of growth.

(4) A far more elaborate biochemical examination. This would involve multiple quantitative analyses of the normal constituents of food, blood, urine and fæces. These analyses would be carried out primarily from the point of view of assessing the efficiency with which the organism can adapt itself to the varying conditions of activity of the individual's life—abnormal substances would be looked for and excluded with the clear understanding of the significance of their presence. In the urine, for instance, their presence already denotes a degree of disturbance of function or disease which is usually irremediable.

(5) Dynamic efficiency tests, mostly of an instrumental nature.

These would be designed to assess the efficiency of the circulation (arterial, venous and capillary) respiratory efficiency, automatic nervous equilibrium, muscular and nervous response. They would be designed to detect the slightest degree of stress and strain imposed on the neuro-endocrine-circulatory system by the demands of the individual's daily life.

It is unlikely that any single physician or applied physiologist possesses sufficient knowledge to evolve and much less to carry out all these tests entirely by himself. This would necessitate an organisation comprising:

(a) Physicists, chemists, physical chemists, biochemists, biologists, statisticians and other

workers in pure science, in order to devise methods and vouch for their scientific accuracy.

(b) A staff of trained "technicians" to carry out the routine part of the analyses and tests.

Such an organisation obviously lends itself to research as well as it does to the practice of individual health. In my plan in Chapter VI I shall describe district individual health services revolving around central institutes.

All progressive organisations, whether they be industrial or medical, must have a research department to animate their activities. Only in this way is it possible to keep pace with the continual advance of science.

As we are dealing with an entirely new field of human endeavour, research must go forward at an even greater pace during the early years of an individual health service.

Many people have an erroneous conception of scientific "research." This term is apt to conjure up a picture of a pallid, distraught individual, surrounded by test tubes or guinea-pigs, in a laboratory far removed from the practical problems of everyday life.

This conception may sometimes be justified in pure scientific research. In the field of individual health, however, we are primarily concerned with the study of man and his reactions to the environment. In the true sense, all the activities of an individual health centre or institute could be considered as research. Its activities would be threefold:

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(a) Pure research in physical and chemical technique.

(b) Experimental investigation of volunteer subjects: the effect of climatic and dietetic changes and the influence of a host of physical and psychological forms of stimulation and depression would be studied in detail.

(c) The routine periodic investigation of individuals living in the district and availing themselves of the individual health service. All these routine records would also be of the greatest value from a true research point of view, partly statistical and partly inferential.

As methods of a dynamic type that I have just described for examining the individual and his reactions are not yet in existence, I need not stress the magnitude of our ignorance as to almost all the practical problems of individual health.

Not until there has been a concerted utilisation of such methods over a considerable period of time by many independent observers will it be possible for the following questions to be answered:

- (1) What shall I eat?
- (2) How much shall I drink?
- (3) How many times a day must I go to the lavatory?
- (4) How much and what form of exercise should I take?
- (5) How much sleep should I have?
- (6) How many hours can I work with impunity?

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- (7) Does smoking hurt me?
- (8) Must I have colds in the head?
- (9) Must I have headaches?
- (10) Must I have influenza?
- (11) Must I put up with digestive discomfort?
- (12) Need I have rheumatic pains?

The reader could help me to prolong this list almost *ad infinitum* but it would serve no useful purpose.

If the reader has followed me so far, he will realise that it is impossible to give an answer without an intimate understanding of the neuro-endocrine-circulatory equilibrium of the individual who asks these questions. The neuro-endocrine-circulatory mechanism exists to ensure the normal chemical composition of the body. If this is normal the individual cannot suffer from any unphysiological symptoms. Further, it is not possible and probably never will be possible to lay down general laws for physiological habits of life. Every individual comes into the world with a separate and individual neuro-endocrine make-up. If this make-up is an exceptionally good one, he will have a greater margin of reserve and he will be able to stand up to an almost unlimited amount of environmental stress and strain, but the margin seems to be getting smaller in civilised people.

No health problem can be anything but an individual health problem. It may be possible when we know enough, to lay down certain rough rules of conduct for average individuals who do

the same work, live under the same climatic conditions and follow the same mode of life in their homes. I do not wish to imply that we have no knowledge on these subjects at present. We do possess knowledge which could be used with advantage, but as I have explained, no concerted attempt in this direction is being made.

The danger at present is that amateurs and professionals alike—recognising this need in part—who dabble in health cults, will mislead the public unless it has a clear realisation of the above facts. My own opinion is that it is far safer to consult one's appetites and instincts, however imperfect.

I will give only one example to illustrate the difficulties of research in these fields and the dangers of premature generalisation. I shall revert to the question: "How often shall I go to the lavatory?" This is a question which is very much on the tapis at present. There is a great deal of propaganda emanating from individuals and so-called "health societies" advising people to eat enormous amounts of vegetables with the object of ensuring an evacuation after each meal. This advice can only be based on an abysmal ignorance of applied physiology. I make this statement because I have had unique personal experience in investigating and analysing innumerable stools passed by so-called "healthy" persons in the last few years.¹

¹This is not the place to discuss technical results. The public should, however, have some idea as to the danger of excessive defæcation, either spontaneous or due to purgatives. The stools

Even on the basis of the knowledge that I have, I am not justified in going to the other extreme and stating that constipation is desirable as part of the mechanism of adaptation to civilised sedentary conditions. It is obvious that individual criteria will be the only valid ones, but it is almost certain that such advice would be wiser than advice to overwork the bowel.

The reader who has read and understood Tables IV and V will remember that sedentary life and brain work demand more and more blood supply to the brain and less to the abdomen and muscles. The obvious deduction is that such an individual should eat and drink in as sparing a manner as possible in order to divert as little blood away from the brain as is compatible with the satisfaction of natural appetites.

For my own part, I am unfortunate enough to be a gourmet and something of a gourmand. Hence I contemplate with sorrow the prospect of swallowing compressed tablets in order to improve the efficiency of my work. I am consoled by the thought that I should waste less time in the lavatory and by the fact that sufficient knowledge will not be available in my lifetime to permit of such a revolution in our habits.

passed by vegetarians and others who boast about their stools, often contain as much or more of those substances which the body needs, such as calcium and phosphorus, as they take in by mouth. This may lead to serious consequences during the years of active growth, as a definite mineral deficiency is caused.

CHAPTER IV

PROBLEMS OF REORGANISATION

“Wissen möchtet ihr gern die geheime Struktur des Gebäudes
Und ihr wahlst den Moment, wenn es in Flämmer geräth.”

Goethe, *Xenien*, *Arzte*, Weimar,
Hermann Bohlau, 1893, p. 19.

ON the facts that I have put forward, the case for reorganisation seems to be overwhelming. Nevertheless there are many obstacles which will have to be overcome. It would be unwise to minimise them. I have already pointed out some of the difficulties. At the risk of repeating myself, I will examine them in a more systematic manner. They can be grouped under three main headings:

(1) Difficulties arising from misdirected thinking on the part of the public.

(2) Difficulties arising out of the present system of medical training, practice and research.

(3) Organisational and economic problems.

(1) Much of the lack of co-operation on the part of the public is due to lack of elementary scientific education. Few schools, even the modern progressive ones, include an adequate course of elementary physiology and anatomy. It will

always be difficult to persuade people to take an intelligent interest in health unless they have an understanding of these subjects. This difficulty will be removed if a course of this kind is included in every curriculum. It should not be difficult to devise a course which will give a bird's eye view of, and link the subjects up with general biology.

The next difficulty arises naturally from the first. An unscientific outlook predisposes the public, not only to ignore the possibility of a science of individual health, but to follow the latest fashionable exponent of a new quack medical fad or health cult.

It is true that the worst offenders in this respect belong to that most pitiable class of maladapted misfits to the modern world. I refer to the, alas too numerous, cranks, faddists and hypochondriacs who live in a state of morbid and intimate pre-occupation with their own organs. A subconscious realisation of their own neuro-endocrine-circulatory inadequacy drives them into a frenzied search for the universal panacea. They soon turn from doctors who have no means and no intention of pandering to their introverted obsessions. It is inevitable, therefore, that they should fall an easy prey to the prophets of health cults, nature cures, and the like. Unfortunately such prophets do not only delude the cranks. Prophets are fanatics. Fanaticism is particularly dangerous in an age of transition and uncertain shifting standards. Many otherwise intelligent people really believe, as did our ances-

tors thousands of years ago, that their lack of well-being is due to "poison in the system." They are content, even anxious, to pay large sums of money to nature cure establishments for the privilege of fasting or existing on carrot, lemon or tomato juice. Particularly when this regime is enforced in pleasant rural surroundings, it may be beneficial to the overfed and the over-stimulated townsman. Misapplied, it may do serious harm to many.

My real objection, however, is not a humanitarian one. Fasting is undoubtedly a measure of considerable potential value for health. What is wrong, criminally wrong, from a scientific point of view, is its indiscriminate generalised use. If the unbalanced fanatics who run these places tempered their commercialism with scientific curiosity and investigated their patients on individual lines, first to find out whether an individual should fast or not, and later to find out the exact effects on the individual of such fasting, they would be helping rather than hindering the cause of individual health. This difficulty can only be overcome by education and propaganda.

I have already referred to the next difficulty, i.e., advice given by societies or leagues, whether lay or medical, on the basis of insufficient knowledge. Advice as to diet, and bowel habits in particular, is given by these associations without sufficient knowledge to warrant such advice. Prematurely dogmatic pronouncements on these subjects are liable to delude the public into believing that

sufficient knowledge is already in existence. This delusion engenders an attitude of complacency and interferes with research.

The less reputable manufacturing chemists and ostensibly altruistic "food reform" shops contribute to the confused state of mind of the public on health matters. Knowledge gained in the chemical laboratory on complicated subjects such as the food vitamins, sometimes not even properly tested out on animals, is prematurely applied to human beings, who are impressed by the scientific jargon which accompanies the preparations which contain these substances. Fantastic and unfounded claims are made for the properties of herbal, vegetable and vitamin preparations which encourage the natural human tendency to believe in a miraculous short cut to health. All these activities constitute an obstacle to progress. This difficulty can only be removed by education or the inculcation of a rational and scientific point of view, and by establishing boards of scientists to approve of such preparations before they are let loose on the public.

(2) Such opposition as there is to reorganisation on the part of medical men is a natural corollary to the present type of medical training and practice which I have already described.

Even now, the newly qualified medical student enters practice with no equipment or knowledge as to normal or physiological human beings. He has no standards with which to measure the

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functional efficiency of the healthy person. This exclusively pathological outlook is changing, but it must change more quickly before this difficulty can be overcome.

The main obstacle to reform, in this field as in all other fields of human activity, is the domination of the schools and hospitals by "old" men. I do not, of course, mean of necessity old in years, but I mean "old," conservative, tired and unprogressive in outlook. "Old" men are always complacent and combat reorganisation. Fortunately the younger generation of doctors are less complacent, and are not satisfied with the present state of affairs.

A great deal of medical research is going on all over the world. Research attracts the best brains in any profession. From the point of view of knowledge which will further individual health, a great deal of this research, is a tragic waste. Facilities for research on advanced disease are not lacking in hospitals and clinics. The difficulty is, however, that there are no institutions or clinics which possess the proper facilities for research on individuals who are not well but not suffering from any definite illness.

In pure physiology, circumstances have made it necessary that a great deal of the knowledge as to normal function should be learned on animals. The most suitable animals for this purpose are dogs, cats and rabbits. Whilst for some research work animals are utilised which are more prolific

and cheaper, such as rats, mice and guinea-pigs. If these experiments had not been made, we should be in a hopeless position. Without them the physiologist could not have given us the invaluable knowledge which I have summarised above as to the neuro-endocrine-circulatory mechanism of adaptation.

Experimental difficulties are obvious in the field of applied physiology. This new science, which is the key to any individual health service of the future, cannot expect to learn much from experiments on animals. Its function will be to study the complex neuro-endocrine-circulatory reaction of the human organism to the almost infinite multiplicity of physical and psychological variables in a civilised environment. Laboratory animals which have a relatively simple neuro-endocrine-circulatory mechanism and live in a simple environment are unsuitable for this purpose. Experiments in applied physiology will have to be made almost exclusively on human beings.

Nowadays too many people have an inexplicable aversion to being what they call "experimented" on. To those of us who have a scientific outlook, this attitude is incomprehensible. It is so obvious that the whole of life is experimental in the true sense. The difficulty in finding subjects would be automatically overcome if individual health institutes and centres were to be formed. Everyone under such a system would realise that being investigated, advised and treated was to be er

“experimented” on, but that in all likelihood mutual benefit would accrue to the investigator and the investigated.

(3) I need not say much about the organisational and economic problems. These are dependent on each other, and in turn dependent upon a more enlightened outlook on the part of the public.

It is not my function to discuss in detail in this short book how an individual health service could arise out of the present individualist private practice of medicine. Nor is this the place to argue whether such a plan could best be financed by private enterprise or by the State. In the final analysis, the latter does not seem to me to matter. Most thinking people are agreed that some form of socialism or communism (involving State control of medical services) will inevitably ensue within a relatively short time, unless the present “capitalist” system adopts large-scale co-ordinated planning on an international basis.

If the latter alternative is followed an individual health service planned, as it must be, on a nationwide scale, would be equally suitable for public or private management. The first essential for the success of an organisation is an efficient personnel. This factor is independent of political opinions.

As soon as the public in every country has been educated to realise the simple fact that it is a form of criminal imbecility to spend a large part of dwindling national incomes on armaments for the

destruction of life, there should be no difficulty in diverting the necessary funds to an organisation for enriching life by the promotion of individual health.

I shall also do no more than touch on the problem of equipping, organising and financing the individual health institutes or centres themselves. From an economic point of view there are two main factors to be considered.

(1) The cost of biochemical and other scientific examinations.

(2) Remuneration of staff.

The first presents a very definite organisational problem. The most expensive item would be the cost of running the biochemical laboratories. If these are organised and run as Ford runs his motor-car factory, the cost per individual subject could be kept within very reasonable limits. In discussing a plan which would necessitate a vast amount of biochemical work, I have been told that the cost would be prohibitive. These critics are generally medical men who are accustomed to the usual medical laboratories which smack more of the priestly origins of medicine than of its scientific heritage.

Staff remuneration must be considered in the light of the fact that the staff working in and attached to individual health institutes and centres will have to be very numerous. Panels of 2,600 will not be possible. If the individual health practitioner is to investigate the individuals under

his care with an elaborate, and therefore time-consuming technique, he cannot expect to deal with more than a fraction of this number. If he were to be paid on a capitation fee basis, he would not be paid a living wage. In my opinion, all scientific or applied-scientific workers should be paid an annual salary according to their individual capacities. If in the future steps are taken to ensure preliminary selection of intending medical students, the profession of health practitioner would be recruited from those who are really fitted for it by temperament and inclination. Their main interest is therefore likely to be the pursuit of knowledge and the efficient performance of their duties—not the pursuit of wealth. I do not anticipate difficulty on this score.

I see no purpose also in discussing at present the question of cost of future health services to the patient or subject. This will depend entirely on the general nature of the organisation. I do state categorically that the present system of payment for medical services is wasteful and unsound, both from the point of view of the doctor and the patient. Payment for visits should be relegated to the limbo of the unscientific past, just as payment for the treatment of illness will be inconceivable under an individual health system.

Some form of annual payment to the individual health organisation will have to be instituted. This will be equivalent to an insurance policy against disease. For this payment, the individual

will be entitled to a comprehensive and positive health service. If the health practitioner, either through lack of knowledge or lack of skill, allows an individual under his care to become ill, it is the practitioner, or rather the organisation, who will have to pay for treatment. Under such a system I do not anticipate any financial difficulties. If the practitioner is paid a living wage, given adequate facilities for congenial work, and if the members of the public pay a reasonable annual sum to be kept well, an individual health organisation can be built on a sound economic basis.

CHAPTER V

FIRST ATTEMPTS

“We must approach the conquest of disease through the territory occupied by normality and health.”

Lord Moynihan.

THE quotation above is taken from the preface to *The Case for Action* by Pearse and Williamson (12).

These two doctors are biologists and they believe in applying biological principles to human life. This book, which I recommend to the reader, is a fascinating account of their Health Centre in Peckham.

They started with a small house and invited a certain number of artisan families in the district to become members of the centre. For a small subscription every member of the family was entitled to a complete annual overhaul by the two doctors. Proper medical records were kept and every effort was made to remedy what they called “cryptic,” or hitherto undiscovered minor disease and to cope with psychological maladjustment by wise advice. They made provision for infants as well as mothers and had facilities for refreshment and recreation.

This initial experiment was such a success that

they decided to appeal for funds for a larger building. These, I understand, have now been forthcoming and the building is going up. They will be able to deal with a much larger number of families and they expect the centre to remain self-supporting on a subscription basis. In the larger building they will provide greater facilities for physical culture and recreation and a more complete organisation for furthering the practice of personal hygiene.

The individual health centre, which I visualise, would have a very similar pattern to the Peckham Health Centre. The experience of this centre will be of the very greatest value to those who may be responsible for the organisation of a future individual health service.

Doubtless there are innumerable experiments in different parts of the world which are in the direction of welfare centres, which might even be called health centres. If I omit any description of them it is because I have not heard of them. It is not likely, however, that an organisation of any size exists with the right kind of preventive or health motive behind it without some written account which should be available.

Apart from the Russian health services, I only know of two organisations in being and one which is being planned, which combine health research and positive furtherance of health:

(1) The St. Andrews Institute for Clinical Research.

(2) The Kaiser Wilhelm Institut für Arbeitsphysiologie at Dortmund.

(3) The proposed "Preventorium" of the Margaret Street Hospital for Consumption.

The St. Andrews Institute for Clinical Research was founded by the late Sir James MacKenzie in 1921.

This great physician can be considered as the pioneer of individual preventive medicine in English-speaking countries. In his numerous writings, which have exerted incalculable influence for good on medical thought, he never tires of emphasising the importance of recognising early symptoms, before irreparable disease has supervened. His object in founding the Institute is best given in his own words (13): "Our object is the prevention of those diseases that are common among the people of this country. To achieve that object, it is necessary to know the life history of such diseases from their onset to their termination in death or recovery. The investigators must have the opportunity of seeing such diseases in all stages, so that they may detect the circumstances that favour or induce their onset: can watch the phases from the early stages, when the symptoms are limited mainly to feelings of ill health, on to the later stages when the agents of disease have damaged the tissues and produced physical signs.

"The general practitioner is the only type of individual who has the opportunity for such continuous observation, and so we have enlisted the

co-operation of all the practitioners in the town of St. Andrews. Associated with them are other members of the profession, the Professors of Anatomy and Physiology of St. Andrews University, an expert bacteriologist and chemist, and an X-ray department, efficiently staffed."

The research being carried on at this institute is essentially long-time research: they are keeping exact records of the disturbances of health and the early symptoms of disease in many families. These records will prove of the greatest value: it is yet too early to know what lessons, other than statistical, we are to learn from the labours of the staff of this institute.

The object of this institute is the same as that which lies behind any possible future individual health service: such a service would have to thank the institute for the benefit of its experience.

The Kaiser Wilhelm Institut für Arbeitsphysiologie in Dortmund differs in two ways from the experiments I have described: it is financed by German heavy industry and has a very finite objective: it exists for the purpose of applying physiological methods to the study of working conditions.

When I visited this institute a department was occupied in testing pneumatic road-drills, which had been sent up by all the manufacturers in Germany in order that the stress and strain on the forearms and chest of the worker might be measured and for the selection of the one which produced least strain. Similar experiments had

been undertaken to find out the ideal length of shovel handle for different purposes in order to reduce fatigue and increase productivity.

In another department a most ingenious apparatus had been devised for registering fatigue in prolonged sedentary repetition work, such as fine hand-sewing.

The workers in this institute have elaborated instrumental methods for measuring fatigue resulting from all kinds of work and its effects on the human organism. They have also devised an apparatus for the measurement of varying degrees of efficiency of the normal heart muscle.

This institution, under the able direction of Dr. Atzler, is an example of what can be accomplished when science is applied to practical purposes of this kind. The building is modern and is equipped with extremely efficient departments for bacteriology, biochemistry, animal experimentation and various branches of applied physiology. It employs its own mechanical engineers and has a first-rate machine shop.

The experience of this institute and similar smaller ones which are being organised in England and America on this model should provide material assistance to the future individual health service.

The Committee of the Margaret Street Hospital for Consumption, London, are appealing for funds for a "preventorium" for delicate children. This is worthy of mention as the originators of the plan

intend to have an "ultra-modern" building, with every possible facility for improving the health and resistance of delicate children taken from poor surroundings. They intend also to institute applied physiological research into the exact mechanism of the effect on these children of different diets, different artificial and natural climatic influences, as well as the appropriate glandular or medicinal treatment from the positive health point of view.

If this plan matures, it will be the first institution of the kind, which combines research and positive health measures for children.

State Health Protection in Russia. Medical services are now organised in Russia according to a system which, in theory at any rate, is enormously in advance of that of any other country.

The Soviet Government was in a favourable position to plan rational and co-ordinated health services for the community. This the Communist Party of Russia, which controls the government, realised to the full as is shown by the programme of the party, which contains the following clause relating to the health protection of the population: "The Communist Party of the Soviet Union will base its public health policy on a comprehensive series of health and sanitary measures aiming to prevent the development of disease." In his recent book *Health Protection in the U.S.S.R.* (14) Semashko, who was the first People's Commissar of Health in June 1918—corresponding to our Minister of Health—comments on this clause in

the following language: "This prophylactic direction of the Soviet medical services makes it possible to base the entire system of health protection on combining medical aid to the sick with radical measures calculated to improve the health of the general population. Apart from the general importance of a prophylactic policy, this policy is of special importance in the Soviet Union, where the old insanitary conditions of life survived to a considerable extent until recently and where—the remnants of the old diseases such as contracted syphilis, rash, trachoma, etc., were still widespread."

This passage brings into relief what I understand to be the two most important factors which govern the application of health measures to the Russian community: the first is that the motive behind the well-planned and co-ordinated State medical service is an enlightened and comprehensive one. The second factor is the extreme difficulty of applying comprehensive measures to a backward country, which has insufficient general and medical educational facilities, insufficient medical personnel and a heritage of uncontrolled epidemic diseases, alcoholism and other social scourges.

Unfortunately, I have not had the opportunity of making a personal visit to Russia. I should like to see how co-ordinated State planning on health protection lines works in practice. I should also like to inspect the preventoria, the night sanatoria, convalescent homes and other interesting

experiments, which have been "tried out" there during the last few years.

The difficulty in arriving at an accurate picture of medical services in Russia is increased by the inevitable introduction of the political factor. Most observers who go to Russia are swayed, consciously or unconsciously, by their political passions. Fortunately we do now possess the account of the visit of two observers who cannot possibly be accused of political bias: Sir Arthur Newsholme and Mr. Kingsbury, who visited Russia and who describe its medical organisation as part of, or rather, an appendix to, their international health studies, on behalf of the Millbank Memorial Fund of America, have written *Red Medicine* (15), which I strongly recommend to anybody interested in the reorganisation of medical services. I will content myself with pointing out those facts which are of particular interest from the individual health point of view.

The general organisation of public health services is centralised in each of the seven constituent republics of the Soviet Union: each of these has a People's Commissariat of Health, which in its own territory administers:

- (1) Preventive medicine or public health measures.
- (2) Individual medical care, ambulatory and institutional.
- (3) Pharmacy.
- (4) Medical training.

(5) Certain health resorts.

The social insurance which caters for sickness is controlled by the trade unions: every worker is insured and his insurance covers any in- or out-patient treatment of sickness, half to full pay while he is ill, also prolonged convalescent treatment.

There are no private doctors, they are all salaried employees of the State: each doctor, in theory at any rate, has to keep records of a certain number of individuals for whose welfare he is responsible.

Besides institutional doctors, there are district doctors, who are comparable to general practitioners, and doctors in every factory.

The organisation of factory medicine is very complete: The factory doctors are in control of all details of hygiene, they determine working hours, holidays and sanitary conditions of work.

Large polyclinics, or so-called "ambulatoria" provide facilities not only for diagnosis and treatment of disease, but for positive health service, for the entire population of the district surrounding the ambulatoria. An interesting sidelight on social conditions and social philosophy in Russia is provided by the fact that every ambulatorium has a department for consultation on sex and marriage, including, of course, birth control.

As a consequence also of the improved legal status of women in Russia, a very much improved maternity service is available for every working woman. This covers both childbirth and the ante- and post-natal periods. Women are given special

benefits in the shape of full wages during absence from work, both before and after confinement and allowances while nursing.

There is free hospital provision on a liberal scale during the pre-natal period and during confinement. After confinement there is free attendance at infant consultation clinics. The system of crèches, which seem to be extraordinarily well-equipped and staffed, has become generalised to an extent far exceeding that of any other country.

Under the bad housing conditions which still prevail in Russia it is probable that proper care of infants and young children would be impossible without this provision.

Abortion is legal in Russia. Hospital facilities for it are provided on exactly the same scale as they are for maternity. Practically all abortions are carried out in State hospitals. The chapter in *Red Medicine* on the problem of abortion (15) is of special interest. Other governments, which refuse to face the fact that a great deal of mental, apart from physical, suffering and therefore a great deal of psychological disturbance throughout life, is caused by the lack of open facilities for dealing with these problems, may soon have to follow this example.

A striking feature of Russian organisation from the health point of view is the lavish provision of holiday, preventorium, night sanatorium and convalescent accommodation in the palaces which

used to belong to the Czarist nobility or in the best type of modern building.

The night sanatoria are intended to deal with the early stages of disease, when the patient has not reached the point when he must stay away from work, but is not sufficiently well to continue his ordinary mode of life. The patient after work goes to the night sanatorium, changes his clothes for sanatorium garments, washes himself, receives proper food, sleeps either in the open air or with open windows and is given what medical attention he may require. In the morning he returns to work. The object of this treatment is to prevent any further disturbance of health and even to allow the worker to improve his health without absenting himself from his job.

This system is, as far as I know, quite original to Soviet Russia.

In the light of the plan for a first preventorium for delicate children in England it is interesting to read that numerous preventoria for children exist in parts of Russia enjoying special climatic advantage. Two groups of children are received during the summer, each group remaining forty days. The children are periodically examined by medical experts, dental and other treatment is given. There are also teachers for physical sports.

The official impetus given to all kinds of physical culture and open air games since the beginning of this system in Russia is especially worthy of mention.

There seems to be no aspect of preventive or curative medicine which has not been considered by the Soviet Health Commissariat. Unfortunately, the appalling conditions and still more the insufficient number of doctors and nurses available for working this system have demanded a concentration on the improvement of sanitary conditions and the prevention of epidemics during the preliminary years.

The definite plans for health research which have already been put into operation in Russia are the most significant from my point of view. Newsholme and Kingsbury report a visit to the "Institute of Health" in Moscow, which has as its objective basic research in preventive medicine and the study of health education. They also report an interview with the "Director of Research in Health" in the Park of Culture and Rest (16). There is also a department which enjoys the title of "Institute for Neuro-Psychiatric Prophylaxis"—evidence of the importance attached to the study of nervous strain under modern conditions.

If Russia attains and retains a condition of political stability, its health protection system should be able to prove its value within a comparatively short period of time.

CHAPTER VI

PLAN FOR A COMPREHENSIVE INDIVIDUAL HEALTH SERVICE

“Nobody can suggest that with our present knowledge we can predict even the initial stages of a strictly scientific application of genetic principles to the problem of improving the human species.”

Dr. H. H. Dale: *Seventh Annual Norman Lockyer Lecture*. British Science Guild, 6 John Street, Adelphi, W.C.2. December 5th, 1931.

IN the course of discussing the need for the application of scientific method to the promotion of individual health, I touched on the probable functions of what I call an Individual Health Institute-Centre.

In my plan I visualise a network of such institutes and centres to cover the whole country. Just as at present we have a County Public Health Service, controlled by a County Medical Officer of Health, from a central Public Health Office, with laboratories and other facilities, so I visualise that each county or district would have a centralised individual health service. All the individual health activities of each district would revolve around the central Individual Health Institute-Centre—to avoid repetition of this long and

clumsy title I shall now use the abbreviation I.H.I.C.

I should explain a little more fully my reasons for incorporating such a comprehensive and ambitious plan in this chapter. I had the greatest difficulty in deciding whether to follow my own temperamental inclination or to launch out and describe an ideal plan for ideal conditions. My inclination was to outline an immediate practical plan for establishing a small experimental institute which could be built at once if a relatively small sum of money were available. I visualised this original experimental institute as a nucleus or a rallying point for the considerable number of people who are already prepared to put their progressive ideas to the test of practical experiment. I still think that this should be possible in the very near future. I would therefore have preferred to confine this chapter to outlining an immediate practical plan.

I am fully aware of the inevitability of gradual transformation of any system with the slow but the only really satisfactory assistance of education. In nature as in the institutions of man, the only healthy growth is slow growth. I am unfortunately denied the spiritual joys of the visionary. I cannot persuade myself that there is any likelihood of a sudden transition from muddle to an ideal system ordered only by logic. There is bound to be a long transitional period during which those of us who believe in the possibility

of reform may contribute a little if we strive actively in the direction of reform.

Holding these views I was disinclined to put forward such a utopian plan as that which follows. I was finally convinced of the desirability of describing a comprehensive plan in this book by the following reasons: (1) If I had confined myself to the description of a small experimental institute it would have been difficult, if not impossible, to link up this chapter with the following chapter in which I describe the application of individual health methods to the practical problems of health and disease which confront us to-day. (2) By describing a central Individual Health Institute-Centre or I.H.I.C. in detail, I "kill two birds with one stone." Even an initial experimental institute must be organised roughly along these lines, even if it be on a smaller scale. (3) It is undoubtedly desirable that an individual health service should be expanded to cover a wider range than will be possible for a single experimental institute. By foreshadowing a comprehensive regional organisation, I allow the reader to visualise concrete lines of direction. (4) This book is essentially for the lay and not the medical reader. Details of an immediate, small concrete plan should really be discussed with colleagues who are qualified, either by their scientific or medical knowledge to make suggestions as to the minutiae of organisation.

I trust therefore that my readers will bear this

sincere "apologia" in mind when they read the following pages.

Under a comprehensive plan every member of the community in each district would have an inclusive service, both from the preventive and, if necessary, the curative point of view, controlled entirely by the central I.H.I.C.

The local public health services would probably remain autonomous for administrative purposes, but would correlate with and rely on the I.H.I.C. for experimental information and practical advice.

Hospital and other institutional facilities would also revolve around and be attached to the I.H.I.C., with the exception of isolation hospitals, convalescent homes, preventoria, etc., the location of which would obviously be determined by climatic conditions.

Nevertheless, the I.H.I.C. would be the hub of all the medical activities of each district, or better, it could be compared to a heart which would pump scientific health knowledge derived from applied physiological research, through the vessels of its medical staff to every member of the community.

Before entering into details of organisation, equipment, staffing and functions of a central I.H.I.C. I must discuss some aspects of a regional system of organisation.

If, or when, a comprehensive plan for individual health service is first initiated, it would, as I have

said, have to grow from a small beginning: a single I.H.I.C. would have to be started in an experimental way in a district chosen for its particular amenities. Unforeseen practical difficulties would be sure to arise: sufficient experience, however, should be forthcoming after a short preliminary period to enable plans to be drawn up for a nation-wide organisation on these lines.

I shall confine myself to a description of the original experimental district, revolving round a central I.H.I.C.

It would be premature for me at this stage to attempt to forecast the exact size of a community which would be most suitable to act as a regional entity. It is almost certain that a county would be far too large and unwieldy: corresponding boroughs in large towns, such as London, might also be too large, although most of them would not.

When the regional I.H.I.C.'s are set up, the original central I.H.I.C. would probably be expanded to become the national central I.H.I.C. From a practical point of view, it would be best if each regional I.H.I.C., including the central national one, were of exactly the same size. Architectural planning, standardisation of equipment, economic distribution of staff, would all be simplified if this were possible.

On the other hand, just as each regional I.H.I.C. would co-ordinate its own research department with the practical activities of its medical centre, it would be necessary for the national I.H.I.C.

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to be a co-ordinating centre for the whole country.

A centralised statistical department, as part of a central liaison department (*a*) between national regional I.H.I.C.'s and (*b*) international, would be of primary importance. It is also probable that the central institute would have a larger research department. Research workers of exceptional scientific ability do not grow on every tree. The national central I.H.I.C. should have the best-qualified staff and be equipped with any specially expensive or elaborate research appliances.

The standardisation of size might still be arranged for if the central national I.H.I.C. were organised in two separate institutes under one roof. (*a*) A regional department for the regional services identical to the other regional I.H.I.C.'s. (*b*) A national and international co-ordinating institute.

I shall now describe an I.H.I.C. under the following headings:

(1) The institute or scientific research department.

(2) The centre or general health supervisory department.

(3) Departments shared by both centre and institute.

(4) Accessory health departments.

(5) Accessory medical and surgical departments.

(6) Staff.

(I) *The Institute or Scientific Research Department*, would have at least the following facilities:

(a) Special research laboratories for pure chemistry, physical chemistry, biochemistry for the experimental elaboration of new technique and also for pure research in each of these branches.

(b) A section of pure physics, which would be occupied with (i) pure research, (ii) with the devising of new physical instruments (mechanical and electrical) for adding to the routine test procedure of the health centre practitioners. (iii) Preliminary testing of new methods on human subjects under different conditions before incorporating such new methods into the centre routine.

To allow for all these activities considerable space would be needed.

(c) A section of biology, which would be roughly sub-divided into (i) pure biological research, (ii) applied biological research and animal experimentation. The latter would dovetail into those activities of other sections demanding the use of animals either for routine or research purposes.

(d) A section of physiology mainly for the elucidation of unsolved problems of pure physiology, which would incorporate facilities for the microscopic study of the cell as "the unit of all life."

(e) A section of "pharmacology" with facilities for research in isolating new chemical substances and studying their action, first on animals and later

on human beings. This section would be able to use methods of pharmacological assay on substances sent to it from the biochemical department of the centre.

(f) A section of pure and applied meteorology for the study of climate.

(2) *The Individual Health Centre or General Health Supervisory Department.* This department would act as both the administrative and health centre for the whole district or region. It would therefore demand careful planning, and a considerable amount of space. It should occupy the central position in the building. It should contain at least:

(a) An administration block with secretarial offices.

(b) Rooms for the medical staff, to act as consulting-rooms, examination rooms, and rooms for common examination and discussion between the various members of the medical staff. It would also have filing facilities for medical records. The filing system will be described below, but its paramount importance must be emphasised. Every member of the population, therefore every person in the district, would have a dossier (medical or health file) which would be kept at the centre. All clinical details, as well as the result of all examinations and details of everything that happens to him would be entered up in this record. From an organisational point of view it would be desirable that filing cabinets for these records be split up in separate doctors' departments. Each health prac-

tioner would be responsible for a certain number of individuals. Each individual would have a dossier that would follow him from the cradle to the grave, so that he would pass through the hands of at least two doctors throughout his lifetime.

(c) Special section for infants and small children, which would incorporate the principles already being applied in Infant Welfare Centres and Child Guidance Clinics.

(d) Special women's section for education in sex matters, ante- and post-natal observation and care.

(e) Psychological section.

(f) Large central biochemical laboratories, which would carry out the necessary exhaustive routine biochemical examination and at the same time provide facilities for such routine analyses as might be necessary in the work of any other sections of the institute.

(g) Bacteriological and serological departments.

(h) Rooms for the routine efficiency tests.

(i) A special medical secretarial department, providing facilities for the doctors to keep all records up to date, and for a follow-up system whereby continuity of care and records would be ensured. This follow-up department would also ensure attendance at proper intervals.

(3) *Departments common to Institute and Centre.*

(a) Library.

(b) Statistical department.

(c) Common rooms for periodic meetings

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between all the workers in pure and applied science working in the I.H.I.C. and in the district.

(d) Commissariat department—including dietetic kitchen for feeding all the staff and providing any meals necessary for individuals being investigated.

(e) A machine shop for making the necessary laboratory and other appliances both for the centre and the institute, and for providing skilled workmen to look after repairs and maintenance.

(4) *Accessory Health Departments.*

(a) Department for teaching all forms of physical culture.

(b) Massage and manipulation department.

(c) Hydrotherapeutic department, which would have every form of bath tested out and proved to be efficacious by the staff of the institute.

(d) Department for electrical and other physical treatment involving the use of ultra-violet, infra-red rays, and any similar methods devised or approved of by the staff of the institute.

(e) Dispensing department for the distribution of chemical substances tested, tried or manufactured by the pharmacological department of the institute, as well as glandular substances prepared and/or tested by the biological department of the institute.

(5) *Accessory Medical and Surgical Departments.*

These would be divided into (i) so-called out-patient facilities and (ii) in-patient facilities.

(i) would offer facilities for:

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(a) An emergency accident department.

(b) Special departments for eyes, ear, nose and throat section, etc., which I will not dilate on, as they will not differ in any material way from present hospital departments for the purpose.

(c) A Dental Department.

The in-patient accommodation attached to the I.H.I.C. would be confined to the following:

(a) Surgical ward for emergency surgical operations.

(b) Medical ward for medical emergencies such as pneumonia. This would be used only for patients so ill that it would be dangerous to move them out to the hospitals or preventoria in the country.

(c) Maternity wards

(d) Wards for research. Each ward would be kept for varying periods for one single disease or other medical problem at a time. These wards would be kept for the study of those complex diseases and disturbances of the glands and metabolism which would demand the combined resources of the institute and centre for their solution.

(e) Observation wards. These would be used by the centre when needing accommodation for tests necessitating one or more nights at the centre, also for observing people for a few days only in order to decide whether they should be sent to country hospital or preventorium, or whether they could be treated at home.

(6) *Staff.* There is no need to mention secretarial and domestic staff, or mechanics, electrical engineers, plumbers, etc.

I will also not discuss the recruiting and the preliminary training of the staff in much detail. These factors would depend to a great extent, at any rate as far as the medical staff were concerned, upon the state of medical education at the time of the initiation of the first I.H.I.C.

Certain general rules would, however, have to be laid down. Health practitioners and the other members of the medical staff would all have to go through a lengthy preliminary training as junior individual health practitioners attached to the I.H.I.C. This would ensure the necessary applied physiological orientation of interest and thought. It would also allow of interchangeability. This would be essential to keep alive the flame of enthusiasm for pure and applied scientific endeavour.

After a varying period of apprenticeship as junior individual health practitioners, specialised courses, either at the I.H.I.C. or one of the peripheral institutions to be described below, could be taken.

Similar general principles should determine the choice and organisation of the unqualified staff. Young laboratory assistants, after varying periods of "robot" service would be encouraged to take up scientific study according to their particular aptitudes and finally qualify for transference to the senior staff of the institute.

The staff would consist mainly of:

A. *A General Director*, whose function would be mainly executive. The main qualifications for this position would be a thorough grounding in pure and applied science, organising and synthetising ability. It would be his function to decide on the lines of research in pure science, to ensure correlation between the activities of the institute and the centre, later to ensure correlation between other regional centres and his own. He would also make sure that the departments responsible for international correlation became cognisant of progress in pure or applied scientific work in other countries. In an elaborate system of the sort that I am describing, it would be of vital importance to ensure co-operation and correlation, so that there would be no overlapping or duplication of time-consuming work.

Besides a special aptitude for correlation and synthesis, it would be desirable for the director to have a capacity for inspiring the workers under his direction with enthusiasm. It is obvious that the efficiency of such an organisation would largely depend on the creation of an atmosphere of constant dynamic endeavour.

B. *An Assistant Director*, who would also act as understudy to the director.

C. A staff of *Senior Individual Health Practitioners* who would spend all their time carrying out routine periodic prophylactic investigations, and who would be in permanent charge of a certain

number of individuals. It would be their function to see that the individual's dossier was kept up to date.

Under circumstances of continued health many individuals, in particular males, would not need the medical or health services of anybody but the individual health practitioner in charge of them. The proportion of such persons would naturally increase *pari passu* with the increase in knowledge as to the promotion of health by warding off disease.

Under a variety of other circumstances, the health practitioner would refer the individual to a preventorium for rest, or to specialist colleagues, but he would always act in close co-operation with them. Also, if the individual subject were to need domiciliary treatment from the junior staff, or need hospitalisation, it would be the practitioner's function to co-operate with such colleagues and keep a permanent watch over the individual's general health. The same would apply to females during pregnancy, during the ante-and post-natal periods and during childbirth.

D. A staff of *Junior Individual Health Practitioners*. These would assist the senior individual health practitioners, and carry out domiciliary visits in case of illness. Such visits would be made as a routine so that a full description of home conditions could be incorporated in the dossier. They would also be personally responsible for the more complicated procedure involved in routine investi-

gations, i.e., specially delicate efficiency tests, taking anthropometric measurements, taking of blood, etc. They would also co-operate with the specialists and the medical and surgical staff in the auxiliary departments and ensure correlation between the senior individual health practitioners and all other members of the staff.

E. *Specialists*, who would be health practitioners with specialised interest and experience in fields such as psychology, the physiology of reproduction, infants and children.

F. Special staff, both surgical and medical, for the auxiliary medical and surgical services I have described above.

During the preliminary transition period between the present system of medical organisation and an individual health service this section of the staff would probably be recruited mainly from medical men who had already specialised in these fields. It would be hoped that contact with the other members of the staff, exclusively engaged in the promotion of health, would bring about a gradual reorientation of thought: they would be infiltrated with the "health virus" and thus be able to co-operate better in practice and research.

G. The composition of the qualified (non-medical) scientific staff of the various departments of the institute demands no special description.

H. *Laboratory assistants and technicians*, except for heads of departments, who would occupy positions of a certain responsibility, most of these posts

would be filled by "robots." This will illustrate one of the many advantages of combining scientific research facilities under the same roof as routine medical or health activities.

As the technical experts in the various branches of the institute, such as the biochemistry department, would be on hand to supervise the accuracy of the methods used in the routine determinations and also to check the accuracy of the results, it would be possible to utilise cheaper and younger "robots." This illustrates yet another advantage of this combined system: one of the disadvantages usually attached to pure scientific work is its detachment from real life: under this proposed system the scientist would be linked up along several lines of communication with the application of his work to all kinds of methodological and practical problems.

I. *Nurses* would be needed for the auxiliary services. Conversely, in their case, contact with scientific investigation and research would have a stimulating influence.

J. A librarian and several statisticians.

All residential institutions for health, medical or surgical care should be in the country, not in towns. Provisions for prolonged institutional treatment could, therefore, not be incorporated in a great many districts. I refer, of course, to large towns, such as London, Manchester, etc., which would be divided into a large number of urban I.H.I.C.'s. This fact would complicate the strictly

regional planning which must be the basis of any individual health service.

In the case of rural I.H.I.C.'s these institutions could be incorporated. The I.H.I.C. would be localised in a country or provincial town and the "peripheral" institutions in the surrounding country.

The exact distribution of peripheral institutions connected with I.H.I.C.'s would have to be decided according to territorial exigencies.

In a country like England, which contains a large proportion of densely populated urban districts in relation to the rural districts, it might be necessary for each rural I.H.I.C. to have larger peripheral institutional facilities than would be necessary for its own population. Inter-regional arrangements would be made. The regions which enjoyed special climatic advantages and regions with already existing health resorts, would be used for special purposes, just as they are in Russia.

The peripheral institutional facilities necessary for each I.H.I.C. would be of three types:

(1) *Hospitals*. It is extremely probable that the organisers of any future individual health service would decide to reverse the present hospital system under which all hospitals of any size are situated in the middle of densely populated towns. In England, at any rate, these situations are almost always grossly unhygienic. Soft coal is still in general use and produces an atmosphere which could not be more unsuitable for the treatment of unfit and sick people.

INDIVIDUAL HEALTH SERVICE

Only emergency operations and medical emergencies should be treated in urban hospital wards attached to the I.H.I.C.

Peripheral hospitals in the country would have wards for the following departments:

(a) Surgical: for all operations which do not have to be carried out in a great hurry. This system would present obvious advantages. It would allow time for proper pre-operative investigation. The patient's general fitness for operation would be gone into in an exhaustive manner, his liability to bleeding and the integrity of his resistance mechanism against possible post-operative infection would be established. Any pre-operative treatment could then be carried out under the best climatic conditions.

These same conditions should ensure a more rapid and satisfactory recovery. Accessory scientific methods would also be utilised for ensuring the continuation of high anti-infective resistance. The fact that these surgical wards would not admit emergencies would also prevent the possibility of premature discharge of the patient. He would be kept until declared fit for transference to a convalescent home.

(b) Medical: for all cases of sub-acute and chronic infections and diseases and for cases of disturbed function (glandular, metabolic, etc.) so severe as to demand institutional treatment.

Both medical and surgical patients would be ensured continuity of general care owing to the

I.H.I.C. system. The medical staff of the hospital would have forward a copy of or excerpts from the "dossier" at the same time as the patient, with special emphasis on idiosyncrasies or weak points which would affect treatment in hospital and incorporating any remarks as to special sensitiveness to stimuli or forms of treatment.

In case of doubt, the senior health practitioner of the I.H.I.C. responsible for the patient could be consulted on the telephone.

Each hospital would be thoroughly equipped with bacteriological, X-ray, biochemical and allied departments, which would be utilised on each individual to a much greater extent than such accessory scientific aids to diagnosis and treatment are employed at present. In this respect also experience as to the value of applied physical and physiological methods in improving efficiency during relative health will be of value in determining the most sensitive and reliable scientific tests for use on patients in hospital.

Special diagnostic and therapeutic problems arising during hospital treatment would be referred by the hospital staff either to the institute or centre staff.

There should also be continual exchange of junior hospital and I.H.I.C. health practitioners. The same special methods evolved in the auxiliary wards attached to the I.H.I.C. described above could be applied to the disease problems in the hospitals.

I will not discuss the many other manifest advantages of a closely knit co-ordinated hospital and central research system. They are outside the province of a short description of the system designed primarily for the lay reader.

(2) *Preventoria*: These would fulfil a very much needed function which is only partly fulfilled even by the Russian preventoria.

Each preventorium would have some special climatic advantage, if in a health resort it might use the baths and waters—their exact action, of course, would be studied by workers from the institute—and would be equipped with every facility for physical culture, games and recreation. It would also have a dietetic kitchen.

These preventoria would be available for: (a) Healthy members of the community who had been under some prolonged strain and who wanted rest. (b) Healthy members of the community who would select the preventoria for a holiday and who would combine a holiday with special measures of health promotion. For instance, a senior health practitioner might consider that one of his subjects would particularly benefit from a special form of diet. Facilities would be available at the preventorium for teaching him or his wife how to put himself on such a diet in the most efficient and economic manner. As every institution, including preventoria, would possess a scientific investigation department, it would be possible to decide whether after a certain period

the diet was really suitable for more permanent use.

During his annual holiday at the preventorium this class of subject would be taught how to live during the rest of the year.

The preventorium would also be used for this purpose by members of the community labouring under special constitutional or occupational difficulties. All other persons—as in a Russian preventorium—would be entitled to a shorter or longer period of rest and recreation and exercise under skilled supervision.

Preventoria would not admit sick people.

It would be important, therefore, that the atmosphere of preventoria should be as little like the popular conception of a hospital or medical institution as possible.

The less technical aspects of a preventorium would be supervised by lay experts in entertainment and hotel management. As in all other institutions under an individual health service, there would be a resident psychologist or rather, an individual health practitioner with special interest in psychology.

Needless to say, the closest correlation between the staff of the I.H.I.C.'s and particularly the senior health practitioners and the staff of the preventoria would be ensured.

(3) *Convalescent Homes*: Would be very similar in function to preventoria, but would have to have somewhat more extensive medical and, in some

cases, surgical equipment. In many instances cases which were transferred from hospital to convalescent homes would later be further transferred to preventoria. Nothing further need be said about convalescent homes, except to repeat the importance of exchanges of staff, correlation with the I.H.I.C. and a general similarity of treatment and health promotion.

All these "patients" or subjects would provide material for the study of special adaptational problems which would not be available in the urban districts.

I will complete this rough outline of the general organisation of such an individual health service by a forecast of its relation to the public health services. The latter services would continue to deal with the health services which affect the community as a whole. For some time to come they would continue to administer existing organisations for the diagnosis or treatment of venereal disease, tuberculosis and those infectious diseases which arise in epidemics and necessitate isolation.

Close correlation between the staff of the institute and the senior health practitioners of the centre should result in a much needed reform in the management of venereal disease, tuberculosis and epidemic infectious diseases. At the present time, the old-fashioned outlook on tuberculosis in particular still holds the field. Those who are responsible for dealing with tuberculosis go closely into the details of the damaged part of the body,

i.e., the lungs, but entirely ignore the individual as a whole who is suffering from the disease. It is true that they pay lip service to the principle of general treatment to raise the bodily resistance being more important than the lungs. In practice, however, this means exposure of the victim to all the rigours of an inclement climate amidst the incredibly depressing surroundings of a sanatorium and to the accompaniment of a symphony of coughing into sputum receptacles.

If, in spite of this and as a result of rest and removal from even worse surroundings, the patient suffering from tuberculosis improves, he is returned to the slum and the ill-ventilated workshop. It is probable that an intensive study of the behaviour of the neuro-endocrine-circulatory system in different types of individuals in response to the tubercle bacillus with the aid of the special facilities of the individual health service, would very soon lead to rational treatment of the individual suffering from tuberculosis. The incidence and mortality from this disease has already fallen as a result of improved social conditions. Tuberculosis should become almost as rare as typhoid and typhus in Western communities when more efficacious measures of treatment become available.

During the transition stage it is probable that sanatoria will have to be replaced by the industrial colony system for the tuberculous. Under present conditions this system has been demonstrated at Papworth in Cambridgeshire to be the only

rational method of tackling the tuberculosis problem from a sociological point of view.

It has also the advantage of protecting the community from infection, as the ex-patients are given employment in self-supporting industries. They can bring their families to the village settlement, where they may spend the rest of their lives under sheltered conditions adapted to the permanent impairment of efficiency—always the heritage of past disease.

Such colonies would replace the present obsolete sanatorium system until the disease was finally conquered.

Venereal disease could also be tackled from a more comprehensive angle by co-operation with the individual health service. Facilities would automatically be available for prophylactic advice.

Co-operative research would also be instituted into many obscure constitutional factors which must be responsible for some of the later manifestations of this disease in certain individuals. In fact the most distressing sequelæ of syphilis, those which affect the brain and the central nervous system some years after contracting the primary infection—such as tabes and general paralysis of the insane, are the manifestations as to the cause of which least is known.

As to the general functions of the public health services, such as the control of food, water, milk, etc., many of their functions would automatically be taken over by the individual health centre and

in any case these would provide a fruitful field for co-operation between the institute, the centre and the public health officials.

Other less directly medical problems which are also under the control of the public health services, such as the sanitary and hygienic aspects of housing, would benefit by closer co-operation not only with the I.H.I.C. but with progressive architects and engineers.

The general working programme of an I.H.I.C. and its regional individual health service organisation can be inferred from the above description. The details of technique would take me too far away from the general explanatory scope of this book. Some aspects, however, need emphasising.

All the resources of a comprehensive pure and applied scientific organisation would, for the first time, be concentrated on the positive task of promoting human efficiency. The elastic structure of the I.H.I.C. would ensure the automatic incorporation of any new advance in pure science, whatever its source. If no quite unforeseen obstacles arise in practice, this should lead to an increasingly successful onslaught on the causes of disease on the part of the health centre.

The activities of the auxiliary medical and surgical departments would dwindle in inverse ratio to the increase in the efficient activities of the centre. In the same way, improved methods of health promotion would justify a forecast as to a progressive diminution in the field of surgery.

The logical result should ultimately be the restriction of surgery to accidents.

On the other hand, the I.H.I.C. should sow the seeds of the true eugenic science of the future. Generation by generation more medical men would become positive health practitioners, more lay people would become scientifically minded and health conscious.

As to the periodicity of the complete periodic health examinations, it is premature to attempt to lay down rules. Circumstances and experience should make the establishment of a general rule fairly easy. During periods of stress, such as growth, puberty and active reproduction, it is probable that these would have to take place at least once a year. During the more stable years of life, probably once every two years would be sufficient.

At the change of life, which may have almost as dramatic consequences in the male as in the female, more frequent examinations would again become necessary and later on the intervening period might sometimes be lengthened. I do not anticipate any difficulties arising out of the necessity for elaborate examinations if care is taken in working out the details of the technique of investigation. The subjects should not object to the procedure once they really understand the purpose and the advantages to themselves.

It must be remembered that the health investigation would be planned to reflect the everyday

conditions of the subject's life. It follows that there would be little or no sacrifice of working time.

The confidence of the layman in the practitioner would be reinforced by the results of centralised responsibility. As I have explained above, the individual health practitioner would possess the centralised responsibility for a certain number of individuals. Even from the point of view of treatment of disease, there is often no one to fulfil this function under the present conditions of medical organisation. Nowadays many people, particularly with means, do not even have a general practitioner. Almost the greatest fault at present is the complete lack of continuity and correlation in care and treatment. Individuals drift from specialist to specialist for advice and operations, go to health resorts, have osteopathic, massage and other physical treatment on their own initiative and even when there is a general practitioner, he has no true or detailed knowledge of any of these treatments.

The individual health practitioner would either in person or by proxy follow up his subjects through all possible vicissitudes.

In discussing hospitals, I have already pointed out some of the disadvantages of the present system, such as lack of pre- and post-operative care, lack of concerted and routine application of known accessory scientific aids to diagnosis. These examples could be multiplied *ad infinitum*.

I will only mention one further example at this point: Pregnancy and childbirth are at present entirely in the hands of the obstetrician. The obstetrician is essentially a technical expert in the mechanics of childbirth and in pelvic operative technique. Even if he is interested, which is unusual, in the physiology or physio-pathology of pregnancy, he possesses neither the training nor the facilities for investigating the causes of those disturbances which so often arise, particularly under civilised conditions. All too often the pregnant woman is told that she must accept the physical and psychological ailments of this period as an act of God. The reader who has understood my elementary account of the importance of the neuro-endocrine-circulatory mechanism, will realise that such disturbance of function must arise from biochemical abnormalities due to the failure of this mechanism to adapt itself to the strain of pregnancy. Under all these circumstances, the individual health practitioner would follow up his subjects, readjust the balance and look after the general welfare, while the specialist dealt with his particular part of the body.

I have left out a great many details in this summary description: for instance, I have not touched on the procedure which would have to be adopted by an individual in the community who fell ill and needed domiciliary treatment or who felt unwell and wished for advice. In the first instance he would be visited by the junior health prac-

titioner, in the second instance, he would go direct to his senior health practitioner.

The I.H.I.C., with its peripheral institutions, would provide ample facilities for every type of investigation and treatment that the individual would need.

As my main purpose in putting forward this survey is to arouse interest and discussion, any further elaboration of the subject would be useless as well as premature. In fact, if the reader compares my account of the present position with the account of the proposed individual health service in this chapter, he might well be justified in thinking that the whole plan is premature and impossible of realisation for a very long time.

CHAPTER VII

AN INDIVIDUAL HEALTH SERVICE AND PRESENT-DAY PROBLEMS OF HEALTH AND DISEASE

IN foreshadowing the most fruitful lines of research and the more immediate practical application of an individual health service, I shall be emphasising the consequences of an altered point of view.

The medical profession at present is mostly occupied in the palliative treatment of symptoms or diagnosing and treating disease. If an individual health service were to be started it would consider each individual as a separate problem in applied physiology. The health practitioner would ask himself every time that he saw a subject under his care the following question: "Is this individual adapting himself or herself in the best possible way to his or her particular environment?"

In order to find this out, he would ascertain by questioning whether the subject enjoyed continuous positive well-being. He would at the same time carry out an investigation to find out whether the individual was, to use an Americanism, "100 per cent. efficient." If the subject complained of any symptom or lack of well-being, the investigation would reveal some breach, however small,

in the integrity of the neuro-endocrine-circulatory system. Measures would then be instituted to readjust the balance and restore the individual to his optimum capacity of adaptation.

I need hardly say that arbitrary standards of 100 per cent. efficiency are as undesirable as they would be impossible under a system of *individual* health. The details in the subject's dossier should allow of an assessment of the individual's maximum capacity. No attempt would be made to make the person who has come into the world with a neuro-endocrine-circulatory equipment which is in quality, say, 40 per cent. less "good" than the maximum, assume the responsibilities or live at the rate of the 100 per cent. subject.

This illustrates the two cardinal differences in point of view.

The first and most important is that the individual health practitioner would consider the subject as a complex dynamic organism in relation to a particular set of environmental circumstances.

The second difference is the prophylactic or preventive orientation.

Once the desirability of this point of view is granted by both medical men and lay people, the "lag" period before reorganisation commences will not be overlong.

A considerable minority of the medical profession has this point of view to-day. This minority is handicapped (*a*) by the opposition of the more old-fashioned and less progressive members of the

profession (*b*) by the lack of a co-operative organisation for putting their ideas into practice, (*c*) by the lack of a "dynamic" technique of examination, utilising in a new and comprehensive way the applied scientific knowledge which is already in existence, (*d*) by the apparent indifference of public opinion.

I have endeavoured so far to explain the position to lay readers and discuss theoretical considerations. If I now attempt to link up theory with practical problems, I hope that I may be able to convince more people of the desirability of supporting this medical minority in its efforts to reform our medical services.

In order to do this, I will survey, briefly, the whole field of individual preventive and curative medicine as it stands to-day. I will give special consideration to the commoner disturbances of development and function, as well as the commoner ailments and disabilities which afflict people to-day.

I will deal first with disorders of function and development, whether they be primarily hereditary or environmental in origin.

In infancy and childhood development may be delayed, may be too rapid or may be abnormal. This period of life during which there is rapid growth, can be considered as a period of necessarily fluctuating instability which renders the individual particularly sensitive to every change in the environment. This has been recognised, and a

great deal of applied physiological knowledge already exists as to the mechanism of disturbances which occur during this period. It is doubtful, however, whether this knowledge is applied either often enough, or in a sufficiently systematic manner. Parents are apt to ignore minor abnormalities which may have serious consequences throughout the future life of the individual. Psychologists rightly lay stress upon the paramount importance of early influences.

Routine examination during these vital years would allow of advice as to dietetic, hygienic or endocrine measures which can readjust the balance with comparative ease during the early years. Even in the present state of knowledge, it is possible to arrive at dramatic and satisfactory results with simple measures.

Later when growth has ceased, and the organism has reached a state of equilibrium or stability, whether on a good or a bad plane, the equilibrium is much more difficult to re-establish. When a more comprehensive technique for examining the neuro-endocrine-circulatory system is available, it should also become possible to readjust more serious developmental deficiencies.

At puberty both the male and the female organism has to readjust itself to an entirely altered set of neuro-endocrine circumstances. The stress and strain of puberty changes often affect the individual for a period of several years. Here again modern psychologists have done a great deal of

good by pointing out to parents and schoolmasters that wrong behaviour of young people at this time does not necessarily arise from innate "badness"—an extraordinary conception which will take many years to die out. The real explanation is that a considerable minority of human beings does not have a smooth transition from childhood to adult life. A difficult and prolonged puberty postulates the consumption of a great deal of potential energy, not only by growth, but by the process of adaptation to altered internal environmental or neuro-endocrine circumstances. There is no potential energy left over for the process, difficult at all times, of adjusting to the external environment, in particular other people, school, work, etc.

The individual health practitioner of the future should be able to say, either "leave this young person alone, allow him to vegetate on a farm," or "the natural puberty changes are taking too long, let us help them on by such and such artificial means."

During the adult or reproductive period of life the female presents far more problems than the male.

Pregnancy is a physiological process but this does not mean that the pregnant woman should not be watched with the greatest of care, especially under the unnatural conditions of modern town life.

Ante-natal care is at present confined to the very

necessary function of measuring the pelvis or the pelvic outlet in order to be sure that no unsurmountable difficulties will arise at childbirth. X-rays are also used towards the end of pregnancy, as it is then possible to arrive at a direct measurement of the relative proportions of the foetal head and the pelvis.

What is now ignored and which would be one of the most important functions of the individual health practitioner, would be to watch the behaviour of the female organism and particularly her neuro-endocrine-circulatory system, under the conditions of increased strain, represented by pregnancy.

Digestive disturbances, headaches, malaise of all kinds, mean inefficient function on the part of the liver or the kidneys, which in turn lead to a disturbance of the chemical balance of the body and neuro-endocrine-circulatory dysfunction. Apart from the more immediate advantage of ensuring well-being throughout pregnancy, proper individual health examination and care would go a long way towards preventing subsequent ills, both of the mother and of the child. I will mention only a few, such as permanent minor derangement of the glands, particularly the thyroid, obesity and lowered vitality of the mother, lowered vitality, lowered resistance and disturbance of bony development in the child.

I will refer to the more serious disturbances of function or real abnormalities of pregnancy later on.

There is still a great deal of controversy as to whether childbirth is or is not a strictly physiological process in the human female. Be this as it may, its performance is fraught with such dire consequences for the future, that it is desirable to concentrate all our scientific methods on the subject at this time. In well-equipped maternity hospitals, particularly in America, there is adequate provision for dealing with parturition as a mechanical process. In any maternity hospital attached to the I.H.I.C. a similar organisation would prevail, but would be supplemented by the senior health practitioner. He would observe and watch over the general welfare of the woman throughout labour. Under this system the obstetrician at one end and the anæsthetist at the other would be expert technicians, each for his particular localised job. The practitioner would see to it that the woman started labour after proper preparation: if her chemistry and particularly, her calcium metabolism were watched, the uterine contractions would be adequate and the labour would not be too prolonged and there would be no danger of excessive bleeding. If her circulation were watched and supported, there would be no collapse after labour and she would recover quickly. If the mechanism of her resistance against infection were watched and if necessary supported, there would be no such thing as puerperal sepsis, abscess of the breast or chronic pelvic infection.

At present, we possess quite an extraordinary

amount of exact knowledge as to the details of the reproductive cycle in the female. Endocrinologists, particularly in Germany and America, have made an intensive investigation of the physiology of the endocrine glands which regulate reproductive processes.

The highly interesting and potentially useful results of their investigations prove, if proof were necessary, that the scope of applied physiology is almost limitless. These investigators have found that all the processes involved in reproduction including menstruation, are controlled by the anterior portion of the pituitary gland in the brain. The supply of hormones secreted by the ovaries is controlled from this source. Furthermore, they have been able to isolate substances from the urine which are most efficacious in controlling many disturbances of menstruation. The urine of pregnant mares is now used for the preparation of these substances on a commercial scale and it is possible to do a great deal towards controlling abnormal flow during, abnormal periodicity of, and pain during, menstruation.

The various departments I have described in the I.H.I.C. would provide the practitioner with facilities for continuing and expanding this work.

The reproductive life of the male, though uneventful on the surface, can present many problems. Civilised life puts considerable strain even on the normal individual. If there are any neuro-endocrine-circulatory deficiencies or disturbances

the individual may suffer from a great many psychological and physical symptoms of maladjustment. Reproduction may be less important from the biological point of view to the male, but it still is very important. The less healthy or the less physiological the male, the less likely is he to be able to lead a satisfactory and well-adjusted sex life. Partly owing to misconceptions arising out of prudery and partly because scientific method has not been applied to the study of the subject, we know very little about the physiology of sex union. Nevertheless, there are very few people who do not need advice or assistance in this matter. Points of technique, variations of potency, a proper understanding of the relationship between the physical, psychological and spiritual aspects of sex, all have a very important bearing on the life of the individual.

In due course the health practitioner would be in a position to give sound and helpful advice on all these subjects.

At the menopause or change of life there is again an internal revolution. The internal environment is changed owing to the neuro-endocrine readjustment made necessary by the fact that the sex glands no longer secrete their hormones. Just as in puberty, many hitherto healthy people are unable to adjust themselves smoothly to the change. In the male as well as in the female, the process of adaptation to old age or post-reproductive life may be prolonged.

Alteration of character may be so great as to render the subject unrecognisable or may even lead to insanity. From the physical point of view, prolonged and unsuccessful attempts at readjustment impair endocrine efficiency, disturb the chemical balance and thus lead up to all the chronic infirmities which are liable to haunt the old.

The health practitioner would have the opportunity of watching the neuro-endocrine-circulatory changes and the chemical balance. He should be able to prevent crippling arthritis, the enlargement of the prostate gland, with its revolting consequences on bladder function, hardening of the arteries, with consequent hæmorrhages and paralyse, nervous diseases, kidney disease and many forms of heart disease.

In this way he should be able to ensure a physiological and perhaps later a prolonged old age, under proper circumstances. By this I mean a mellow enjoyment of the intellectual and spiritual fruits of experience amid the peace of dying physical appetites.

A word as to "rejuvenescence." A good illustration of the fevered hunt of the unbalanced modern for a "short cut" is provided by many senile plutocrats. They have allowed themselves to be grafted with the testicles of apes and subjected themselves to various operations on the genital tract. It should be obvious to any thinking person that there cannot be any simple means of rejuvenescence. Such measures can only have a

fleeting effect, the duration of which is likely to be in inverse proportion to the expense involved.

No one is in a position to say to-day whether increased longevity, in full possession of the higher faculties, is either desirable or feasible. There is only one road to knowledge: slow and patient investigation into all the factors involved. Under an individual health service it should be possible to arrive at an opinion on these questions, but only after a period of years, during which an unlimited number of exact observations would have been made and interpreted with intelligence.

Both males and females throughout the various stages of life are liable to suffer from a whole host of symptoms which are rarely properly evaluated or treated at present.

Many people are doomed nowadays to go through life with no reserve of vitality. They are usually found to have a low so-called "blood pressure" and inefficient circulation. They feel the cold excessively. They may get chilblains. They may bruise too easily, and they may have a host of similar minor symptoms. It should not be difficult for the health practitioner, with the resources at his disposal, to **increase** the functional efficiency of such people to a **very** great extent. Their symptoms are mostly **due** to inefficient circulation. In some instances **this is** due to such a **degree** of constitutional or **hereditary** neuro-endocrine deficiency that **very little** permanent good could be hoped for from **treatment**. In the

Alteration of character may be so great as to render the subject unrecognisable or may even lead to insanity. From the physical point of view, prolonged and unsuccessful attempts at readjustment impair endocrine efficiency, disturb the chemical balance and thus lead up to all the chronic infirmities which are liable to haunt the old.

The health practitioner would have the opportunity of watching the neuro-endocrine-circulatory changes and the chemical balance. He should be able to prevent crippling arthritis, the enlargement of the prostate gland, with its revolting consequences on bladder function, hardening of the arteries, with consequent hæmorrhages and paralyses, nervous diseases, kidney disease and many forms of heart disease.

In this way he should be able to ensure a physiological and perhaps later a prolonged old age, under proper circumstances. By this I mean a mellow enjoyment of the intellectual and spiritual fruits of experience amid the peace of dying physical appetites.

A word as to "rejuvenescence." A good illustration of the fevered hunt of the unbalanced modern for a "short cut" is provided by many senile plutocrats. They have allowed themselves to be grafted with the testicles of apes and subjected themselves to various operations on the genital tract. It should be obvious to any thinking person that there cannot be any simple means of rejuvenescence. Such measures can only have a

fleeting effect, the duration of which is likely to be in inverse proportion to the expense involved.

No one is in a position to say to-day whether increased longevity, in full possession of the higher faculties, is either desirable or feasible. There is only one road to knowledge: slow and patient investigation into all the factors involved. Under an individual health service it should be possible to arrive at an opinion on these questions, but only after a period of years, during which an unlimited number of exact observations would have been made and interpreted with intelligence.

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Many people are doomed nowadays to go through life with no reserve of vitality. They are usually found to have a low so-called "blood pressure" and inefficient circulation. They feel the cold excessively. They may get chilblains. They may bruise too easily, and they may have a host of similar minor symptoms. It should not be difficult for the health practitioner, with the resources at his disposal, to increase the functional efficiency of such people to a very great extent. Their symptoms are mostly due to inefficient circulation. In some instances this is due to such a degree of constitutional or hereditary neuro-endocrine deficiency that very little permanent good could be hoped for from treatment. In the

majority of instances, however, comprehensive treatment of the individual from all angles which have a bearing on the circulation, i.e. affecting the chemical and the whole neuro-endocrine-circulatory balance, should be able to increase reserves of vitality to an extent which would render the individual what we call "normal."

Innumerable individuals also suffer from indigestion. This is labelled "functional dyspepsia" if the usual medical examination has failed to reveal any organic trouble. In my description of the neuro-endocrine mechanism I gave an example of the correlated control of function by the two sections of the autonomic nervous system, using the stomach as an illustration. From this it follows that indigestion, whether it be discomfort or pain, is often not an expression of anything specifically wrong with the gastro-intestinal tract, but is an expression of neuro-endocrine dysequilibrium. It is all a question of reserve: even the healthiest man who receives the news at the dinner table that his beloved wife has run away with a Polish musician, has violent dyspepsia. This is due to the rupture of equilibrium between the sympathetic and parasympathetic portions of the autonomic nervous system. The sympathetic portion predominates, shuts his pylorus (the valve at the end of the stomach), the muscle wall of the stomach relaxes, the stomach balloons out and he gets distension and pain in the "pit of his stomach."

The same may occur in unfit persons after every

meal, without the necessity for any external emotional stimulus. The effect of food dropping into the stomach is sufficient and a train of abnormal rather than normal automatic reflexes is set up.

I have explained these points at some length, as I think it is essential for people to realise that digestive discomfort is a symptom of maladaptation to the environment as a whole. If they realise this, they will not only save money, which they would otherwise present to patent medicine manufacturers, but possibly prevent the onset of disease.

Another common malaise to which the over-stimulated civilised person is increasingly liable is headache. It is so common that the majority of people do not dream of going to a doctor about it. They swallow innumerable tablets of aspirin, phenacetin or similar drug and in due course the headache passes off. Again, it should be realised that a headache means a sudden change in the pressure of blood in the vessels of the head. Whether the pressure suddenly diminishes or increases, a headache is produced.

Ordinary headaches in young people usually mean a rupture of the normal neuro-endocrine-circulatory equilibrium—with or without secondary effects on the liver or other organs.

In some people it may mean much more serious organic disease, either abscess or tumour of the brain, kidney disease or permanent high "blood pressure"—usually as a result of the latter.

Under an individual health service, these symptoms would be investigated and treated in a properly comprehensive manner.

I have already referred to the question of diet under civilised conditions. I will do no more than repeat an expression of personal opinion. Diet should be adjusted according to the mode of life of the individual and his particular "make-up" and premature generalisations should be avoided. I merely mention the subject again as its bearing on several important practical problems cannot be overlooked. I refer to obesity and abnormal thinness, constipation and diarrhoea.

The avidity with which the fat person swallows patent medicines and unphysiological diets alike is pathetic to the observer. There can be no better illustration of the basic principles of applied physiology. The healthy person with a normal neuro-endocrine-circulatory equilibrium, leading an ordinary life can eat or drink practically anything and remains the same weight. If the equilibrium is upset in favour of the anabolic (building up) neuro-endocrine group, weight will increase, even on a semi-starvation diet. Conversely, if the equilibrium is upset in favour of the katabolic (breaking down) group, the weight will remain below normal.

Starving or stuffing are equally short-sighted attempts at symptomatic treatment of the underlying cause.

Of the two, obesity produces more suffering

than thinness. Fat people are uglier than lean people. Also the general disturbance of the neuro-endocrine-circulatory and therefore chemical balances, which is the invariable cause of the obesity, can lead to more serious after-effects.

Obesity should therefore be treated as a serious ailment. Every obese person is an individual problem and demands the most careful and comprehensive investigation. I cannot visualise such investigation being really properly carried out except with such facilities as an I.H.I.C. would dispose of.

Before leaving this subject, a word of warning against self-medication with tablets made from animal gland substances is called for. The majority of obese people are suffering from a disturbance of equilibrium involving abnormality of several endocrine glands. Only in a very small proportion of cases is there any thyroid deficiency, in fact, in a large number there is thyroid instability, with a tendency to phases of excessive secretion. Such people are highly nervous and if they swallow large quantities of thyroid, may do themselves an irreparable injury.

I will also refrain from discussing "constipation." I have already indicated the unpopular trend of my thoughts on this subject. On the infrequent occasions that I visit a chemist's shop, I am appalled at the vast number of irritating purgative preparations, attractively arrayed for popular consumption. If one must choose between two evils, I

think it would be better to choose an exclusive diet of bran bread, raw fruit, salad and raw vegetables, rather than a mixed diet and a daily purgative.

The advice of the sane health practitioner is badly called for on this most misunderstood subject.

This brings me to loose bowels or diarrhœa. I have given the example of bad news at the dinner table producing indigestion through autonomic dysequilibrium. If the individual in question had possessed a stronger stomach and a weaker bowel, he would have had diarrhœa instead of pain in the pit of the stomach. This phenomenon has led to the discomfiture of many a student waiting in terror outside an examination hall. This is not abnormal.

Many individuals do, however, have frequent attacks of loose bowels without apparent cause. This should be considered abnormal.

One of the disadvantages of purgatives is that they act by irritating the delicate mucous membrane of the lower bowel. Purgative addicts may thus produce a condition of "colitis" which is an outpouring of mucus from the outraged colonic mucous membrane, similar to the outpouring of mucus from the nose in a cold.

In other circumstances, however, the frequent occurrence of this phenomenon has a similar significance to functional dyspepsia and should lead to a thorough "overhaul" for the detection

of the causes of the neuro-endocrine-circulatory dysequilibrium.

I will now deal with recognised "medical" problems:

Even in these days of scientific medicine, bacterial infection can often neither be prevented nor adequately treated. In the opinion of many medical men this is due to the fact that attention has been focused on the seed—the search for the responsible microbes—to the exclusion of the soil, i.e., the human body and its mechanism of resistance. If this is true, it is quite understandable in view of the extraordinarily rapid progress of systematic bacteriology; but the pendulum is already swinging the other way and medical opinion is ripe for an intensive study of resistance. This will involve an investigation of the individual neuro-endocrine-circulatory system and the concomitant biochemistry of the body.

Let me take as an illustration the common cold. Bacteriologists have excluded all ordinary microbes and have established the fact that the organism is almost certainly of the nature of an ultra-microscopic virus. Nevertheless measures for preventing and treating the common cold are almost invariably unsuccessful.

It seems to me that research will have to start from an entirely different angle. Certain people have an uncommonly high resistance to colds. Victims can cough and sneeze in their faces and they do not catch a cold. Other people catch a

cold if they go to the theatre and one member of the audience, five hundred yards away, sneezes. There is every gamut of resistance in between these two extremes.

The exact mechanism of resistance in all these various classes of people should be studied and measured. Already studies of the blood have indicated certain lines of progress. The blood contains chemical substances which are important for resistance, and it also contains cells which are hurried to the nose and act as a first line of defence. There is a stage of the common cold which everybody can recognise when the fight is in the balance between the virus or microbes and the defending forces in the blood. The chemical substances are numerous and complicated, and there are also three types of cells. When all these factors are measured it is sometimes possible, even now, to take steps to remedy the defective links in the chain of resistance and prevent a cold, and even sometimes to intervene on the side of the defenders when the battle is in the balance.

The question of the body temperature is also a very important one. This is of course regulated by the neuro-endocrine-circulatory system as a whole. The old-fashioned custom of treating a cold with alcohol, a hot bath and hot blankets which rests on empirical observation is often successful, as the microbe obviously dislikes heat.

I anticipate little difficulty in solving this problem if a team of investigators were to combine, as

they could do in an I.H.I.C. They should be able to readjust the mechanism of resistance in such a way as to make everybody's resistance similar to that of an individual with a high spontaneous anti-catarrhal resistance.

Liability to catarrhal infection of a more chronic kind, either of the nose, the throat, the trachea (large breathing tube leading down from the throat to the bronchi) or the bronchi themselves, represents a similar problem. More intensive investigation of the "soil" should lead to the elaboration of more efficient methods of prevention.

Under an individual health system, as soon as it became possible to ensure continuation of the normal neuro-endocrine-circulatory equilibrium, anti-catarrhal and anti-infective resistance as a whole would be so high that these infections should not occur. During the transition period it would probably be necessary to use artificial measures to raise the individual resistance.

Preliminary studies of the blood in influenza cases seem to indicate that the problem is almost identical to that of the common cold. The same methods would, therefore, have to be used for prevention and if necessary treatment.

The treatment of pneumonia, on the other hand, is already altering. Wise physicians are returning to the older methods of pre-bacteriological days. Pneumonia is an extraordinarily virulent disease and threatens the survival of the individual. The

whole neuro-endocrine-circulatory mechanism of the organism is therefore suddenly put under a great strain. It is even more important to watch the general condition than to watch the lung.

The health practitioner, who would already be in possession of many facts about the individual's idiosyncrasies and the weak points of his mechanism of resistance, would be able to lend rapid and intelligent assistance. All too often unassisted "nature" lets the patient down. Fortunately the period during which the patient is in danger is only short. Until sufficient knowledge is available for the prevention of pneumonia, I visualise a special ward in the auxiliary medical department of the I.H.I.C. which would deal with pneumonia. Frequent measurements of heart and circulatory efficiency would have to be made, the blood would have to be taken and analysed frequently and every possible means of investigation would have to be utilised which could assist the practitioner without disturbing the patient.

Pneumonia has taken its toll of too many valuable lives for its prevention and treatment to be passed over lightly.

It is already recognised in so-called "septic" infections with pus formation, that the "soil" is more important than the seed. The inference is obvious and I will only mention common manifestations such as boils, carbuncles and acne. These ailments, because they are superficial, are too often

neglected. It should be realised that they are a manifestation of general maladaptation.

It is significant that boils and carbuncles so often occur in crops during young adult life, when individuals have been exposed to unusual strain, such as violent athletics. These skin infections should be considered as a warning signal. A proper "overhaul" should be carried out and the proper measures instituted to re-establish the balance generally. If these are insufficient, it is possible to stop the sequence of boils by injecting certain substances to raise the resisting power of the patient. It is important to do so, as the absorption of poisons from a boil or carbuncle can have a prolonged devitalising effect. In any case, these ailments should be treated seriously and of course would be under such a system as I have outlined.

Small pustules on the skin, such as acne, are still considered to be within the province of the skin specialist. It seems obvious that this cannot be so. Not everybody can be afflicted with acne which usually starts at puberty. This also should be interpreted as a danger signal, although less acute than boils. It means that the stress and strain of adjustment to puberty is not being met by the neuro-endocrine-circulatory system in the most efficient manner. Like most other physiological problems, this is basically a chemical one. The chemical balance is upset in this instance usually in the direction of increased "acidity." A diet containing more alkali-producing than acid-producing

foods may help the process of recovery. It has also been observed that certain fats, such as pig fat, seem to be particularly relished by the acne bacillus and should therefore be avoided by those who suffer from acne. It can be said with certainty, however, that the health practitioner would not be content with prescribing lotions and ointments.

Many medical diseases of later life can be lumped together, such as the various rheumatic manifestations, heart disease, and kidney disease. These are end results of maladaptation. It is possible even with the present biochemical means at our disposal to watch the insidious early stages of these diseases. Before outward and visible manifestations arise, the chemistry of the body has been disturbed for a long time, probably for years. The usual vicious circle then supervenes. The neuro-endocrine-circulatory mechanism becomes more and more out of gear—the chemical balance of the body then becomes more upset and degenerative processes in the vessels, the kidneys, the heart and the joints supervene, for which nothing can be done.

So-called “high blood pressure” could also be included in this category. In the majority of instances this is a symptom or danger signal, which must be respected. In any event, attempts to reduce the blood pressure by drugs, without knowing the real cause for the high blood pressure, are strongly to be deprecated. It would be the function of the health practitioner to explain to

his older subjects that a "high blood pressure" figure by itself is only a symptom.

It may, as I have said before, be a sign that the kidneys are badly damaged, in which case it is necessary for the pressure to rise in order to force waste products out through a scarred kidney.

It may, however, and nowadays often is the case, be merely a symptom of excessive "nervousness" or sympathetic predominance. If a doctor is rash enough to tell such a patient that he has a high blood pressure it will rise higher still. The real blood pressure could then only be ascertained by determining it during sleep.

Also, under certain circumstances of faulty hygiene, the blood pressure is high because the chemistry of the body has become grossly abnormal. In City men, who take no exercise and eat and drink too heartily, the tissues become increasingly clogged with waste products, usually acid waste products. The rise of "blood pressure" in these cases represents a compensatory attempt on the part of the body to force out the retained waste products through the kidneys. If they are carefully dieted or fasted, the pressure falls because the chemical abnormality has been righted. Variations of the same mechanism must be responsible for practically all the other medical disease that I can think of. Faulty hygiene, excessive stress or strain or disuse, upset the neuro-endocrine equilibrium and thus the chemistry of the body, in other words, the "soil," is "fouled." As to which

part or parts of the body become affected depends on hereditary factors, which predispose to a localised weakness.

The vicious circle may or may not be accentuated by infection. The term "focal sepsis" is known to everybody in America and probably to most people in England: it has been used by a certain school of medical men to explain all the ills to which man is heir. It means, of course, toxic absorption from some focus, such as tonsils, teeth, gall bladder, intestines, etc. It has been responsible for too much indiscriminate and short-sighted surgery. Under certain circumstances it is obviously wise to remove infected teeth or very badly infected tonsils. It should be realised, however, that few if any of these localised infections would arise in a properly adapted body. All that toxic absorption, from a focus of sepsis, can do is to accentuate the vicious circle and accelerate degenerative processes.

Serious and complicated disease of the endocrine glands, such as exophthalmic goitre or acromegaly, would have to be studied intensively from all aspects, in the auxiliary wards of an I.H.I.C. The former is a disease of the thyroid in which the neck swells and the eyes of the victim seem to be popping out of the head, whilst acromegaly is a disease of the pituitary, which leads to a coarsening and thickening of the hands, the bones of the face and other parts of the body.

The factors involved are so complex that it will

be extremely difficult to reconstruct the mechanism of the early onset of these diseases. They will almost certainly necessitate special facilities such as would be available under an individual health service. When these diseases have been studied and their mechanism understood, it may be possible to prevent them.

I need not say much about surgical "diseases." I have already referred to the necessity for more intensive pre- and post-operative observation and treatment.

I have also dealt with the relationship between general resistance and septic infections which account for a large number of surgical operations.

The province of the general surgeon is almost entirely limited to dealing with the result of these infections, accidents, the removal of an enlarged prostate, as well as benign or malignant tumours in other parts of the body.

This is not the place to discuss cancer. A great deal of time and money are being spent on cancer research. A great deal of valuable information has already been forth-coming. Many authorities, however, question the desirability of concentrating on animal experiments and the observation and treatment of advanced cancer in human beings. It would seem an obvious postulate that abnormal, malignant cells like cancer cells could not grow in pure "soil."

Such biochemical research as has been done on cancer subjects shows that there is a gross disturb-

ance of the normal chemistry of the body. This brings cancer into line with the medical diseases which I have been discussing.

It is also known that cancer, particularly in certain situations in the body, is liable to recur in several generations of the same family. It would seem therefore that a regional individual health service organisation would provide the ideal facilities for elucidating the mechanism of hereditary predisposition as well as the early disturbances of chemical neuro-endocrine balance in the body which must precede cancer.

I will make a rapid survey of the so-called "special departments" in order to illustrate the dangers of divorcing part of the body from the whole. This will also serve to stress the advantages which would accrue to the specialists themselves from being attached to an organisation like the I.H.I.C. which would give them facilities (a) for putting up special problems to the available research departments for solution, (b) co-operation with the individual health practitioner, who could throw light on the inter-relationship between general condition and local condition.

Gynæcology is almost entirely confined to the operative and non-operative treatment of infections or tumours of the female reproductive tract. I have already indicated the probable way in which an individual health service would deal with the prevention of these ailments.

Obstetrical complications during pregnancy when

so severe are already being tackled by biochemical or endocrinological methods. It is important that severe functional disturbances during pregnancy should be linked up with the earlier dysfunctions which I have discussed under "normal" pregnancy.

In certain women every pregnancy is rendered dangerous by the so-called "pernicious vomiting of pregnancy," although this may be only an accentuation of the usual morning sickness of the first few months.

It may become so serious as to demand therapeutic abortion. Some obstetricians and physicians still persist in thinking that this grave phenomenon can be entirely "psychological" in origin. Such work as has been done on its biochemistry proves beyond any question that this is not so. It is more probable that this condition is always due to chemical substances (called proteins) which are absorbed from the maternal placenta (a special structure attached to the wall of the uterus through which blood passes from the mother to nourish the foetus—when it is expelled at childbirth it is called the "after-birth"). Placental proteins act as foreign proteins, even although they arise from within the body, and thus act as chemical poisons. A normal woman soon evolves a mechanism for adjusting to these foreign proteins which circulate in her blood. If she does not, the degree of nausea or early morning sickness is a measure of her degree of sensitiveness to these proteins. If she is

hypersensitive, either because she is a constitutional "allergic" subject—I will explain this term later—or if the pregnancy is proving a particular strain on her and producing gross neuro-endocrine-circulatory dysequilibrium, she becomes hypersensitive and cannot deal with these poisons.

Under the conditions which would prevail in an I.H.I.C. it would be possible to evolve methods to help such victims to render their placental proteins innocuous. Such a method of treatment is called "desensitisation" in medical parlance.

Other severe disturbances of pregnancy such as eclampsia, and acute yellow atrophy of the liver, are the more severe manifestations of the slighter liver and other functional disturbances, to which many pregnant women are prone.

More careful watching would probably be successful also in preventing the too frequent occurrence of "pyelitis," which is an infection of the kidney to which pregnant women are particularly liable.

Repeated miscarriages in the majority of cases are almost certain to be due to general neuro-endocrine-circulatory causes and would be investigated and treated or rather, prevented, in the same way as many cases of sterility for which no mechanical cause can be found.

Much of the chronic catarrh to which I have referred belongs to the province of the *ear, nose and throat specialist*. It is almost certain that in future general treatment along constitutional lines

will always be instituted to reinforce the local measures of the specialist.

Deafness, which is still too common, might thus be prevented.

Middle ear infections are usually due to extension of infection from the nose and throat up into the middle ear, due to low resistance. Under circumstances of still lower resistance the infection spreads to the bone and serious mastoid operations may be necessary. These infections, together with the non-infective disease, called otosclerosis, are responsible for most deafness. There is no local treatment for otosclerosis and research work has already shown the probable disturbance of function of one set of endocrine glands, the parathyroids, in this disease. This process is analogous to cataract in the eye, in which there is also a disturbance of calcium metabolism. Hence, these conditions are end-results and the early deviations of the chemical balance in the body will have to be watched before they can be prevented.

The province of the *skin specialist* will in time almost certainly be restricted to those conditions which are due to external parasites. Most of the other conditions which he is now called upon to treat, such as acne, psoriasis and eczema, are constitutional in origin. The health practitioner with special knowledge of the anatomy and physiology of the skin, should eventually be able to solve these problems.

Most progressive *dentists* co-operate with their

patients' doctors, as there is full realisation of the bearing of the general condition on the state of the mouth. A striking example of this is the crumbling away of the teeth which may occur during pregnancy when the calcium metabolism is not carefully watched.

A great deal of highly suggestive preliminary work has already been done in the dental biochemical field. Certain evidence has been adduced that the condition of the gums called "pyorrhœa" occurs only when the reaction of the blood is deviated to the alkaline side and that caries, or the crumbling away of the enamel, only occurs when the reaction of the blood is deviated to the acid side. With more comprehensive facilities for combined research, it should be possible to link up the facts that are known at present with the underlying neuro-endocrine-circulatory disturbance.

Finally, I will discuss a subject of considerable importance to a great many people, and about which relatively little is known. It constitutes at present a sort of medical "no-man's-land."

I refer to *allergy*. This medical term is used to indicate a condition of extreme "hypersensitiveness." This means that the allergic individual has an acutely sensitive neuro-endocrine mechanism. He reacts in an excessive manner to stimuli which would have no effect on a normal person. When the term allergy was first coined it was supposed that foreign proteins were the only stimuli to

which allergic individuals responded in an excessive or abnormal manner. It was then already known that foreign proteins contained in the pollen of various grasses could cause hay-fever, and that proteins contained in the emanations from the coats of horses and cats could produce asthma. It was also known that certain foreign proteins taken by the mouth, and still more, injected hypodermically under the skin could produce these phenomena which were called allergic explosions. Since then, it has been learnt that all sorts of chemical substances which are not proteins could produce allergic manifestations. Later it also became realised that less concrete stimuli which were not chemical had the same effect: climatic changes, psychological disturbances, particularly emotional, and a host of other agents or influences could bring about the same result. This led to the logical inference that the basic cause of allergy was a condition of neuro-endocrine instability so great as to render the subject generally hypersensitive. It seemed that such subjects had a nervous system which was not normally insulated.

A further fact about allergy or allergic subjects was soon established. Allergic subjects seem to be grouped in families. Careful questioning usually elicited a history of some known explosive manifestation of hypersensitiveness in some other member of the family. Thus the factor of heredity is of great importance.

Known explosive manifestations of allergy are

the following: migraine, in the head, hay-fever, paroxysmal sneezing and asthma in the respiratory tract, colitis and diabetes mellitus in the abdomen, eczema and urticaria or nettlerash on the skin, gout in the joints.

Those doctors who have taken a particular interest in this subject have also observed that subjects suffering from these explosive manifestations are not necessarily and in fact are usually not quite normal in between their attacks. They have also observed that other members of allergic families who never suffer from allergic explosions, often show similar general stigmata. These are usually in the nature of temperamental instability and hypersensitiveness. These people suffer from far more violent and frequent fluctuations in well-being than the average non-allergic person. The extreme depression or lack of wellbeing which occurs periodically in these subjects is so severe as to warrant the term "latent generalised allergy." This condition may be far more distressing to the subject than the known explosive manifestations.

This might very well be analogous to the increased severity of general symptoms in children suffering from measles who have little or no rash. Conversely the more spectacular the rash, the less ill the child. I labour this point because there is some evidence that latent "allergy" is becoming far more frequent. Everyone knows for instance, that the old-fashioned florid type of gout is less frequent. In fact, so infrequent that many of the

younger doctors have never seen a classical case of gout with an acutely swollen big toe.

If allergy is a condition of neuro-endocrine-circulatory instability, it is not surprising that it is on the increase. The overstimulation of the nervous system which arises from the hectic conditions of modern life naturally tends to produce or accentuate instability, as I have already explained.

The prevalence of allergy has led to innumerable attempts to find a successful method of treatment. The respiratory manifestations of allergy such as asthma and hay-fever have been treated mainly by measures of so-called "specific desensitisation." This method of treatment involves making elaborate tests with extracts from grasses and many other protein-containing substances to see which of the proteins produce a reaction of redness around some of the substance which was injected into the skin. A very weak dilution of the offending protein was then used for a course of hypodermic treatment. In some instances such treatment has been successful, in many, however, the effect was only temporary. It would seem that severe "allergics," at any rate, are so hypersensitive that even if they are "desensitised" against some proteins which are particularly injurious to them, they are still hypersensitive to others. Also they still react to a host of stimuli, physical, climatic and emotional, which have nothing to do with protein. Unfortunately for the exponents of this method of treatment, it

is not possible to make a weak extract of rage or love.

Specific protein desensitisation therefore has not proved a real success.

The probable explanation lies in the fact that this form of treatment does not grapple with the underlying cause.

Preliminary biochemical and endocrinological studies point the way to the probable solution of these important disturbances of function.

It would seem that allergics have a very peculiar and special deviation of the chemical balance of the body—hence the neuro-endocrine-circulatory instability and hypersensitiveness.

In all other medical conditions which we have discussed the disturbance of the chemical balance has followed a disturbance of the neuro-endocrine-circulatory equilibrium. All the facts known about allergy which are summarised above would point to the fact that the chemical disturbance in allergics is primary or hereditary. Although the exact mechanism is not yet known, it is reasonable to put forward an hypothesis which would provide a logical and synthetic explanation of the known phenomena on the basis of those facts which are already known.

Readers will remember that I explained the probable mechanism of autonomic imbalance or neuro-endocrine instability under condition of a deviated chemical balance. I explained that a deviation of the acid-base equilibrium of the body

to the acid side, for instance, probably produces an increased nervous excitability.

It would seem that the basic underlying cause of allergy is an hereditary metabolic idiosyncrasy. This chemical idiosyncrasy may well be an incapacity of the body to rid itself of acid by-products of metabolism—metabolism of course means the chemical exchanges in the body. The retention of acid waste products is not likely to be due to any abnormality on the part of the excretory function of the kidneys.

The fault probably lies in the cells or the protoplasm of the cells, which seem to hold back acid instead of allowing it to be washed away by the tissue fluids and the blood, thence to be excreted by the kidneys.

In respect of their behaviour to acid and alkali—which neutralises acid—the normal tissues behave like a sponge: which allows of free percolation of both acid and alkali. It must be remembered that acid is continually being fed to the tissues from two sources. Acid is being introduced from outside in the shape of protein food, particularly animal food. This is burnt down in the body to an acid "ash." Also during the process of wear and tear in the body, acid products are continually being formed which also find their way into the body fluids. The second form of acid is called endogenous acid. The rate at which endogenous acid is formed is largely controlled by the rate of thyroid secretion. This one illustration will help to

link up the emotions with the intimate mechanism of allergy seeing that the thyroid gland is particularly responsive to emotional stimuli.

If the theory of "acid retention" is eventually proved, it would seem that the allergic subject's tissues act like a reservoir full of sand instead of a sponge. This sand holds back the acid, but does not hold back the alkali which is lost through the kidney or through the bowel.

The tissues of the allergic therefore tend to be "clogged" with acid. If the level of retained acid in the "reservoir" does not exceed a certain minimum there are no manifestations of either latent or explosive allergy.

If the level of retained acid exceeds a certain maximum overflow point, which would vary from individual to individual, there is an allergic explosion. The symptoms are referred to that particular organ or system of organs which constitute the individual's weak point. Hence, one gets migraine—perhaps because the brain has been used too much. Another gets asthma—perhaps because the bronchi have been sensitised by frequent catarrhal infections—and so on.

If the level of retained acid keeps continuously at an intermediate level, these conditions might lead to latent allergy.

I have deliberately chosen allergy as a closing example. Even if the theory which I have outlined above be found wrong in detail, there would seem to be no doubt that the under-

lying cause of allergy must be a biochemical one.

The whole basis of my plea for the eventual establishment of an individual health service rests on the assumption that all the problems of disease as well as those of health demand a different and more comprehensive mode of attack.

I am fully conscious of the fact that the plan I have put forward is Utopian in nature. If, however, the reasons for the establishment of this Utopia are sound, and if we all agree that this Utopia is desirable, we can combine to take the first steps in the direction of Utopia.

I do not believe that the establishment of a small experimental institute to work along these lines would be difficult even now. It could be fitted into the framework of the present medical system. If such an experimental institute were started it would soon be possible to find out whether a comprehensive health service would present too many practical difficulties for expansion along the lines that I have foreshadowed. In that case experience would teach us a simpler and more gradual way of reorganising present medical services—but some form of reorganisation is imperative.

“Je vous abandonne à votre mauvaise constitution, à l’intempérie de vos organes, à la corruption de votre sang, à l’âcreté de votre bile, et à la féculence de vos humeurs.”

Molière, *Le Malade Imaginaire*.

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