A STUDY OF THE POSSIBLE EFFECTS OF INFECTIOUS AND CONTAGIOUS DISEASES ON THE ACHIEVEMENTS OF SCHOOL CHILDREN

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TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

Introductory Statements. Former generations charged the annoying behavior of a child quite simply to "badness" or nervousness. They asked, will he not or can he not "behave" himself? Never did they ask, Why does he act as he does? Today the question is asked whether there are not physical and mental causes underlying all behavior, both good and bad. Medical authorities believe that the state of nutrition, environmental background, and past illnesses play a much greater role than is usually credited.

> Today we consider that the physical and mental health of childhood should be the active concern and intelligent interest of parents, teacher, doctor, psychologist, psychiatrist, public health nurse, social worker, and every other constructive force of our social organization that has responsibility for the welfare of childhood.[1]

Nutrition, acuity of the special senses, muscular coordination, elimination, locomotion, circulation, all play a part as well as the effects of bac-

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[1] Richards, Esther L., Behavior Aspects of Child Conduct (New York: The MacMillan Co., 1933). Introduction by Adolph Meyer, p. xi.

terial invasion and biochemical disharmonies, in determining the intellectual capacities of children.

> Economically, children are more valuable than ever before. Because of the steady decline in the birth rate, we have an ageing population which, if present and past trends continue, will become static within three or four decades. Inevitably our gross death rate will increase. This is to be expected and it is not so much a cause of concern as the continued and unnecessarily high death rates in early life and from preventable causes.[2]

When we as teachers become impatient and berate a child for being stupid or lazy, we would do well to pause and look carefully into the background and illness history of that child. There are children who seem to bend and break beneath the strain of environmental situations which have apparently had little effect upon their brothers and sisters and playmates. Such children may lapse into states of profound fatigue, or become prey to depressive moods, and they drift more or less deliberately into daydreaming as an escape from the realities and responsibilities of a world too exacting for them to face.

The necessity exists at such times for the

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[2] Parran, Thomas, "Relationship of Maternal and Child Health to the General Health Program," American Journal of Public Health, 28:256, March, 1938.

teacher to scrutinize the physical condition of these children. A child may be recovering from an illness; he may be suffering from the after-effects of a childhood disease which attacked him a number of years ago; his heart may be damaged; or his nutrition may be inadequate.

Our special interest is centered in the fact that we believe too little study has been given to the after-effects of infectious and contagious diseases upon the learning abilities of children. In dealing with the child who is recovering from a diseased condition, we must consider not only his nutrition and the status of his development, but also form an estimate as to the degree of retardation in his entire growth, physiological, psychical, and emotional that has been brought about by the disease, is the opinion of Dr. Dashiell.[3]

The Problem. This study is concerned with the characteristics of infectious and contagious childhood diseases, and with the sequels of these diseases, and with the effects of these sequelae on

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[3] Dashiell, A. M., "The Appraisal of the Child in his Environment," Institute on Maternal and Child Health, (Texas State Department of Health, Austin, Texas), August, 1941, p. 28.

the learning of children. The following questions seem to be pertinent to the study:

(1) What are the common infectious and contagious diseases from which children suffer? What are the possible sequels of these diseases?

(2) What are the less common infectious and contagious diseases of children? What are the possible sequels of these diseases?

(3) What are the psychological effects of frequent illness on the child?

(4) Is the learning ability of the child impaired by the infectious and contagious diseases incident to childhood?

(5) What is the school's responsibility in reducing its demands on children who have been ill, so that long-continued and serious complications will not follow?

(6) How are teachers to recognize the importance of sequels of infectious and contagious diseases?

(7) Are teachers qualified to cope with these problems?

Methods and Materials. The research necessary

in the investigation of the effects of childhood diseases was mainly one of library research. A survey of the medical literature on the subject was made from medical books, medical journals, and periodicals found in public and private libraries and in the library of the local health unit and in the private libraries of physicians. Reading on the subject was followed by personal interviews with physicians who specialize in childhood diseases, pediatricians of wide experience, whose advice was invaluable. There have been conferences with persons engaged in physical training and with school nurses and private nurses and with a psychiatric social worker who made available to me certain sources of information and who allowed me to profit by her long experience in working with maladjusted children. A comprehensive letter from Leo Kanner, M. D., of the School of Psychiatry of the Johns Hopkins Hospital provided me with information concerning the previous studies which have been made on the subject. The consensus organized, condensed, and simplified makes up the report which follows.

Organization of the Study. The study has been organized in six chapters. Those following this introduction consist of: Chapter Two - definition of the terms used, the characteristics and predisposing causes of childhood disease, the prevalence of these diseases, the incidence and mortality figures of such diseases in the United States Registration Area, the State of Texas, and the City of El Paso. The limitations of previous studies in the field are discussed. Chapter Three - a list of the common infectious and contagious diseases of children and a discussion of each disease. The history of the disease is given in some cases when it was thought to be of particular interest; the etiology, the prognosis, the symptoms, the diagnosis, the complications and treatment are discussed. Chapter Four - a list of the less common infectious and contagious diseases of children. These diseases are discussed in the same manner as the common diseases. Chapter Five - a survey of the sequels of these diseases. They are studied from the medical standpoint; the effect on vision, hearing and the heart. Conva-

lescence is discussed, stressing the need for conservation of energy, the effect of disease on growth and development, nutrition, fatigue and the need for rest. The psychological aspects of childhood diseases are studied. Chapter Six - a summary, followed by certain conclusions concerning the sequelae of childhood illness. Recommendations are made as to the attention children should receive who return to school in a weakened, retarded, discouraged, and generally debilitated condition.

CHAPTER II

RELATED INFORMATION IN THE FIELD

In attempting to discuss the nature of infection and disease, it is first necessary to have an understanding of certain terms used by medical authorities. In the following pages these definitions are given; the characteristics and predisposing causes of disease follow; the prevalence of infectious and contagious diseases of children and the mortality and incidence rates are studied; limitations of previous studies are investigated.

Definitions. Contagious diseases are those which are spread by contact with other individuals who either carry the specific organisms in their person or else actually are suffering from the disease.

Infectious diseases are not transmitted by ordinary contact, but require a direct inoculation through a break in the previously intact skin or mucous membrane. Examples of such diseases are malaria, yellow fever, and tetanus.

Communicable diseases are caused by micro-organisms or filtrable viruses that are transmitted from one to another by actual contact, and with notable exceptions

rarely are air-borne. The contact may be direct or indirect, but there is always a contact. Most communicable diseases are human-borne. Some few are transmitted from animal to man; but here, too, always by contact.[1]

Immunity is defined by certain authorities as non-susceptibility to a given disease or to a given organism or toxin. It seems likely that there is no state of "absolute" immunity. Immunity may be natural or it may be acquired, either (1) by surviving an attack of the disease or (2) by means of artificial inoculation or (3) by inoculation or infection with a closer related disease.[2]

The agents which cause infectious and communicable diseases in man may be classified into four groups: (1) plant-like organisms, (2) organisms of animal origin, (3) probably living bodies called Rickettsiae, and (4) invisible agents called viruses, which may or may not be living.

Physicians believe that the symptoms of a bacterial infection are not the direct result of the action of the bacteria as is often supposed, but rather they are a

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[1] Bower, Albert G. and Pilant, Edith B., Communicable Diseases for Nurses (Philadelphia: W. B. Saunders Co., 1941), p. 21.

[2] Garrod, et al., Diseases of Children (New York: William Wood & Co., 1929), p. 17.

function of the body responding to invasion by these parasites. Since infection is the response of the body to invasion it is then the resultant of two forces; it is the product of the virulence of the germ and the susceptibility of the host. It may be expressed as follows: Virulence multiplied by susceptibility equals infection.[3]

Here we have the two major factors to be considered in studying the probable outcome and after-effects of any infectious or contagious disease. These are: (1) the virulence of the infecting organism. There are various degrees of virulence of the organism, for instance, of the diphtheriae variety, against which ordinary inoculation of toxoid does not protect; fortunately, these are very uncommon; (2) the resistance of the host. The resistance depends on many factors: (a) Nutrition, the most important, including caloric intake, vitamins, and minerals. (b) Previous functional disorder, organic disease or infection.

Characteristics of Disease in Childhood. The diseases of children vary very decidedly from those occurring in later life. Not only are the causes very different in many cases, but the reaction of the growing tissues in early years is not the same as in adult life. Anatomic

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[3] Rice, Thurman B., The Conquest of Disease (New York: The MacMillan Co., 1927), p. 39.

and physiologic distinctions also exist. There is consequently seen a tendency to the development of certain diseases in infancy and childhood, and an immunity toward others. The susceptibility of the incompletely developed nervous system is very great, often masking the real nature of the disorder. Trifling factors thus produce general symptoms which are, or appear to be, severe out of all proportion to their causes, similar agencies acting in adults giving rise to no symptoms of moment. The initial effect of deleterious influences is often unusually marked in early life, and the development of symptoms very rapid and apparently severe; while on the other hand, the recuperative power is great, and the convalescence speedy. Various causes render the examination of a sick child much more difficult than in the case of an adult. There are also marked peculiarities at this period in the reaction of the system to certain drugs, some being well-tolerated, and others not at all.[4]

The characteristic qualities of a particular human being may be regarded as derived from two sources - those with which the child starts life endowed and those that he acquired during the course of his existence. Obviously,

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[4] Griffith, J. P. Crozer and Mitchell, A. Graeme, The Diseases of Infants and Children (Philadelphia: W. B. Saunders Co., 1935), p. 139.

the latter are to a large extent dependent on the former. The diseases that anyone suffers from are mainly due to his exposure to the causes of those diseases, but also depend on his inherent power to resist the operation of those causes. Our equipment at the start of life depends on who our parents were, and thus the study of heredity is as important for the study of infection and disease as the child's mode of life and his environment.

It is possible for parents directly to pass on a disease to their offspring. On the other hand, the condition of the blood which renders the mother immune to certain infections may be conveyed to the unborn child. For example, the immunity after an attack of measles lasts a long time, and a mother may present to her unborn child some of the immunity she acquired from an attack in childhood. It is interesting to note that this is a possible explanation of the comparative mildness of measles in European countries, where nearly everyone has the disease in childhood, compared to the severity of the outbreak among a community where the complaint has been previously unknown, several writers believe.[5]

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[5] Garrod, et al., Diseases of Children, p. 1.

No more dangerous notion in regard to child life exists than in the wide-spread idea that the child should have all the "catching" diseases as soon as possible, to "get them over with". The infant is born into the world with temporary immunity against many infections. Nature seems to say to the newcomer, "I want to give you a fair chance to get started." For six months diphtheria, scarlet fever, infantile paralysis, and measles are not likely to bother the child, but after that, the mother must be on her guard. This immunity is a gift from the mother to her child.[6]

It seems that the baby has no special natural protection against smallpox and whooping cough. He has some months of grace for a few infections, but before the end of the first year he is susceptible to almost all of them. The longer he can keep from catching these infectious diseases, the more likely he is to recover.

Predisposing Causes of Disease. Among causes predisposing to the development of certain disorders in children direct or indirect, inheritance plays an important role. Syphilis is congenitally transmitted,

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[6] Bundesen, Herman B., "Catching Diseases," Ladies Home Journal, 59:142, May, 1942.

as are occasionally such of the acute infectious diseases as typhoid fever, scarlatina, and some others. Tuberculosis existing in the parents certainly predisposes to its development in the offspring, but the disease itself is rarely transmitted, and many cases of apparently hereditary predisposition are in reality instances of exposure, physicians tell us. Rheumatism and gout exert a similar predisposing influence as do nervous disorders, such as epilepsy, insanity, and some of the muscular dystrophies and disease of the spinal cord. Some of these maladies may not actually show themselves until childhood is past, although the seeds of them are present in the system.

Sex influences the occurrence of certain diseases also. Certain physicians say in this connection:

> Of importance, too, is the existence of various diatheses, i.e., a constitutional tendency to the development of certain sorts of diseases varying with the individual; a tendency which makes the same acting cause vary in the character of the symptoms produced, manifesting themselves at birth or later, to which occurrence of certain symptoms seen

in early life is to be attributed.[7]

Among the most active causes of disease in infancy and childhood are imperfect feeding and hygiene. As a result many forms of disturbed digestion and consequences arise; such constitutional conditions as rickets and scurvy, the disordered states of the respiratory apparatus so common in children and the diseases which depend on lack of proper care of the nervous system. The influence of school-life is responsible for many nervous ailments, affections of the eyes, deformity of the spine, disturbance of the general health, and acute respiratory disorders developing from exposure and infection. Certain writers tell us that infection has unusual etiologic power in children, since the great majority of cases of acute infectious diseases are witnessed at this period.[8] This is partly due to a greater degree of susceptibility; partly to a much greater

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[7] Griffith and Mitchell, The Diseases of Infants and Children, p. 140.

[8] Ibid., p. 140.

opportunity of exposure; and partly to the fact that most adults have already become immune through earlier occurrence of the affedtions.

Prevalence of Infectious and Contagious Diseases. During early childhood, i.e., from the age of two to that of six years, certain forms of digestive disturbances are common. More or less malnutrition is of great frequency. The occurrence of tonsillitis and pharyngitis and various forms of stomatitis increases. Respiratory affections are very common. Rheumatism and acquired affections of the heart are occasionally observed. The tendency to the acute infectious diseases appears to be approaching its height. Appendicitis begins to be observed.

"In general, illness has been found to be more prevalent among children under five years of age than in any other age group."[9]

The next group, from five to fourteen years, represents a relatively healthy period. While growth is proceeding with a maximum of serenity and not too rapidly, children are able to consolidate the earlier gains in growth. The majority of nine-year-

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[9] Strang, Ruth, "Health Education," Encyclopedia of Educational Research, Walter S. Monroe, editor, (New York: The MacMillan Co., 1941), p. 561.

olds have already been exposed to prevalent communicable disease and have gained immunity through having had the disease or through having successfully combated slight exposure or through inoculation.[10]

In this age group chorea, rheumatism, and disorders of the heart and diseased condition of the tonsillar tissue are common. The infectious diseases continue extremely frequent. Meningitis is of common occurrence, and various psychoses appear as puberty is approached. Acute nephritis, which is inflammation of the kidney, may readily attend the infectious diseases. Diseases of the bones and joints, generally tuberculous, are frequent in all periods of life. Diseases of the brain substance are rare except when secondary to meningeal disturbance, and that of the spinal cord, nerves and muscles likewise; the exceptions being infantile paralysis, which is common in infancy and early childhood; the neuritis following diphtheria; and the muscular dystrophies and certain systemic nervous affections which are characteristic of childhood, some physicians believe.[11]

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[10] Ibid., p. 562.

[11] Griffith and Mitchell, The Diseases of Infants and Children, p. 171.

Race is a factor in some conditions. It is very interesting to learn that sickle-cell anemia is a disease that is confined to the negro race. The birth-order, or place in the family, seems to be a predisposing factor at times; the first-born being apparently more subject to developmental anomalies, including congenital heart disease, than the children born later in the family.

Although the mortality and morbidity statistics compare favorably in the age group of five to fourteen years with other age groups, children of these ages are not free from serious health problems. Malnutrition and fatigue, and defects of bones and teeth, vision, hearing, nose and throats, prevalent among smaller children persist in the primary and intermediate grades. The exact extent and severity of malnutrition and fatigue are difficult to judge because of lack of standardization in diagnosis, but both are very prevalent, it is believed. In this connection one educator writes:

> Visual defects increase as the child progresses through school until by the time of college entrance less than one-half of the children tested are reported to