diarrhoea and vomiting and two healthy. The significance of these related strains of *Bact. coli* cannot as yet be assessed, but further work may bring an answer to this problem.

Another and more important problem is the possible status of *Bact. coli* D 433, when confirmed by biochemical and serological test, as a causative agent of infective diarrhoea and vomiting. Its close association with clinical cases in certain outbreaks of diarrhoea and vomiting and its absence from control groups of babies suggest that it may play some part in the genesis of the disease, but further work is necessary before any definite conclusion can be reached. Possible lines of research are animal transmission experiments, pathogenicity and toxicity tests, laboratory investigation of the strain for further distinguishing characteristics, closer correlation between the clinical findings and the detection of the strain, and studies of possible dual virus and *Bact. coli* causation.

Summary

A clinical and bacteriological investigation of infantile diarrhoea and vomiting was carried out. The clinical material was drawn from one outbreak of epidemic diarrhoea of the newborn (Group A), two outbreaks of diarrhoea and vomiting in a mothers and babies' hostel (Groups B and C), one outbreak in a residential nursery (Group D), intercurrent cases among sick babies in hospital (Group E), two series of admissions to gastro-enteritis units (Groups F and G), and endemic diarrhoea and vomiting in a residential nursery (Group H).

No recognized intestinal pathogen was isolated, and virus investigation of fatal cases yielded negative results.

Bact. coli sera, prepared from strains isolated from cases of Group A, led to the identification of a particular serological type, referred to as *Bact. coli* D 433. It was isolated from all nine cases examined during life in this outbreak.

The same sera were subsequently used for the identification of *Bact. coli* D 433 among the other groups of babies studied. It was isolated from all 22 cases (100%) of Groups B, C, and D, from 21 (91%) of the 23 cases in Group E, from 6 (43%) of the 14 cases in Group F, from only 5 (21%) of the 24 cases in Group G, and from none of the 14 cases in Group H.

Bact. coli D 433 was not isolated from any of the 208 babies of the control groups.

Five babies with mild or moderate diarrhoea and vomiting has severe relapses while in gastro-enteritis units. *Bact. coli* D 433 was not isolated from them during the initial attacks, but was present during the relapses.

Bact. coli D 433 was isolated from cases in seven counties and during all seasons of the year. The youngest baby in whom it was found was aged 10 days and the oldest 11 months.

Bact. coli D 433 was isolated from four of 84 adult contacts and from nine of 34 baby contacts examined in connexion with Groups A-E.

Bact. coli D 433 was not isolated from rectal swabs taken three to six months later from 82 infant occupants of nurseries and wards in which cases of diarrhoea and vomiting (Groups A-E) had been investigated. Fifty-one newborn babies, occupying the maternity nurseries in which epidemic diarrhoea of the newborn (Group A) had occurred, were swabbed more than a year after the outbreak. From 21 of them an anaerogenic motile *Bact. coli* strain was isolated which was closely related antigenically to *Bact. coli* D 433. Ten of these babies suffered from a mild diarrhoea the significance of which is at present undetermined.

Whether, the serological type of *Bact. coli* has any aetiological significance in diarrhoea and vomiting is undecided. Lines for further research on this matter are indicated in the discussion.

We wish to acknowledge our thanks and indebtedness to the following: Dr. R. Cruickshank and Professor A. A. Moncrieff for their encouragement and advice; the Medical Committee of the Hospital

for Sick Children, Great Ormond Street, London, for facilities for research in the wards and laboratories, and Dr. B. E. Schlesinger for his interest in the work; Dr. R. G. Cooke for facilities to make investigations in the Derby City Hospital; Dr. S. Dundon and Dr. R. E. Glennie for voluntary and invaluable service in the gastro-enteritis unit for neonatal diarrhoea; Mrs. W. S. Willett (working for the Public Health Laboratory Service) for the preparation of the *Bact. coli* sera and for much other bacteriological work during the early stages of the investigation; Dr. G. R. Osborn and Dr. M. Lécuyer for permission to include their post-mortem findings; the medical officers of health of the areas in which investigations were made; the medical superintendents, medical officers, matrons, sisters, and nurses of the hospitals, nurseries, and welfare clinics concerned.

REFERENCES

- Allison, V. D. (1949). *Proc. R. Soc. Med.*, **42**, 216.
 Bray, J. (1945). *J. Path. Bact.*, **57**, 239.
 Buddingh, G. J., and Dodd, K. (1944). *J. Pediat.*, **25**, 105.
 Chapman, G. H. (1945). *Amer. J. digest. Dis.*, **12**, 399.
 Costello, J. P., and Lind, H. E. (1939). *Sth. med. J.*, **32**, 620.
 Crowley, N., Downie, A. W., Fulton, F., and Wilson, G. S. (1941). *Lancet*, **2**, 590.
 Gale, E. F. (1944). *British Medical Journal*, **1**, 631.
 Giles, C., and Sangster, G. (1948). *J. Hyg., Camb.*, **46**, 1.
 Gillespie, E. H. (1948). *J. clin. Path.*, **1**, 99.
 Hynes, M. (1942). *J. Path. Bact.*, **54**, 193.
 Kauffmann, F. (1947). *J. Immunol.*, **57**, 71.
 Knipschildt, H. E. (1945). *Undersogelser over Coligrupperens Serologi med saerligt Henblik paa Kapselformerne*. Nyt Nordisk Forlag, Arnold Busck, Copenhagen. (English summary.)
 Light, J. S., and Hodes, H. L. (1943). *Amer. J. publ. Hlth*, **33**, 1451.
 Lovell, R. (1937). *J. Path. Bact.*, **44**, 125.
 Sakula, J. (1943). *Lancet*, **2**, 758.
 Seviatt, S. (1945). *J. Hyg., Camb.*, **44**, 37.
 Vahlne, G. (1945). *Serological Typing of the Colon Bacteria*. Gleerupska Univ.-Bokhandeln, Lund.

WHAT IS SOCIAL MEDICINE?*

BY

W. HOBSON, M.D., B.Sc., D.P.H.

Professor of Social and Industrial Medicine, Sheffield University

It is usually assumed that the expression "social medicine" is of relatively recent origin. Dr. René Sand (1948) has shown, however, that it was used exactly 100 years ago by Dr. Jules Guérin, writing in the *Gazette Médicale de Paris*. The idea of social medicine therefore is certainly not new. The only new thing about it is the reawakening of thought which realizes that here is something of fundamental importance that has been forgotten in certain circles.

If, in the past, clinicians have forgotten the importance of the environment in determining disease, hygienists have perhaps been too limited in their outlook and interpretation. Social medicine attempts to link together clinical medicine and preventive medicine in the hope of benefit to both. It is my purpose to try to illustrate the existence of a common ground between the two.

If we are to understand fully the meaning of and need for social medicine it is necessary to trace briefly the history of medicine as a whole and its relation to other branches of human activity.

To the Greeks medicine meant the art of healing; it achieved importance because of the necessity for curing a sick person of disease. The emphasis was therefore on the treatment of disease, and little or nothing was known of aetiology. Preventive medicine was certainly studied by Hippocrates, and his writings are full of sound reasoning concerning the spread of epidemics. Preventive medicine, however, could make no real advance until the basic sciences of physiology and bacteriology had been developed. Throughout the Middle Ages no advancement was made in

*A paper read to the West of England Branch of the Society of Medical Officers of Health at Bristol on Nov. 20, 1948.

our knowledge of aetiology, and treatment was largely empirical and often associated with magical and ritualistic rites. The Greeks also developed the idea of health not merely as absence of disease but as something to be cultivated.

The word hygiene, meaning "wholeness of body," is still in use to-day, and is associated with the idea of the production of a greater functional reserve against the encroachment of adverse influences by a discipline of clean and vigorous living. This theme of positive health is well illustrated by the words of William Morris: "First of all I claim good health ; to feel mere life is a pleasure ; to enjoy the moving of one's limbs and exercising one's bodily powers ; to play as it were with sun and wind and rain ; to rejoice in satisfying the due bodily appetites of the human animal without fear of degradation or sense of wrong-doing: yes, the wherewithal to be well formed, straight limbed, straightly knit, and expressive of countenance."

England was the first country in the world to control epidemic disease by the sanitary idea. Advancement in this idea did not of necessity depend upon the knowledge of causation of disease ; indeed, the decreases in epidemic disease began before the germ theory of disease was established as a scientific doctrine.

Public Health

The Magna Charta of Public Health was passed in 1875, but for many years after that Sir James Creighton was disputing the germ theory of disease, and yet William Budd, working in this City of Bristol, had already shown the practical way in which excremental diseases were spread. Sanitary science is now a well-established technique, and as such it has its obvious social uses. It should not be taken for granted that it is any less necessary or less important than it was a century ago. It was perhaps unfortunate that the practice of public health was largely divorced from the practice of clinical medicine ; indeed, it has been the fashion for the consulting physician to regard his brethren in the field of public health as belonging rather to another and inferior world.

The general practitioner, too, has tended to adopt a critically hostile attitude to the medical officer of health, and he has often resented an intrusion into the field of curative medicine. Certainly there has not always in the past been that happy liaison between the two which is to the best interests of the community. The public health services were saddled with the heavy responsibility of administering the municipal hospitals—a responsibility which was thrust upon them because the public health service was the only administrative machine in existence capable of dealing with it. It never was the function of a medical officer of health to enter this realm of curative medicine, and the recent steps taken to put these services under a separate authority are logical and necessary.

Side by side with the study of the environmental factors which affect health there was simultaneously a concentration of study on the disease processes in the sick individual. Diagnosis, which had formerly relied entirely upon the skill and experience of the physician at the bedside, became more and more dependent upon the intricacies of biochemical investigation, radiographic analysis, and the like, and the pathology of internal disease developed *pari passu* with the use of the microscope and the advancement in histological techniques. The era of internal medicine had arrived. Almost the whole of the resources of clinical medicine as practised in hospital were centred upon

diagnosis and the removal of the disease process in the individual, and little attention was paid to the study of man in his environment.

This is the point of view which has permeated the teaching of medicine in many of our universities and medical schools. When he first qualified the medical student had received little or no training in the conduct of general practice. He soon learnt by bitter experience that to attach precise labels to disease was often difficult and impossible with his limited facilities. He discovered also that man is a social animal, and many of the disease processes he was called upon to control had roots in social sources, in particular that of poverty and all that is associated with it—bad housing, overcrowding, unemployment, and inadequate food.

Adverse Social Factors

To-day we realize that disease processes can be initiated not only by adverse factors in the purely physical environment but also by adverse factors in the social environment. With the growth of civilization and urbanization the technicalities of life have become more and more complicated and increasingly difficult to understand. The factors which make for a healthy social environment are becoming more difficult to obtain. A happy family circle, a full and adjusted community life at work and at play, a sense of purpose and responsibility in the world—these are of vital importance to social well-being. In the troubled times in which we live it is small wonder that the psychosomatic diseases such as duodenal ulcer and angina pectoris have increased in prevalence ; and there are other pointers to psychosomatic imbalance, such as the increased urge for tobacco and the rise in juvenile delinquency.

It is also important to realize that diseases conditioned by an adverse environment have often inevitable social implications and repercussions in themselves. Tuberculosis, venereal disease, and many mental ills are typical and outstanding examples of those conditions in which the individual has in turn a responsibility to the community.

The family physician has always been aware of these various factors in the physical and social environment which affect the health of his patients, and he is equally aware that these factors are of profound importance in determining health or disease. Unfortunately, as an individual he is not always in a position to correct them, as the causes are often dependent upon the social framework and way of life of the community. There are, nevertheless, many factors in the environment which it is in our power to control, particularly by communal action. They come into the realm not only of preventive medicine but also that of curative medicine.

When we consider the effect of environmental factors upon health we find there is no hard-and-fast line between prevention and cure. The use of the term "preventive medicine" in this sense is therefore limited in its scope ; the term "corrective" is perhaps more suitable. In America, according to Smillie, the term "preventive medicine" has an even more limited application. It is used to describe those activities in the prevention of disease which are the direct responsibility of the individual, and "public health" serves to denote those factors which are a responsibility of the community. However we define these terms it is clear that the physician in practice has an obligation to his patient and to the community to prevent illness and to promote family and communal health, and for that reason full diagnosis and adequate treatment are impossible without a knowledge of the social and economic factors which influence the life of the patient.

"Internal" and "External" Medicine

One thing is clear: the term "medicine" as used in its widest sense to-day is no longer limited to the art of healing. It includes the prevention and treatment of disease, and takes within its compass the study of the basic sciences of anatomy, physiology, and pathology as well as the healing arts of clinical medicine and surgery. It also includes within its scope the factors which promote health. There is no sharp dividing-line between health and disease—the one merges imperceptibly into the other; and I must stress the point that there can never be watertight compartments in medicine. There is a need for stressing the importance of environment in medicine, because in the teaching schools and in hospital practice this has often been forgotten. We can call this "external medicine."

In what way does "internal medicine" differ from external medicine? Internal medicine has for its background the study of the internal anatomy and physiology of the individual and the elucidation of the changes which take place in disease and their internal causes. It is concerned with the diagnosis of the disease condition and with the treatment of disease by the correction of the deranged mechanisms of the body, whenever possible. External medicine, on the other hand, has for its background the study of social structure and social pathology; it is concerned with the ultimate aetiology of disease and with those factors which promote health. It aims at the control of these factors both by individual and by communal action.

So far as research and investigation are concerned we can see two lines of development. The high-power research of the laboratory has centred largely upon internal medicine, mainly because the immediate results have been of practical value to the patient. But original research and investigation in external medicine, apart from epidemiology, have been haphazard and have lacked organization and co-ordination. With a few exceptions, what has been done has usually been carried out by individuals working alone in the course of busy routine work. But research in external medicine more than in any other branch requires teamwork, organization, the use of statistical method, and survey technique. In the past undoubtedly valuable contributions have been made by medical officers of health; but as their time became more and more absorbed with routine work so their opportunities became less.

The result is that our knowledge of disease processes in the body and our advances in diagnostic technique have outgrown our knowledge of aetiology.

The practitioner of medicine must be a complete doctor; he must study and consider all factors affecting health, internal and external. Sir William Osler, one of our greatest clinicians and a prolific writer on internal medicine, was also a great exponent of the value of external medicine.

Definition of Social Medicine

With these ideas in our minds we are now in a position to give a definition of social medicine and to demonstrate its activities.

Social medicine is the study of those environmental factors which affect health, and the application of that study to the benefit of man. It has two main applications: (1) The use of this knowledge for the benefit of the individual both in health and in disease: this is a responsibility not only of the physician and surgeon but of each individual. (2) The use of this knowledge on a community basis: this is a responsibility of the community and has been known in the past as "public health" or "State medicine."

The term "environment" is used here in its very widest sense, to include not only the physical and social environment but also the study of heredity and genetics in their effect upon human health; and by the term "health" is implied "optimum health," and not just the absence of disease. Clearly we cannot be limited in our conception of the communal aspects of this branch of medicine.

From what has been said it is not possible to separate preventive from curative and individual from communal medicine. It may be asked why it has been necessary to reintroduce the term "social medicine" at all. I think the answer lies in the fact that the older terms "public health" and "preventive medicine" are too limited in their scope to define adequately the branch of medicine which I have described and which has definite claims to be regarded as a distinct branch. It also indicates the importance of the social environment as distinct from the purely physical environment. Unless we take into account all factors affecting health, our efforts to improve social evils may cause more harm than good. Thus Dr. Mannheim (1948) has shown that in Cambridge there is a much higher rate of juvenile delinquency on the new housing estates, just as Dr. McGonigle at Stockton-on-Tees found a higher death rate in a population which had been moved from a slum area to a new housing estate. Rehousing in itself is no cure for social evils.

Clearly there are many factors not mentioned in the Public Health Acts which affect health, and it is difficult to envisage any field of human activity or endeavour that does not have its repercussions upon the health of the individual—agriculture, the Road Traffic Acts, the employment of labour, town planning, crime, finance, sport, and even politics. It is this common interest which brings social medicine in relation to so many phases of human activity.

Mortality Statistics

One of the basic sciences of social medicine is that of social pathology, just as the basic science of clinical medicine is human pathology. Its function is to study the disorders and ills dependent upon a communal life. The idea, however, is certainly not new. One of the greatest accounts of social pathology was that written by Edwin Chadwick (1842). This was, however, largely concerned with the physical environment. Much of the information on the adverse effects of environment can be ascertained from the study of mortality statistics, first instituted by John Graunt and later developed by William Farr. Our information on communal mortality is contained in the Registrar-General's Reports. Perhaps the most important of all these is the Decennial Supplement on Occupational Mortality for 1931. Although this document was not published until 1938 it constitutes the most complete account in any country of mortality analysed by occupation and social class. The technique of the analysis of mortality statistics has been described by John Ryle (1948) as the "social post-mortem."

It is easy to arrive at erroneous conclusions from a study of mortality statistics. The Registrar-General has made every endeavour to eliminate these from the purely statistical point of view. He is able, for example, to measure the effect of an ageing population and to counteract this effect by the use of special devices: this is particularly important in such diseases as cancer and heart disease. He is not, however, able to measure changes in the fashions and trends of diagnosis. We know that there have been considerable changes and inaccuracies in diagnosis in recording the cause of deaths. This may make considerable differences in such diseases as bronchogenic carcinoma and

the leukaemias. An interesting example is seen in the changing trend of diagnosis between nephritis and essential hypertension, which has recently been analysed in cotton-workers by Platt.

The value of mortality statistics lies not so much in their relative accuracy as in the fact that they are pointers to lines of more detailed study and research, lines of study which should give vitally important information on the causation of disease. It is clear that for their correct interpretation one must have some knowledge of disease processes in the body. There is no doubt that here is common ground for social pathology and internal pathology, and the one can make good the deficiencies of the other.

The morbid anatomist is too often apt to regard his material as characteristic of the population as a whole. Usually, however, his material is highly selective and is based on a very small sample of the population. On the other hand, the information which is gleaned by the social pathologist very often includes the whole population. The wise pathologist will not limit his activities to the field of morbid anatomy. He will combine the studies of experimental and social pathology and endeavour to correlate the findings of these techniques. But the use of such methods is still in its infancy; that is why I look to the future to see the increasing use of morbidity and mortality statistics as research tools of the social pathologist.

Infant Mortality

If we attempt to analyse mortality we find that it is greatest at the extremes of life. In infancy and old age the individual is less adapted to withstand adverse environmental factors. The infant mortality rate has often been used as an index of the healthiness of a community, and there is a considerable differential class mortality, the mortality rate being considerably higher in the lower social groups. This information has been analysed in detail by Titmuss, who has shown that this differential class mortality, contrary to what is usually assumed, is, if anything, becoming more pronounced. I would draw attention to the fact, however, that mortality in the second year of life is probably a more sensitive index of environmental factors. Thus the mortality rate from measles during the second year of life is 19 times greater in the lowest social class than in the highest.

I would here like to draw attention to an interesting feature of infant mortality in relation to the occupation of the father. When we consider those occupations which are connected with the highest infant mortality, are we right in assuming that the social way of life entailed by those particular occupations is responsible for the high loss of infant life, or are there genetic influences at work? Also, are there sufficient numbers from which to draw any significant conclusion?

As one would expect, there is a very high mortality amongst the infants of labourers, costermongers, and similar groups. Three occupations, however, show a high infant mortality where one would not expect it to occur. These occupations are sugar-confectionery makers, retailers of sugar confectionery, and salesmen of sugar confectionery. I shall leave you to decide whether there is any real significance in the association of a high infant mortality with employment in the sugar confectionery trade.

There are, of course, not only diseases of poverty; there are also diseases of affluence. Thus gout, diabetes, and particularly cirrhosis of the liver show a greater mortality in the higher social classes, and in publicans in particular. It is interesting to note that a considerable fall in mortality

in these diseases occurred during the war, a fall which was not shared by our neighbours in America. And what of the diseases of worry, the so-called psychosomatic affections, of which duodenal ulcer and angina are important examples? Surely there is some significance in the observation that the mortality has increased during the last few years and that it is greatest in the higher social classes?

I shall not attempt to discuss all the possibilities envisaged by these observations, but hope that they will stimulate others to search this fascinating publication, the Decennial Supplement on Occupational Mortality, for further information, and perhaps even to pursue their own inquiries into the aetiological relationships suggested by this technique of the "social post-mortem." Personally, whenever I pick up some occupational mortality supplement I never fail to find something new and exciting.

Duties of Medical Officer of Health

In 1925 the Ministry of Health issued a memorandum on the duties of the medical officer of health, and in it appears this sentence: "He should endeavour to acquire an accurate knowledge of the influences, social, environmental, and industrial, which may operate prejudicially to health in the area."

So far as the study of the occupational influence is concerned it remains virtually an unexplored field to the medical officer of health. He has therefore a great part to play in the development of this idea, and a fresh sphere of opportunity awaits him. The loss of the millstone of hospital administration can only be to his ultimate advantage, for in that way he is left free to investigate the environmental factors which affect health. The opportunities will present themselves, but to make full use of them he must go to the homes of the people and become more closely associated with the activities of clinical medicine. The formation of practitioner health centres should provide a great opportunity for him in this respect. The only way to obtain the final answer on the aetiology of many disease conditions is to study man in his environment. This is no new idea; it was expressed by Ramazzini in 1705 in words which might be applicable to-day: "For my own share I have done what I was able to do and thought it no indecency to step sometimes into the meaner sort of houses, especially now that almost all physic is reduced to mechanism and the schools sound of nothing so much as an automaton or machine of the body, the shops and houses of tradesmen are the only schools in which we can find any satisfactory knowledge of these matters."

Two important and stimulating addresses on the importance of this idea have recently been given—the first by Professor Parry (1948) in his Presidential Address to the Society of Medical Officers of Health, and the second in a broadcast in the Third Programme by Dr. Cohen (1948); perhaps Professor Parry will forgive me if I make a comparison between the two. Professor Parry has indicated how important it is that the medical officer of health of the future should become more clinically minded and have opportunities for visiting the homes of the people. Dr. Cohen, on the other hand, has shown how meagre is our information on the social sciences, how little we really know of the way people live, and the need for a science of society. There is a woeful lack of data on which to base a scientific approach to the planning of health services and an absence of any kind of research organization in public health departments.

One would have thought that such organizations were essential before we could even begin to find the answers

to some of our practical problems. I hope that in the future the Minister of Health will make some constructive proposals enabling public health departments to set up machinery for sociological investigation, for this is urgently needed to answer some of our immediate practical problems, quite apart from the more fundamental research into aetiology, which must be carried on by university departments of social medicine. Nor must we be cheese-paring in our demands: this type of research requires teams whose sole function is research and whose time is not burdened with routine duties.

Statistical Method

It is clear that false conclusions and deductions can arise from the observations of one man alone, and it was not until the statistical method was applied to the measurements of morbidity and mortality that any real advance was made. Unfortunately, similar mistakes are perpetrated to-day, and medical men in particular are very prone to generalize from results of their own often limited experience. That is why I regard the use of the statistical method of the utmost importance in the study of social medicine.

In the words of Greenwood: "The knowledge which a great physician has of the body and of the mind is neither meagre nor unsatisfactory, but physicians great or small cannot assess group experience without resort to a calculus of groups which must be statistical." One has only to glance through the sections on aetiology in some of the earlier textbooks of medicine to realize the importance of this statement. There are mistakes the origin of which can be traced back to the limited observations of one man. Such mistakes are copied from textbook to textbook, and once they have appeared in print they are more than difficult to eradicate, and even to-day some are still retained. The recorded observations on normal ranges of physiological variations in groups of human beings are also in a very chaotic state, and, apart from Price-Jones's research into the size of the red cell, there has been very little real work done on a statistical conception of normality. The Grant study at Harvard is an attempt to remedy this. When we look for an organized science of aetiological relationships we can see that it is heavy with hypothesis and dismal with uncorrelated observations. Practical success in the prevention of disease depends upon advances in our understanding of causation. As Seiglitz has pointed out, there are predisposing, provoking, and perpetuating factors in disease, all of which come under the heading pathogenesis, and there is rarely one single aetiological factor. I am certain that it is fundamentally wrong to think of a single cause in aetiology. Tuberculosis provides a very good case in point. It may be caused by the tubercle bacillus, but, in terms of practical politics, genetic, nutritional, and environmental factors are of considerable importance in determining the onset of disease. How else can we explain the fact that some individuals can remain perfectly healthy despite heavy and repeated exposure to the tubercle bacillus and yet others require only a minimal exposure to produce a widespread and extensive disease process? Very often the predisposing and perpetuating factors are of greater importance than the provoking factors.

Of all diseases which require detailed investigation none is more important than tuberculosis. Here is a disease of which we know the predisposing, provoking, and perpetuating factors in its causation, and yet it remains the most important cause of death in young people. In females in this country aged 15-20 it still accounts for 40% of deaths. There can be no more important study than the social medicine of tuberculosis.

So far I have confined myself to a study of mortality; that does not mean that the causes of ill-health are not important. In the words of Dickens: "It concerns a man more to know the risk of the fifty illnesses that may throw him on his back than the possible date of the one death that must come." It is over fifty years since Sir John Simon recognized the importance of information on morbidity statistics and advocated their use. We still have no organized means of obtaining such information.

Important Aspects

This conception of social medicine would not be complete if it did not indicate in some degree the emphasis to be placed on its various aspects. There are those who would place this emphasis on its application to the benefit of the patient in hospital, others on health and its communal aspects. John Ryle, himself a clinician of considerable experience and the first professor of social medicine in this country, has elaborated the importance of social medicine in its clinical application. He has nevertheless indicated that the aspects associated with the community and its relation to health are possibly of even greater importance. It is clear that our conception of social medicine must include within its scope the realm of preventive medicine, public health, occupational medicine, and the application of those humanitarian principles so long practised by the good family physician.

There is no doubt that the occupational environment is of supreme importance, but it seems to me that the relative importance of industrial toxicology in the causation of ill-health and death has been grossly exaggerated. It is fascinating and exciting to read about beryllium lung and manganese pneumonitis, but disease arising from such specific poisons is extremely rare compared with the common diseases from which men suffer and die. Many occupations show a high mortality rate because of the social way of life necessitated by those occupations. This is proved by the fact that in a great many occupations the high mortality rate of the men is shared by the wives who are subject to the hazards of the same social environment but do not share the specific occupational hazards. There are of course occupations which have high mortality because they attract men of poor physique—for example, tailoring, printing, and the boot and shoe industry.

Conclusion

In a free society our aims must be to provide a healthy environment and to ensure that all possible measures are taken to secure freedom from disease. Each individual must be left free to develop according to his own needs and requirements. The idea that there should be any dragooning into health savours to me of the Nazi doctrine: hard physical exercise is not the only way to achieve optimum health. That is why I am always a little suspicious of those individuals who talk about positive health.

I regard social medicine as a philosophy which should permeate all branches of medicine, for its implications cannot be divorced from any branch of medical learning. It is a branch of medicine also which provides a connecting-link with the wider humanities. In the teaching of medicine the accumulation of facts has been pursued, to the neglect of the study of man in his environment. The liberal and intellectual structure of medicine and the humanism of medicine are often lost in a welter of technical detail. It is well to remember that the great pioneers of social medicine were men of liberal education and wide outside interests. They were interested in men as part of humanity.

If I were asked to define social medicine concisely I should answer: "The study of man within his environment, to give him life and to give it more abundantly."

REFERENCES

- Chadwick, E. (1842). *Report on an Enquiry into the Sanitary Condition of the Labouring Population of Great Britain*. London.
Cohen, J. (1948). *Listener*, 40, 485.
Mannheim, H. (1948). *Juvenile Delinquency in an English Middle-town*. London.
Parry, R. H. (1948). *Pub. Hlth.*, 62, 27.
Ramazzini, B. (1705). *A Treatise on the Diseases of Tradesmen* (translated from the Latin). Bell, London.
Ryle, J. A. (1948). *Changing Disciplines*. London.
Sand, R. (1948). *Vers la Médecine Sociale*. Desoer, Liège.
Simon, J. (1890). *English Sanitary Institutions*. London.

THE AGE OF THE MENARCHE

BY

DAGMAR C. WILSON, M.D., M.R.C.P., F.R.C.O.G.
D.P.H.

AND

IAN SUTHERLAND, M.A., D.Phil.

(From the Institute of Social Medicine, Oxford)

During the past century there has been a general tendency for European children and adolescents to grow with increasing rapidity, so that at a given age they are now taller and heavier than children of 50 years ago. This effect is also found in the more privileged classes compared with the less privileged, and has been ascribed to better nutrition (Morant, 1939). Studies of London school-children reflect a similar secular change in growth (Daley, 1948). The possibility that earlier sexual maturity may be associated with this accelerated growth in stature and weight is a matter of some social importance and has led to the present inquiry.

It is generally accepted that the development of sexual maturity is influenced both by heredity and environment and, more directly, by the action of pituitary hormones on the thyroid gland and gonads. H. Hogben, J. A. H. Waterhouse, and L. Hogben (1948), in a noteworthy contribution to the study of puberty, have discussed the salient features concerned in the process of full development. Ellis (1948) has shown that when comparing growth and nutrition in groups of boys and girls the stage of sexual maturity of the individuals concerned is almost as important as their chronological age; he has suggested a simple clinical grading for the use of school medical officers.

The onset of menstruation, now usually referred to as the menarche, represents to the individual girl a very definite point in time, which can be accurately determined retrospectively within a few years of its occurrence. No other aspect of sexual maturation, whether in girls or in boys, is so striking. Thus, although the onset of menstrual periods is only one aspect of a complex developmental process, information regarding it can be obtained quickly and reliably. For these reasons the present study is confined to sexual maturation as exemplified by the age of the menarche.

Observations in many different countries show that groups differ in the average age of the menarche. A number of associations between the age of onset of menstruation and environmental influences have been stressed by several investigators. (1) It has been stated that town girls on an average menstruate earlier than country girls. (2) Associations with height and weight have been demonstrated. (3) It

has been asserted that girls nowadays are menstruating on an average at an earlier age than did their mothers (Kennedy, 1933; Pryor, 1936; Michelson, 1944). The present investigation was planned to consider afresh these three suggestions.

Data

Data were collected from nine secondary girls' schools, of which three are in Oxford City and the other six in Oxfordshire. The schools draw children from a variety of social and economic environments. The information included the present ages, heights, and weights of the children, together with a record of whether their menstrual periods had started, and, if so, of their age at the time of onset. In order to be sure that the samples were representative of the geographical areas served by the schools, children were included only if they had been resident in the area for at least three years preceding the menarche or the date of the inquiry, whichever occurred earlier. At one city school the information was available only for those whose periods had already started. In all, records were analysed for 1,338 girls between the ages of 10 and 19—572 were from city schools and 766 from country schools. Of the total, 604 had not started menstruating when the inquiry was made.

City and Country Schools

The age of onset of menstruation ranged in individual girls from 9 to 18 years. The average age of the menarche among the children who had attained it was 13.23 years. In the three city schools the figure was 13.4 years and in the six country schools 13.09 years. However, in each school a substantial proportion of the girls had not started menstruating, and this fact makes the average ages quoted above dependent upon the age distribution of the children in the various schools. Schools with a higher proportion of older girls will naturally return a higher mean age at the menarche among those whose periods have started. This effect is shown in Table I.

TABLE I.—Age of the Menarche in City and Country Schools

	Average Age of Menarche	Average Age of All Children
City schools	13.40 years	14.03* years
Country schools	13.09 ..	13.70 ..
All schools	13.23 ..	13.83 ..

* Two schools only.

It is evident that the apparently lower age of the menarche in country schools may express no more than the younger average age of the children at those schools. The point was tested explicitly in the following manner. It is possible from the data to calculate for each birth anniversary the percentage of girls who have started menstruating by that age. The information for every girl who has passed the particular birth anniversary, whatever her present age, may be used to contribute to the calculation of this percentage. Table II shows

TABLE II.—Percentages of Children who have Attained the Menarche by Various Ages in City and Country Schools

Age	2 City Schools	6 Country Schools
9	0.0	0.0
10	0.2	0.0
11	0.6	1.0
12	5.6	7.5
13	24.8	29.6
14	64.6	63.3
15	90.8	89.4
16	95.5	95.4
17	100.0	98.2
18	100.0	100.0

such percentages for city and country children. The "median" age of the menarche—that age at which half the girls have started their periods—when estimated graphically is almost identical at about 13.6 years in the two groups. Nor is there