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THE BRIDGEHEADS OF CHILD HEALTH IN THE FIVE AGES OF CHILDHOOD*

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At the present time there is much talk, and some planning, on the subject of child health. In a recent debate in the House of Lords on the Beveridge report Lord Dawson (1943) said: "The care of child health should take precedence over almost everything else at the present moment"; and Sir William Beveridge (1942) in his report has declared that "the small families of to-day make it necessary that every living child should receive the best care that can be given to it. The foundations of healthy life must be laid in childhood."

These general statements imply that child health is not only important in itself but affects the health of the population at all ages. Some years ago a statistical study by Kermack, McKendrick, and McKinlay (1934) found a correspondence between the falling infant and general death rates in Britain and Sweden, and showed that a regular maintained improvement in child health (measured by the infant death rate) was followed later in the same population by a corresponding improvement in the general death rate. The same biological law can be seen in operation in a country like Holland. In 1938 the infant death rate in Holland was the lowest in the world; in the same year in that country the other main categories of vital statistics—maternal deaths, stillbirths, and general deaths—also stood at record low levels. Thus the science of vital statistics confirms the common sense and experience of wise men, doctors, and laymen.

The same truth has been uttered by the poets, ancient and modern. Wordsworth, as one of the moderns, has sung, "The child is father of the man"; while Juvenal has a long priority over Beveridge—"Maxima debetur puero reverentia." All this testimony can be summed up by saying that child health is the main bridgehead of national health.

The Five Ages of Childhood

The period of childhood stretches from birth (and includes it) to puberty. This span of life must be divided into smaller periods or "ages" if we are to bring under medical management the whole term of child life; for these subdivisions of child life differ greatly in their character and therefore in the medical problems they present. Shakespeare in his seven ages of man has allotted two to childhood: "the infant mewling and puking in the nurse's arms," and "the schoolboy, with . . . shining morning face, creeping like snail unwillingly to school." If we are to apply the principles of child health to the period of child life we must give to it, not two, but five ages. Each has its pattern of healthy structure and function, and each its special dangers and disasters; to each belongs a differing set of clinical problems, physiological and pathological, and mental.

The First Age

This is the first month, or neonatal period, and it includes birth. It is short; but it is crowded with dramatic events and is dangerous and deadly, and the measure of our control of it is the stillbirth and neonatal death rates. The total loss of infant life in the first age (stillbirths plus neonatal deaths) greatly exceeds that in the remainder of the first year. In Scotland, since the registration of stillbirths in 1939, the stillbirths and neonatal deaths have been more than twice the deaths in the remainder of the first year; and in England, with lower stillbirths and infant death rates, about the same relation exists. Without detailing the many and interlocked pathological conditions that cause this great mass of infant deaths in the first age, it is enough at this stage to divide them into two groups—those that belong to the obstetrician and that depend upon the care and health of the mother during pregnancy and labour; and those that belong to the paediatrician and that depend upon the care of the baby after birth. Certainly the first age is the most dangerous and difficult bridgehead of child health, and the one which medical practice has had least success in occupying and fortifying. The paediatric problems of the first age are mainly dietetics and protection against infection; and their successful management demands on the part of nurses and doctors detailed knowledge of the new and intricate processes of feeding and digestion, and of a strict technique against infection.

The Second Age

The second age extends from 1 to 6 months; and if the baby enters it with feeding and digestion well established, and under good hygienic management, it is likely to pass through it with little further trouble. It is the age of milk diet; and if that milk is human and taken from the breast of the mother the baby enjoys the double security of an ideal food and of protection from alimentary infection. Rapid physical growth occurs, and the first steps in mental progress are taken—simple muscular control of the body, the use of the eyes, and some awareness of itself and others (I and Thou).

The Third Age

The next age might be called the age of teeth and transition. It extends from about 6 months to beyond 2 years, beginning with the first teeth and ending with the appearance of the last molars. But it includes other important changes which make this period of child life critical and dangerous. The eruption of teeth is accompanied by additions to the simple uniform milk diet, with the possibility of digestive and nutritional disturbance. The great feat of standing and walking is achieved; this means weight-bearing by the bony skeleton, and requires a proper calcification of the bones. It is also the age of the major fatal infections of childhood—gastro-enteritis, pneumonia, tuberculosis, meningitis, and poliomyelitis; of measles, whooping-cough, and diphtheria; while the nutritional disorders, rickets and scurvy, are almost

* The substance of an address to the Perth Branch of the British Medical Association.

confined to it. Apart from special immunization procedures, protection against these formidable hosts of infection depends mainly upon proper diet and upon a complete system of hygiene in the city, in the street, and in the home; but with powerful aid from sunshine and air.

The third age brings a quickening and a great advance in the intellectual and spiritual life. By means of speech and walking the intellectual horizon is extended. Speech is the sound-register of thought, and is the most powerful instrument for the formation and the exchange of ideas; it is indispensable for the child's understanding of its own self and for its adjustment to other personalities. By walking, the perceiving and registering mind is brought into contact with the wider range of objects beyond the nursery; and whether these be ugly or beautiful, monotonous or varied, the mind seizes them eagerly, enjoys and stores them.

The third age is the passage from infancy to childhood; it is the age of transition. It is a time fraught with physical danger and mental opportunity. In it the two main bridgeheads of child health are still dietetics and infection; and they are weakly held by preventive medicine.

The Fourth Age

The fourth age extends from 2 to 5 years. It is the age of freedom and of play; and this freedom covers the whole life, physical and mental. This freedom is not absolute; but it is much greater in the mental, and especially the imaginative, life of the child than in the physical life. The spontaneous activity of the imagination is now very great, and outruns control by the weak intellectual and critical faculties. It is a time of dreams, "fantasy," and fairy stories; and one which may give a permanent tone and colour to the child's attitude to life and in which the main patterns of conduct and behaviour may be laid down. The imagination is fed and nourished by everything he sees or hears; and his teachers are not only his parents and other official instructors and guardians, but no less his companions and playmates, and the whole world of objects that comes within his ken. He will get a sense either of security or of fear that may remain with him throughout life. Here Wordsworth's great saying is especially true of the mental life—"The child is father of the man"—and the problem of the nervous child and the solitary child begins in a wrong mental environment in the fourth age. The protection of the mental life at this age depends upon similar factors of mental health as in physical life in the first three ages—the *mental food* that is given, and the guards against *mental infection* that are set up. These three years of child life are years of destiny. Although they are the years of freedom and of play, the play is a rehearsal of the battle of life; and the kind of mental armour, weak or strong, that is forged at this time may determine the issue of the real struggle that lies ahead at school and in adolescence.

The physical life of childhood in the fourth age is relatively free of trouble, unless from chronic ailments of respiration and digestion carried over from an earlier age.

The main bridgehead in this age is mental health. The mind in its effort for health has to get control of the body and so acquire decent and comely habits of body. It has also the greater task of getting control of itself, and enters on the long struggle of self-adjustment and of adjustment to others; and this first essay in the discovery of self may determine the final place of the personality in the realm of ideas and in the world of social contacts.

The Fifth Age

This is the age of school: "shades of the prison-house begin to close upon the growing boy." The child is now put under training both of mind and of body: and it may be a rough and sudden change from the age of freedom and play. If the intellectual, the moral, and the physical discipline are harsh and uncongenial the child has always a way of escape, safe or dangerous, into the inner citadel of personality.

On the physical side, the second dentition adds a physical stress to the new mental tensions that have been created. Infection continues to operate, and rheumatic infection is a new danger; while tuberculous infection of the lungs may now reveal itself for the first time, and the banal infections of the upper respiratory tract transmitted from an earlier age may

give much trouble. But on the whole the age of school is comparatively free from serious physical disease, with the one important exception of rheumatic heart disease.

In this age of school the training of the intellect has received quite properly the first place in the national system of education; but it is widely recognized that the training of the body in dexterity and posture, and the training in morals and character, deserve a larger place in the educational system than they have had up till now.

In the fifth age the bridgehead of health is education. A complete system of life training must cover all sides of child life—intellectual, moral, and physical—and brings all these parts under a wise and proportioned discipline. This discipline must be strict and thorough, and yet not offend the inner freedom and sanctity of the child's personality.

This is a rapid and sketchy outline of the periods of child life; but these divisions are essential if we are to understand the problem of child health and bring it under better control. This sketch of the five ages of childhood shows the range, complexity, and importance of child health. If Lord Dawson's pronouncement that "the care of child health should take precedence over almost everything else at the present moment" is right, it follows that child health should receive a first priority in the comprehensive medical service now being planned.

Our present standards of child health, measured by our national infant death rates, are unsatisfactory. If we set the infant death rates of our greatest towns in England and Scotland against those of the U.S.A., Australia, and Holland our figures show a still greater disparity (see Chart). In the planning of a

Chart showing infant death rates in 1938 in great towns at home and abroad. The black lines represent death rates for the first month; the black-and-white lines those for the remainder of the first year.

better child health service the immediate urgent problem is infant mortality; and the great safeguards against infant death are management of prematurity, infant feeding, and protection against infection. These three clinical problems are included in the term "infant hygiene"; and infant hygiene must obtain a better place in our medical schools if we are to make a more effective attack on the strongholds of infant mortality.

Child Health in the Medical Schools and in Practice

If the standard of child health is to be raised in practice, the training of medical students and nurses must be improved. The range of child health is very wide; in the meantime let us restrict the examination to infant health and infant mortality, and examine the position as regards both education and practice.

Education

In 1932 the General Medical Council strongly condemned the inadequate teaching of "infant hygiene" in medical schools, and recommended "that in the Final Examination there should be a test of the candidate's knowledge of infant hygiene and of disease in children." That recommendation, made 10 years ago, has been more honoured in the breach than in the observance. Among the Scottish universities, Glasgow alone has given the subject a separate place in the Final Examination; and there are signs that some of the English universities will do likewise in the near future. But the fault goes deeper than an inadequate examination test. Very few medical schools are provided with the clinical material of healthy infants and children necessary for the study and teaching of the subject. This clinical

material is abundantly available in the child welfare clinics of the local authorities, and especially those attached to teaching maternity hospitals. What is needed is that all paediatric departments in medical schools should include infant and child welfare clinics as a part of their work in treatment, teaching, and study; that separate courses of instruction in child health should be given both to medical students and to pupil health visitors and midwives; and that this instruction should in the first place be mainly directed to the problems of infant health and should include the critical period of the first month.

In the U.S.A. paediatrics has long enjoyed the status of a major subject in the medical curricula. There has been a great fall in infant mortality in the leading American cities in the last 20 years, and it is reasonable to claim that this fall has been influenced by the high standard of paediatric teaching in the American medical schools. In most British medical schools paediatrics is still ranked as a "special" or minor subject. Until this great subject is given its right place in British medical education we cannot expect much improvement in its practice.

Practice

The general practitioner, the hospital practitioner or paediatrician, and the medical officers of the infant welfare and school medical services are at the disposal of mothers for the care and well-being of infants and children. The family doctor handles the problem at its centre, in the home, where the issue of health or disease is decided. He is well placed to make the greatest contribution to infant health, but complains that he is being ousted from it. The paediatrician is fully engaged in the problems of disease in children's hospitals—although a few paediatricians, attached to the welfare clinics of maternity hospitals, are beginning to take part in the health side of the problem. The medical officers of the child welfare clinics are busily engaged there, but form a semi-detached service. They see too little of the health problem in the home and are debarred from the intensive clinical study of the child in hospital. These three services have but slight contact with each other; their liaison is weak, and there is a good deal of recrimination between them. Indeed, each of them is open to attack: for the child welfare doctors and the family doctors have not received a proper training in child health; and the hospital doctors, expert in the problems of disease, have little experience either of home conditions or of the work of child welfare clinics.

It is agreed that this is a most unsatisfactory position; and a good deal of purposeful discussion is going on at the present time to improve it. In the draft interim report of the Medical Planning Commission (1942) plans are outlined to give general practitioners an increasing share in the work of welfare clinics. The British Paediatric Association has also recently brought together in conference paediatricians, general practitioners, child welfare medical officers, and medical officers of health to exchange views and to plan a co-ordinated health service for children. There are great difficulties to be overcome; and before a reorganized child health service can be brought into being there must be full and free discussion of its structure and conditions between all those who will operate it. What is needed is a service in which there will be two kinds of medical personnel—the family doctors carrying out the routine work in the home and the clinic, and the hospital physician advising and directing; while the health visitors will be at the disposal and under the supervision of both. This service cannot work without control; it must have administrative machinery, and must be "under authority." The general solution of this difficult problem of the controlling authority may be found in some local experiment of a co-ordinated child health service—some happy area where there are already friendly relations between the child welfare service, the family doctors, the children's hospitals, and the medical school.

The Fundamental Postulates of Child Health

The medical and nursing services are not the only elements in the complete plan necessary for child health. There are other fundamental postulates which must be provided: general sanitation on a high standard, achieving cleanness and counter-infection in the city, the street, and the air overhead; houses with liberal accommodation and suitable equipment for parents and children; an income-level sufficient to provide food and

the other necessities of life. The central postulate of all is the mother herself; in the last resort the health of the child depends upon the mother's health, her knowledge of her craft, and her devotion. The nurse and the doctor may give her health and knowledge; but the ultimate responsibility for the care of the child rests with the mother, and the centre of the child's life is the home. Day nurseries and nursery-schools cannot take the place of good homes. Minders, be they ever so mindful, cannot take the place of mothers. The family is a human society—the oldest, the smallest yet the greatest, of all human societies. If the family is to be secure and stable it must have all these things that have been mentioned; and it must also be governed by moral and religious laws as well as by the laws of economics, medicine, and hygiene.

Sir William Beveridge has given us his design and plan for national security and health, and has said that "the foundations of healthy life must be laid in childhood." Not unlike his plan, but with a theocratic as well as a democratic foundation, is the Psalmist's dream of a happy and secure society:

That our sons may grow up as the young plants:

That our daughters may be as the polished corners of the temple.

That our garners may be full and plenteous with all manner of store: . . .

That there may be no decay: no leading into captivity, and no complaining in our streets.

Happy are the people that are in such a case:

Yea, blessed are the people that have the Lord for their God.

Psalm 144.

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SOME ASPECTS OF THE CHEMOTHERAPY OF PNEUMONIA

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That the value of chemotherapy in pneumonia has, in a general way, been proved is a reasonable assumption. The present analysis is put forward in the belief that certain aspects of the results obtained with sulphonamides are not sufficiently or generally appreciated.

The Value of Aetiological Diagnosis

It is well known that in a large proportion of pneumonias the causal organism is a pneumococcus, and that among pneumococcus pneumonias there is considerable variation in the severity of the illness caused by different serological types. It is not so well known that there are differences in the fatality rates when cases receive sulphonamides. In Glasgow, where over a long period of time the commonest type of pneumococcus has been Type II, carrying a high fatality rate, the results of chemotherapy have been less impressive than in the South of England, where the more benign Type I infection is prevalent. My own figures in two relatively large series of cases (Table I) may be cited. The material comprises all

TABLE I

Type	Pre-sulphonamide		Sulphonamide	
	Cases	Deaths	Cases	Deaths
I	172	13 (8%)	64	2 (3%)
II	198	58 (29%)	160	20 (12%)
III	27	4 (15%)	48	15 (31%)
V	—	—	8	1 (12%)
VII	—	—	26	4 (15%)

cases admitted in which the notified diagnosis of "acute primary pneumonia" was confirmed. The great majority conformed to the lobar type of consolidation. Sulphapyridine was given by mouth; after a preliminary dose of 2 g., treatment was continued with 1 g. four-hourly until the temperature had been normal for a period of two to three days. I have included the results obtained with chemotherapy in