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NUTRITION AND GROWTH IN CHILDREN

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A FULL FACE DOES NOT ALWAYS INDICATE A WELL NOURISHED BODY

Herbert, aged six and one-half years, is more than two years retarded in growth. His round shoulders, protruding shoulder blades, prominent abdomen, flabby muscles, and fatigue posture are all signs of malnutrition, but his round face and regular features make him look well nourished when dressed. Defects: underweight 16 per cent (8 lb.); naso-pharyngeal obstruction; carious teeth (two); spinal curvature; otitis media; fatigue posture.

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NUTRITION AND GROWTH IN CHILDREN

BY

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ILLUSTRATED

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TO

MY MOTHER

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PREFACE

In 1908, while in charge of the Children's Out-Patient Clinic in the Boston Dispensary, I became interested in a number of undernourished children who kept coming to the dispensary week after week and month after month, passing from one department to another without receiving help. Their records showed long histories and repeated examinations, yet the most frequent diagnoses were "Debility" or "No disease." From the medical standpoint there was nothing the matter with them, but from the point of view of physical fitness there was everything the matter with them.

I formed a group or class of 12 of these children, and had them report once a week with the idea of studying them for the whole 24-hour period to discover if possible the real cause of their poor physical condition. In order to visualize their progress, as well as to arouse interest, I made charts showing the actual weight of the children from week to week, with a comparative line representing what their weight should be. The mothers were invited to attend the class and consulted as to the possible cause of failure to gain. Advice was then given on any point that seemed to promise better results.

Although the majority of the group showed some signs of improvement, and an occasional child would gain sufficiently to come up to the average standard,

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many of the children made little or no progress, and after months of effort their charts showed lower relative weights than at the start.

So far as I know, this was the first nutrition class ever organized.

The net results of this experiment were the ideas of class organization, the importance of considering the child's entire program, the advantage of visualizing his physical condition by means of the weight chart, and, perhaps most important of all, the challenge that came to me from those patient and persistent mothers who were ready to do all that I asked, even when rewarded by only slight evidence of progress. Such was the interest of the children and their mothers that I still have hundreds of charts from these early years which register regular attendance for periods as long as 40 weeks without a relative gain of a single pound.

Looking back through thirteen years' study of this problem, I find the following ideas to have been considered in turn as primary causes of malnutrition, only to be discarded or relegated to a position of secondary importance, one after the other:

1. Poverty and insufficient food supply
2. Improperly cooked food and consequent indigestion
3. Bad air
4. Heredity
5. Syphilis
6. Tuberculosis
7. Self-abuse

The study of each of these theories made some important contribution to the ultimate development of

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our present nutrition program, but the outcome was in every case different from what I had expected, and I was obliged to enter upon a new investigation.

At the time when I began my studies, malnutrition was almost invariably considered to be a problem of poverty and food, and my approach to it was from this standpoint. At the first meeting of the class of mothers and children referred to, I supposed it would be necessary to see that the families were supplied with sufficient food and taught to prepare it properly. I had even gone so far as to purchase a cook book and study it, so that I could, if necessary, teach the mothers how to prepare food.

It soon became clear, however, that although poverty is a contributing factor, it is not the fundamental cause of malnutrition. Later investigations show an even higher percentage among the well-to-do and the rich than among the children of the poor. With few exceptions, the families concerned in this first study were found to have sufficient food for good nourishment, but the malnourished child had either omitted certain essential foods from his diet or else had formed bad food habits.

Ideal family life requires provision for privacy, wholesome recreation, and much else that is not easy to secure. It is not merely a question of the bare necessities, but of conveniences and comforts as well. Nevertheless, my experience in the poorest sections of our cities, with children both in their own homes and in charity clinics, shows that *the essentials of health* are attainable in the home of practically every family. More recent studies indicate that many families among the poor consume too large a proportion of

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the more expensive foods, and it is frequently possible to teach a mother how to care better for her family on less money than she has been accustomed to spend for food.

The matter of cooking in its bearing on the child's nutrition also retired to a secondary position as I found that the city mother does comparatively little home cooking. Hot bread and deep frying, which produce much of the indigestion found in more remote sections of the country, are not customary features of the diet of poor families in the cities. Standardized bread and milk have taken the control of these fundamental foods away from the home, and, with the abundant supply of good cereals, a large part of the usual dietaries is thus established on a high plane. Food is important, but the difficulty is usually in the food habits of the individual rather than in the quantity available or in the mode of preparation.

At this time it began to be apparent that the fundamental causes of malnutrition are more individual than had been supposed. I had feared that in many homes a number of children would be found suffering from this condition, but it was a common experience to find one child underweight with his sisters or brothers up to the normal standard or even overweight. It was not until 1913, after I had been giving my main energies to the problem for five years, that a family appeared in which as many as three children were malnourished, and this family was in fairly comfortable circumstances.

From this study of the child's nutrition on an individual basis came an appreciation of two new fac-

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tors of vital importance, namely, measured feeding and proper food habits. Prof. Irving Fisher's notable article on 100-calory portions, with the reports of the United States Department of Agriculture, made it possible to work out tables to determine the actual food consumption of the individual. Measured feeding and careful observation of the food habits of the child are now regular features of our nutrition program.

The next subject specially considered was bad air, particularly in relation to sleeping conditions. This was in 1911, when our first clinic was established at the Berkeley Infirmary. The Berkeley window tent was used as a means by which a child could gain the benefits of sleeping in the open air while remaining in his own home.

In order to install these tents it was necessary to go into the homes and work out new sleeping arrangements. This afforded an opportunity for contact with the family in a natural way. I have always insisted that no one has a right to cross the threshold of a home except on the invitation of the family, and that the privilege should not be abused by an attempt to discover the skeleton in the closet.

This step in the investigation gave a glimpse into the significance of home organization and control, although the particular line of attack from which it developed, the consideration of bad air, proved no more than poverty or badly prepared food to be a fundamental cause of malnutrition. The children did better under the improved sleeping conditions, but the central problem was still unsolved.

Heredity as an explanation of malnutrition is still

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a favorite hypothesis. Most undernourished children, however, are born of normal weight, and continue to be well and strong through the period of infancy. It is only when they come to the pre-school or school age that malnutrition appears. This may follow an acute illness, such as measles or whooping cough, or it may be a gradual loss in weight which is taken for granted in the growing child. Here again it is significant that where one child may be malnourished, other members of the family may be in good health.

When Wassermann tests were applied to groups of malnourished children, I found the indication of hereditary syphilis to be somewhat greater than among other groups, but in no study did it amount to more than four or five per cent, and consequently it cannot explain the widespread malnutrition.

Similarly, the proportion of positive von Pirquet tests was about the same as that found among children not suffering from malnutrition. Those children whom we thought might be tubercular gained in weight as fast as the others when the real cause of their underweight was finally determined.

There is a general belief that self-abuse is a cause to be reckoned with in dealing with a debilitated condition, but I have not found a single case in which malnutrition could be traced to this source. This experience coincides with that of the neurologists, who rarely, if ever, find self-abuse a cause of either mental derangement or poor physical condition. It is a common symptom of mental deficiency, but in every case of normal mentality in my experience the practice has been due to local irritation caused by a pyelitis, cystitis, or other inflammatory condition.

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It was somewhat disconcerting after a thorough study of these usually assigned causes of malnutrition to find the problem still unsolved. Difficult as it was to disabuse my mind of these ideas, I decided to study the children as I found them, to utilize every possible means, medical, physical, social or psychological, to get each child well, and to seek with open mind the cause of his malnutrition. This point of view led to a new outlook and to an entire reconstruction of values.

Medical social service was at this time in a state of agitation and unrest, and it was difficult to make progress because the trained worker, like the physician, was prepossessed with ideas which experience had shown me were not valid. During the earlier years of my experiments I was fortunate in having the assistance of Miss Ruth L. Greeley, a faithful and devoted volunteer worker. Since 1912 Miss Mabel Skilton has been associated with me in this work, and her untiring interest and personal work with both mother and child have been of the greatest value in the development of the nutrition class.

The results of earlier studies which continued experience had by this time brought into clearer definition as of vital importance were *home control, food habits,* and *health habits.* Two new factors now claimed attention, namely, *physical defects,* particularly obstructions to breathing, and *overfatigue.* These five factors form the basis of our present nutrition program and have proved to be fundamental ideas to be considered in the care of the growing child.

As these ideas were formulated into a definite nutri-

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tion program, our work attracted attention in other cities. Among the visitors to our clinics in 1916 was Mr. Frank A. Manny, representing the New York Association for Improving the Condition of the Poor. This society, after an honorable record of three-quarters of a century spent in wrestling with the problems of poverty and disease, had undertaken under Mr. Manny's direction a study of the causes and treatment of malnutrition. Arrangements were made for presenting our program at the Academy of Medicine, and the workers in a number of child-helping organizations coöperating with Mr. Manny came to Boston for advice and training. Clinics and classes were established in this connection at Bellevue Hospital, Cornell Medical School, Bowling Green Neighborhood Association, Post-Graduate Hospital, and with a number of the activities that later crystallized into various national organizations for child health.

I had long felt that the proper place to deal adequately with malnutrition was in the public school, where it would be possible to reach practically all the children in the community. I was glad, therefore, to accept an invitation from the Bureau of Educational Experiments to supervise an experimental study on the East Side of New York City.

Work was accordingly undertaken in 1918 in Public School 64 and carried on for a period of 19 weeks. This school had a very conservative program, and in adjusting our nutrition classes to the school schedule many compromises were necessary. Although it was a war year and the cost of food seemed to offer extraordinary difficulties, it was nevertheless demon-

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strated in this experiment that, with slight modification of their day's program, the malnourished children could be made well in their own homes. The gains made varied from 100 to 200 per cent of the expected rate of growth for normal children.

To meet the growing demands from various sections of the country, a national organization, Nutrition Clinics for Delicate Children, Incorporated, was formed in 1919. The requests for special training have led to the holding of institutes twice a year in both Boston and Chicago, in which physicians, research students, nurses, social workers, dietitians, charity workers, teachers and other experienced persons have been given intensive instruction and demonstrations of nutrition clinics and classes.

Clinics and classes have been established in the meantime at the Massachusetts General Hospital, the Little Wanderers' Home, various neighborhood settlements, the Farm Home of the Boston Fathers and Mothers Club, and in connection with the Boston Tuberculosis Association. Each of these organizations represents a distinct type of need, and in each we have been able to demonstrate that malnourished children can be made well by means of a simple nutrition program.

Through an address delivered in Washington at the International Child Welfare Conference in May, 1919, our work came to the attention of Mrs. Ira Couch Wood, director of the Elizabeth McCormick Memorial Fund, Chicago. After a thorough test our nutrition program has since been adopted by Mrs. Wood as the basis of the work of that organization, which reaches not only the home city and state, but

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also influences child-welfare work throughout the West. The office of the Fund has now become the Western headquarters of our society, and under its auspices five institutes have already been held, including in their membership representatives of nearly all the Western states.

The first comprehensive community program developed in 1919 in Walpole, Massachusetts, where the school authorities sought our coöperation in eliminating malnutrition. All the children in the public schools of that town have been weighed and measured, and nutrition classes have been formed for those found to be seven or more per cent underweight.

An institute held in Atlanta under the auspices of the American Red Cross in May, 1920, was attended by 50 members, including representatives of the United States Department of Agriculture from practically all the Southern states. Summer sessions were held in June, 1920 and 1921, at the School of Education in Cleveland, where an affiliated organization carries on the work. In November, 1920, the Tuberculosis Association acting with other child-helping organizations united in an institute of over a hundred members, including 22 physicians, at Rochester, New York.

More recently a largely attended institute has been held at Grand Rapids, Michigan, under the auspices of a child-health association organized for the purpose, and a state-wide movement has been inaugurated in New Hampshire after an institute that was attended by representatives from 62 cities and towns. The nutrition movement has been extended to an older

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group in this state by the inauguration of classes for the students at Dartmouth College.

Public addresses have been made all the way from New Hampshire on the east to California and the Hawaiian Islands on the west and as far south as Georgia. During the summer of 1920 two of our trained workers organized classes in Labrador in connection with the work of Dr. Grenfell, and their work was extended in 1921.

This brief sketch of the stages through which our work has passed is given to show the various aspects of the problem presented by the malnourished child, who in the past has been considered neither sick nor well. Difficulties have been met with, and must still be overcome in many places before the subject receives the attention which its importance deserves. Among these may be mentioned the following:

1. Malnutrition is a very old subject, and the ideas and theories held about it have frequently emanated from men working behind desks rather than from those in direct contact with the children needing help.

2. Nutrition work is a form of preventive medicine, all branches of which have thus far attracted too little attention.

3. The laboratory field, where results can be measured by chemical reactions and the microscope, has been more alluring to the research worker than clinical work with such a difficult and uncertain factor as the children themselves.

4. On the medical side there have been practically

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no studies of the subject, and the physician has been almost as ready as the layman to accept ideas put forward without foundation or justification. As a result little help has come from the quarter that ought to aid the most. Progress will be delayed until fundamental work in nutrition is an established part of the training of the physician. At present the field is almost untouched in either medical school or hospital.

5. Although the problem is fundamentally medical, it is also largely educational, touching the most intimate human experiences—the habits and prejudices of a lifetime in both parent and child.

6. The malnourished child is not considered sick as long as he is able to be on his feet. Even to the average physician there is nothing urgent in his need. In the schools there are so many of these unfortunate children, from one-fourth to one-third of all, that the teachers have become accustomed to attempting to force them through the grades in order to maintain the school's supposed efficiency, whereas in reality their condition is a constant occasion for lowering standards.

7. The program of nutrition clinics and classes meets the opposition of many organizations that do not willingly relinquish the ideas upon which their work is founded.

The spread of these ideas would necessarily have been much slower had it not been for the startling revelations of the selective service draft. The report of the Surgeon-General of the Army, which showed barely 50 per cent of our young men physically fit

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for service in the first line, was a shock to medical men, economists, educators, and the general public. The fact that this condition was largely due to defects and habits that are remediable in childhood has focussed attention upon the problem of these early years. It is in the hope that a wider knowledge of our nutrition program may help to correct this condition that this book on *Nutrition and Growth in Children* is written.

I wish to express my deep personal appreciation of the helpfulness of Mr. Frank A. Manny in preparing these pages, especially the statistical work; of Mrs. Katharine Maynard in rearranging and revising the text and in making the glossary and index; and of Miss Marion Dickson in the making of charts. I wish also to acknowledge again the assistance received from Miss Mabel Skilton in working out these nutrition problems, and the coöperation of many others throughout the country who have borne an important part in extending the work.

WILLIAM R. P. EMERSON

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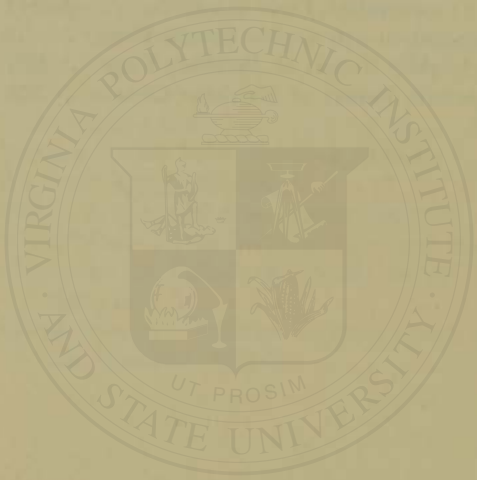

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PART I

THE DIAGNOSIS OF MALNUTRITION

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NUTRITION AND GROWTH IN CHILDREN

CHAPTER I

MALNUTRITION AND GROWTH

The care and feeding of infants has become not only a science, but an art. Accurate studies have been made as regards food constituents, measured feeding, hygiene, and every detail of growth and development. After the age of two, however, the physical condition of the growing child receives little consideration by either physician or parent except in actual illness.

Although this is a most important time for the child's nutrition and growth, little is done to make sure that he will pass through these years safely, and reach maturity physically and mentally sound. Food and health habits are formed during this period, and it may be said with a fair degree of certainty that if good health is established at this time it will continue throughout the years of adult life.

At least a third of all children in this country are underweight for their height, undernour-

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ished, and malnourished. This condition is found alike on the East Side of New York, among the well-to-do in such cities as Boston and Chicago, and in all classes of society, as shown in a series of investigations extending from Labrador to Atlanta.

A similar situation was disclosed by the examinations for the Army, where approximately the same proportion of recruits was found unfit for military service because of conditions largely due, directly or indirectly, to malnutrition. Had the causes of malnutrition been generally understood during the childhood of these recruits, this physical unfitness could have been almost wholly prevented by the adoption of a simple program insuring normal healthy growth.

The five chief causes of malnutrition, in the order of their importance, are:

1. Physical defects, especially naso-pharyngeal obstructions
2. Lack of home control
3. Overfatigue
4. Improper diet and faulty food habits
5. Faulty health habits

The requisites for good health in the growing child are few—good air, simple food, rest, and proper exercise. If the causes of malnutrition

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are removed, and these simple requisites for growth obtained, we have what may be called the *essentials of health.* These essentials are:

1. The removal of physical defects
2. Sufficient home control to insure good food and health habits
3. The prevention of overfatigue
4. Proper food at regular and sufficiently frequent intervals
5. Fresh air by day and by night

With proper planning these conditions can be brought about in the majority of families, and, as a result, the malnourished child can be made well in his own home.

Why, then, has malnutrition, as a definite condition with definite causes and effects, been so generally overlooked?

In the first place, no effective steps have been taken by the medical profession, by hospitals, or by the schools to examine children for this particular condition, and thus identify the malnourished group. Until the World War focused attention upon physical unfitness, malnutrition was not generally known to be a serious matter.

Moreover, there has been a general misunderstanding of the causes of malnutrition. Physicians, educators, and social workers have ac-

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cepted, almost without question, the theory that this condition is due mainly to poverty and improper food. Investigation shows clearly that these causes, as well as many others commonly proposed, such as bad air, heredity, syphilis, and tuberculosis, are of secondary, rather than of primary, importance.

A third explanation is that parents and physicians are so accustomed to the condition that they pay little or no attention to it. Because a child is not sick in bed, and shows no acute symptoms, he is considered well and so treated. If he falls behind in his studies, pressure at home and school is increased. If he fails, he is called lazy. Thus a vicious circle is established that only adds to the degree of his malnutrition. It is from the ranks of such cases that the misfits and failures, the physical and nervous wrecks, who make life miserable for themselves and for others, are later recruited.

Malnutrition is a clinical entity with characteristic history, definite symptoms, and pathological physical signs. The malnourished child is a sick child, and should be so considered. In the child's history it is found that malnutrition results from physical defects or acute illness, or comes on as a consequence of overfatigue or faulty habits in regard to food or health.

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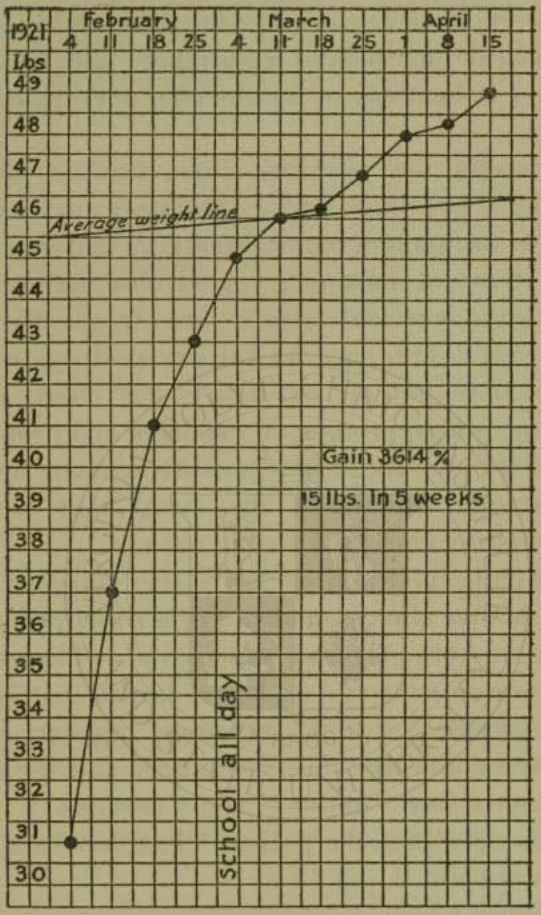

FIGURE 1. A LARGE INITIAL GAIN

Janet D., aged six years, was 30 per cent underweight, and gained 15 pounds in 5 weeks. Notice the initial gain of 6 pounds in one week, and the gradually smaller increases as she approached average weight. The gain continued until she was 5 per cent above the average for her height, clinically her normal weight.

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The child becomes irritable, tires easily, lacks physical and mental endurance, and exhibits other indications of an unstable nervous condition.

Among the physical signs, besides underweight, are lines under the eyes; anxious expression; pallor; mouth-breathing and other indications of naso-pharyngeal obstruction; the anterior cervical glands are frequently enlarged; there may be fatigue posture, round shoulders, lateral curvature, flat chest, rigid spine, ptosis, prominent abdomen, and pronated or flat feet. By fatigue posture is meant an appearance similar to the stoop that results from muscular weakness in old age.

As the child approaches normal weight there is likewise clinical evidence of a transformation that is both physical and mental. There is a return of color and a glow of health that is unmistakable. Normal reactions appear, restlessness and irritability diminish, and the child becomes less "finicky" and "nervous." Parents state that the patient "has become a different child."

When physical conditions have been corrected in a malnourished child, and he is in the condition which we designate as "free to gain," nature gives a strong initial impetus to his de-

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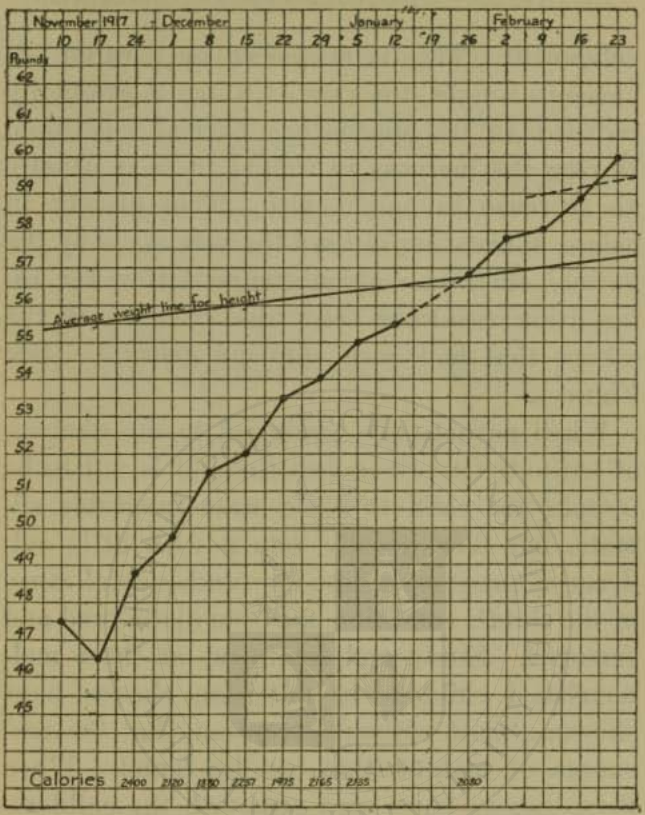

FIGURE 2. UNDERWEIGHT AND UNDERHEIGHT

Paul L., nine years old, was 49 inches tall and weighed 47 pounds. He should have weighed 55 pounds, and was therefore 8 pounds, or 14 per cent, underweight for his height. The loss of weight shown during the first week occurred while he was having dental work done. Following this there was a steady gain until he reached the average weight for a boy 49 inches tall, as shown at the average weight line. During these 12 weeks, however, he had grown in height at twice the average rate, and required 4 pounds additional (as shown at the dotted line) to meet the average weight for his new height—evidence that he had been stunted. A similar acceleration of growth in height accompanies gain in weight in nearly every instance when the child has been habitually underweight.

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velopment. This is evidenced by a rapid advance in weight, the rate of which is gradually reduced as he approaches normal condition. During the increase in weight there is usually an increase in height also. This growth in height is more rapid than the rate made by the normal child—a sudden compensation for retardation resulting from the removal of the causes that had been stunting growth. (See Figure 2.)

When parents are awakened to the dangers of malnutrition their first thought is apt to be to take the child to some more favorable climate, but they usually return with little evidence of progress unless the fundamental cause of the child's condition has been discovered and removed. Study and treatment of these malnourished children in nutrition classes have shown, almost without exception, that the real causes of malnutrition can be found. When these causes have been removed, the child responds to the strong force in nature that makes for recovery, and returns to health in a remarkably short period of time.

The nutrition program adopted to secure these results has the following distinctive features, which are separately described in the succeeding chapters:

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1. Weighing and measuring as a means of identification
2. Diagnosis based on complete physical-growth, mental, and social examinations
3. Removal of physical defects as a prerequisite for successful treatment
4. Measured feeding (48-hour diet record)
5. Mid-morning and mid-afternoon lunches
6. Mid-morning and mid-afternoon rest periods
7. Regulation of physical, mental, and social activities to prevent overfatigue (48-hour list of activities)
8. Nutrition classes for the treatment of malnutrition
9. Nutrition or diagnostic clinics for problem cases

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CHAPTER II

HOW TO IDENTIFY THE MALNOURISHED CHILD

As in the treatment and care of infants a steady advance in weight is one of the most reliable tests of good physical condition, so also throughout childhood the weight curve continues to be the surest indication of proper growth. Unless he is regularly weighed the child may fail to gain for years without its being noticed. For this reason all children should be weighed once a month. In a normal child loss in weight may be an early indication of illness; in an undernourished child failure to gain means that conditions are unfavorable to growth and should be corrected.

Weight Standards.—The tables in general use in the past have taken age as the basis on which to compute normal weight. But the attempt to apply this *weight for age* standard leads to practical difficulties at once because of the great variation among children of the same age. It also tends to discourage many who find the average weight for their age far beyond their reach. The basis of *height for age* is even more

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perplexing because of the large number of children who are above the average height for their years.

After long experimentation with these unsatisfactory standards, the basis of *weight for height* has proved to be an accurate measure of the condition of undernourished children, and in the many thousand cases that have come under my observation I have never found an instance in which it has proved to be impracticable. It may be stated as a physiological principle that a body of a certain height requires a certain weight to sustain it, and the most significant test of a child's physical condition is the relation between his weight and his height.

Weight Tables.—Although the weight for height principle served as a remarkably satisfactory measure of the degree of malnutrition, the figures given in the accepted tables were soon found by clinical evidence to be too low.[1] After reaching the average weight for his height many a child showed by his general appearance, poor color, and nervous condition that he was still below his normal standard. This failure of the tables to agree with the other signs of malnutrition is explained by the fact

[1] See revised table in Appendix I, p. 305.

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that their averages are made up of measurements, not only of children who have attained normal growth, but also of those who for various reasons have been retarded. These tables are thus vitiated as normal standards, although recognized as valuable statistics of average development. It may be urged that the underweight children are balanced by those who are overweight, but the examination of large groups shows that the percentage of overweight is relatively small, and is more than compensated by the borderline cases, while the seriously underweight group comprises from one-fourth to one-third of the total.

The Malnourished.—After accepting a table of averages, however, it was still necessary to determine what range of variation is compatible with conditions of reasonably good health and growth. Ten per cent underweight was first taken as the limit best corresponding to the other clinical evidence of malnutrition, but it soon became evident that many children in need of care would escape under this rule. Observation of a large number of children indicated seven per cent as a more reliable minimum, and this is the measure now used in our nutrition classes. In the application of this rule I have never seen a child *habitually* seven per cent un-

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derweight for his height who did not show other marked signs of malnutrition.

Stress is laid upon the word "habitual" in this consideration of underweight, because, while there is often loss of weight that is the result of temporary conditions, in the greater number of instances underweight has continued during the major part of the growing period, causing the child to be not only under weight but under height also. In other words, the child is stunted, and tends to remain so unless adequate measures are taken to remedy his condition.

Studies made in Europe indicate that boys placed at an early age in military institutes, where they had special care, on reaching maturity attained greater height and weight than other male members of the same families. Mendel likewise reports that "in the recent war large groups of soldiers from certain quarters of London, after a short term under the more healthful conditions of military service, became so much taller and heavier that they required entirely new outfits."

A small percentage of children show an apparently normal relation between weight and height, but nevertheless fall below the average in both respects. These children are also defi-

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nitely stunted. Under proper health conditions, however, a capacity for growth in both weight and height is shown in many cases. This group includes those constitutionally affected by such conditions as syphilis, deficient thyroid, the effect of drugs, and children who are recovering from long continued illness.

It is a common error to take it for granted that a child will never attain average size because he is supposed to "take after" some undersized uncle or grandfather. It is easy to fall back upon heredity, and say, "He will never be a large man for he is just like my father." While a child may inherit certain traits from one ancestor, he may, in other respects, resemble another of very different characteristics. Furthermore, it is unfair to a child to set limits to his physical development until he has been given every possible chance to reach the best growth that is in him. He should be expected to come up to normal until every cause that might check his growth has been removed.

The application of the seven per cent rule to any group of children will identify from 80 to 90 per cent of those in urgent need of nutritional care.

Borderline Cases.—There will also be found a considerable number of "borderline" cases

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FIGURE 3. HOW TO MEASURE

This shows the correct position for measuring height. The child stands with feet together, with heels, back, and head touching the wall. A book or block resting on the top of the head and held against the wall is more accurate than a ruler or flexible rod which is apt to slip down at the back. A tape measure attached to the wall indicates the number of inches.

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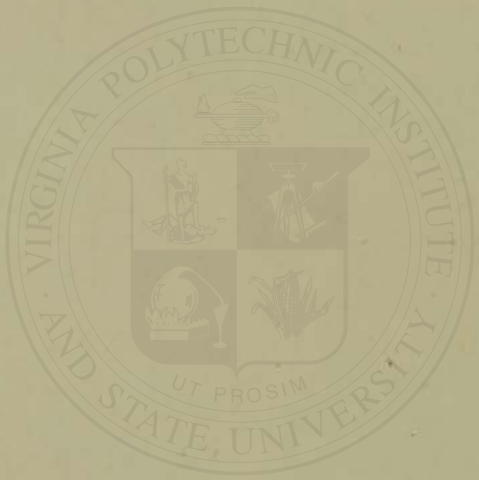

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who are less than seven per cent underweight, and who may, if neglected, easily fall further below their normal standard. These children should be brought up to proper condition as well, for, while they may not be strictly called malnourished, they are proportionately less able to endure special strain or sudden illness.

Ideal Weight.—It must be recognized that any table made up of *averages* is only an approximate standard, and every child has his own individual normal standard which he will reach under sufficiently favorable conditions. Many children in our nutrition classes who reach the average weight for their height, and are therefore ready to "graduate," will, if kept in the classes for a longer period, run up to 10 per cent above this average and then remain practically stationary, gaining in weight only in proportion to their growth in height. This would indicate that the best development is reached when a child's weight is about 10 per cent above the average indicated in these tables.

During the growing period size does count. Although it may happen that a child who is small for his age shows remarkable progress in other respects, nevertheless any investigation of a large number of children will demonstrate that those who are taller and heavier as a rule

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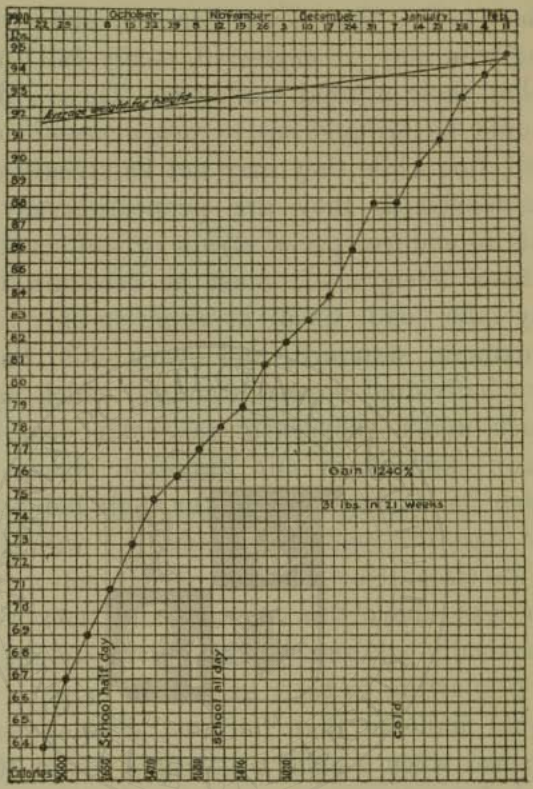

FIGURE 4. A GAIN OF 31 POUNDS IN 21 WEEKS

Clayton C., aged eleven years, was 29 per cent underweight for his height. He was "tall for his age," 59.2 inches, which is the average height for a boy of fourteen. It was thought that he "could not grow both ways at once," but his chart shows a steady climb to the average weight line, which he reached in 21 weeks.

have the advantage both in health and in mental development.

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The Overweight.—Clinical experience indicates that when a child is 20 per cent above the average weight for his height, he has reached a point where his weight should receive attention, and he will be better off if he does not exceed this percentage. Children whose weight goes beyond this point begin to show lessened activity and a general lowering of health, convenience, and comfort. They are to be considered obese and in need of care. This percentage corresponds with the limit set by insurance companies in regard to adults.

How to Weigh and Measure.—There should be scales in every home. It is important that the same scales be used for each weighing, because scales vary and false records may otherwise be made. The child should also be weighed at the same hour each time, as there may be a variation of one or two pounds according to the time of day. Weight should be taken with indoor clothing but without shoes.

In measuring height it is necessary to make sure that the measuring rod is at a right angle and held rigidly in place. A slight slip in position may make a difference of half an inch in the result, which means one to three pounds in the required weight.

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The use of a weight chart,[2] such as we have adopted for nutrition classes, will help to visualize the child's condition, and encourage his efforts to gain. The chart should have a line showing the average weight to be attained, and an actual weight line made from the weekly weighings. When the child's weight reaches the average line drawn at the time of the first weighing, his height should be measured again in order to allow for the normal rate of growth during the interval. The average weight for this new height is his present normal weight, and is the standard used for "graduation" from our nutrition classes.

Parents too often consider the height of a child by itself, and assume that he is growing properly because he is taller than the average. They even boast that, "At ten he is already wearing a twelve-year suit!" The important point, however, is neither his height nor his weight at any particular age, but whether he has a body of sufficient weight to sustain his height, whatever his age or his height may be. As the child grows, every advance in inches calls for a corresponding advance in pounds.

[2] See Form VIII in Appendix II, p. 318.

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FIGURE 5 MALNUTRITION AND OBESITY IN THE SAME FAMILY

The two boys are brothers. John is 12 per cent underweight, while James is 30 per cent overweight. John's condition is due to a deviated septum caused by a fall. Maud and Jessie are sisters, the one is 14 per cent underweight, and the other nearly 40 per cent overweight. Maud's malnutrition was reported due to poverty, but was really caused by faulty food habits. Heredity and poverty are often accepted as adequate explanations of underweight, but malnutrition is an individual problem.

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CHAPTER III

THE CASE HISTORY

After identifying the malnourished child by means of weighing and measuring, further investigation is then required to determine the cause of his malnutrition. This must always be an individual study, and successful treatment cannot be inaugurated without a diagnosis as accurate as that which determines pneumonia, malaria, or other diseases. In order to find the cause of the child's condition, a history and examination form[1] has been adopted that provides for thorough physical-growth, mental, and social examinations as well as for the child's history in detail.

It is of fundamental importance that both parents be present for this history taking and during the physical examination. They are both parties to the business of getting the child well, and it is only fair to him that they understand the significance of his history and of every defect discovered. The father and mother must

[1] See Form IX in Appendix II, facing p. 320.

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be depended upon faithfully to carry out all directions given, and therefore they must be made to see clearly what is necessary to bring about recovery.

It may seem to them quite unnecessary to set forth all the details listed because they feel sure they remember everything that has happened to the child since his birth. Yet these facts, written down in order, present a significance that may easily escape the observer who considers them one at a time and unrelated. A careful and complete history is of the greatest help to the physician in making his diagnosis.

The Family History.—The first group of questions in the form relates not to the child himself, but to his parents, brothers, and sisters. The answers to these questions give the physician important information as to the factor of heredity and the existence in the family of certain diseases that may be revealed by the causes of death. For example, syphilis is suggested by the report of miscarriages or of still births.

Birth and Infancy.—The second section has to do with the capital with which the child began life and facts as to his early development. His condition at birth is significant. Difficult labor may have caused mental defect, which may be

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indicated by slow progress in walking or talking. Knowledge of the child's early care not only further indicates his start in life, but also the intelligence of his parents.

Previous Diseases.—The next division takes account of the more serious illnesses which the child has had. By the dates of their occurrence various complications may be traced. Attacks of earache should be noted, and record made of any bad effects that followed measles, tonsillitis, whooping cough, scarlet fever, or any other acute infectious disease. The dates of previous operations should be given.

General Health and Habits.—The food and health habits of the child are the basis of the next group of questions, and this section is of more importance than is commonly realized, because faulty habits in many small matters of diet and health are a common cause of malnutrition. If several members of the family are malnourished, there is probably a common cause such as the use of tea and coffee, improper diet, or poor hygiene. Exact information is desirable on all these points. The physician will want to know, for example, not only whether the child eats candy, but "How much candy does he eat?"

The mother should think back over the child's

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condition at various ages, and record the time when he may have been well and strong, as well as the circumstances that attended the beginning of his less favorable condition.

Present Symptoms.—The physician will also question the parents as to their own diagnosis of the child's condition by such questions as, "Just what is the chief complaint?" "What led you to bring him to me?" They may have a very erroneous idea of what is the matter with the child, but it is nevertheless desirable to hear their story. In this way much useful information may be secured, as well as an understanding of the situation with regard to home control and discipline. Unconscious remarks by the parents will often throw light on the real cause of the child's malnutrition.

While no history form can cover all the points that may be necessary to discover the cause of the malnutrition, yet this outline should be carefully completed for each child, and further points added as may seem to be important.

Impressions received through the history-taking will direct special attention to certain points of the physical, mental, and social examinations that are to follow, and in this way lead to a more accurate diagnosis.

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CHAPTER IV

THE PHYSICAL-GROWTH EXAMINATION

THE physical-growth examination is of great importance to the physician, not only for purposes of diagnosis and treatment, but also as an opportunity to demonstrate to the parents the true condition of the child. This examination as given in our nutrition classes differs from the usual type not only in the completeness of the medical part of the investigation, but in taking account of defects affecting growth which are commonly overlooked. That these defects are significant is demonstrated by the fact that underweight children have an average of nearly six defects, while in children more than 20 per cent overweight the average is less than two.

The examining room should be quiet, and have adequate light and heat. Besides the usual instruments, there should be an electric otoscope, scales for taking weight, and a measuring rod for determining height. The child's clothing should be removed so that his general condition may be observed and all defects of

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growth and posture noted. A man who judges animals knows how much would be hidden if a horse, for example, were inspected when covered by a blanket. Yet this amounts to the same

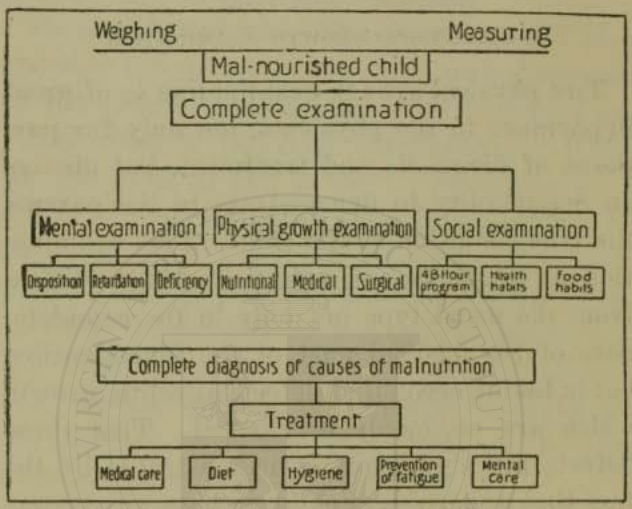

FIGURE 6. COMPLETE EXAMINATION

Diagnosis must be based on a complete physical-growth, mental, and social examination.

thing as the examination of a child when dressed.

The results of a thorough physical examination made in this manner are usually a revelation to the parents. A child with a round, attractive face passes as well nourished when an examination without clothing, or even in underclothing would disclose serious physical defects.

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Such an inspection by parents in the home would often lead to earlier discovery of a serious condition.

The objection is sometimes raised that the complete physical-growth examination takes more time than can be spared for it. But the thoroughness of the examination does away with the necessity for its repetition, and knowledge of the true condition of the child at the outset saves both time and misdirected effort. In one of our nutrition classes a boy who had been examined in the usual way and reported to be in normal condition was found to need care for the following defects:

1. Fifteen per cent underweight for height
2. Mouth breathing
3. Adenoids
4. Hypertrophic pharyngitis
5. Diseased tonsils
6. Enlarged cervical glands
7. Five carious teeth
8. Cerumen in both ears
9. Round shoulders
10. Adherent prepuce

This is one of the worst cases encountered, yet five per cent of the group to which he belonged had 10 or more defects each.

A defect may be either the cause or the effect

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of malnutrition. Those that consist of inflammatory processes are usually causes, while postural defects are usually results.

Physical Signs.—The expression of the face and eyes is an important sign of malnutrition. The serious, drawn look with lines under the eyes is significant. There is usually pallor, a lack of the glow of health, and the hair seems "dead." The skin loses its normal, pink color, becomes rough, and is sometimes so loose that it can be "picked up" and separated from the subcutaneous tissues. The lips of the mouth breather are dry and crusted.

The malnourished child's muscles are flabby. This is most easily tested by feeling the muscles of the upper arm. Similar weakness is shown by the very common "fatigue posture," evidenced both in sitting and standing. By this we mean the position with the head set forward, round shoulders with protruding shoulder blades, flat chest, prominent abdomen, and pronated or flat feet. This "fatigue posture" is one of the most serious results of malnutrition. The prominent abdomen, due to relaxed walls, may not be evident when the child is lying flat, but is well marked in a standing position. The visceroptosis causes digestive disturbance and lowered vitality.

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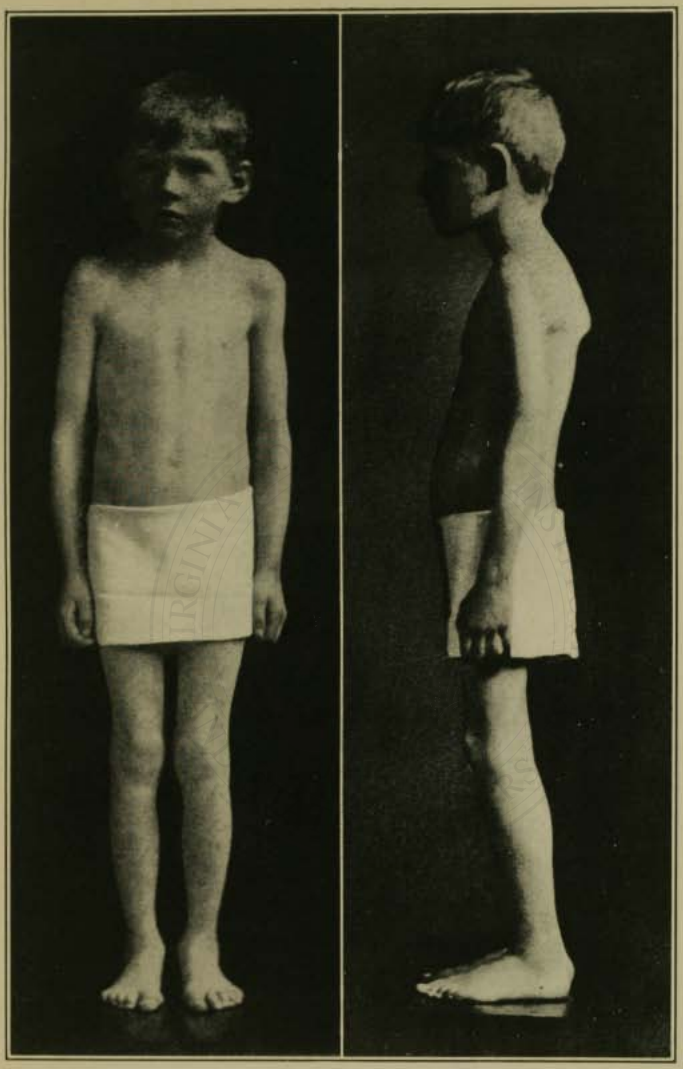

FIGURE 7. A TYPICAL MALNOURISHED CHILD

Alfred H., aged nine years. Notice his serious expression, mouth breathing, lines under the eyes, thin arms and legs, and pronated feet. Alfred was under observation over three years before his case was finally diagnosed as congenital duodenal obstruction. His defects were: underweight 17 per cent (9 lb.); naso-pharyngeal obstruction; carious teeth (eight); fatigue posture; habit spasm; congenital duodenal obstruction (bands) with gastric dilatation.

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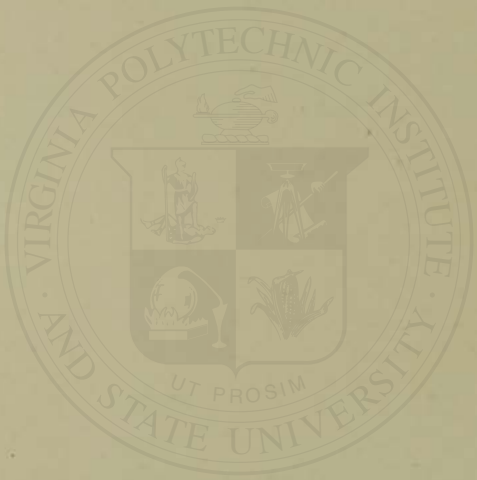

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Naso-Pharyngeal Obstruction.—Obstruction in the nose and pharynx is perhaps the most important of all defects in its relation to nutrition, and its most common symptom is mouth breathing. As the child may keep his mouth closed while receiving the attention of the examiner, this sign may pass unnoticed, but he should be watched when he is not aware of observation, and if the lips are parted, the throat specialist should be consulted.

Controlled observation in the nutrition class, with the weight chart's record of gain or loss, is one of the most valuable means of diagnosing focal infections. The failure to gain when other causes have been eliminated should lead to further examination of the naso-pharynx, and in doubtful cases this may reveal decisive evidence of a needed operation.

Enlarged anterior cervical glands indicate diseased tonsillar tissue and a consequent absorption of toxins. Dull ear drums also suggest a sub-acute inflammatory process extending from the throat.

Even where children have had several adenoid and tonsil operations, there may be diseased tissue remaining that is walled in by cicatrices, thus preventing drainage. The child's health may be worse as a result of this

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condition than it was before the operation. Such infected tissue must be removed before the child is "free to gain."

In Figure 8 is shown a composite graph of 15 cases which required more than one operation

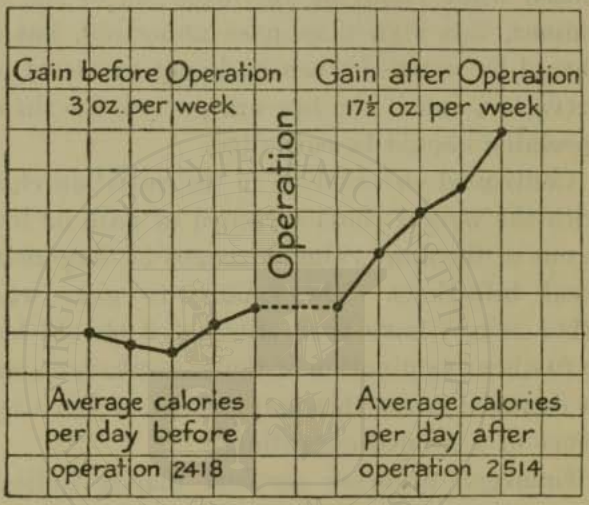

FIGURE 8. EFFECT OF ADENOID AND TONSIL OPERATIONS

This chart shows the average gain of a group of 15 children after adenoid and tonsil operations, as compared with their gain before the operations—in the one case, 17½ ounces a week, in the other, 3 ounces, with practically the same amount of food. Their failure to gain while under observation in the nutrition class was the determining factor in diagnosis.

before the children could be made to gain satisfactorily. Their delay in growth was rightly interpreted as additional evidence of the presence of diseased tissue in the throat causing

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toxins to enter the body. It should be remembered that the effect of focal infection is more marked on the general system than on local tissues, so that poor physical condition may be stronger evidence of toxic effect than the appearance of the throat itself.

Sinus infection is more common than is generally supposed. The sinuses in children are small, but infection may occur secondary both to naso-pharyngeal obstruction and to decayed teeth.

Teeth Defects.—It is generally assumed that carious teeth cause malnutrition. A careful study made of several hundred children, however, fails to establish this relationship. In fact there seems to be no evidence available that small cavities in the teeth directly affect nutrition unless there are also abscesses or other inflammatory conditions present.

In the group studied [1] it was found that those who had carious teeth showed 7 to 22 per cent greater incidence of postural defects and 4 to 16 per cent more obstructions to breathing than those who were free from teeth defects, but no such apparent relation to under-

[1] "Physical Defects in Children." Report of 602 cases. (Pamphlet No. 8 in List of Publications, p. 332.)

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weight was indicated. Even when the comparison was made between the children having many and those having few defects of each kind, the proportion of underweight increased with the number of naso-pharyngeal defects but not with defects of the teeth.

In another study,[2] 88 children were divided into four nearly equal groups—the first having no carious teeth; the second, one each; the third, two and three; and the fourth, four to twelve. The percentages of malnutrition ran 10, 9, 10, and 10, respectively, showing no sign of correlation.

There are excellent reasons for insisting upon the care of the teeth, but the studies that have been made do not justify the assumption that small cavities are a direct cause of malnutrition.

Medical Defects.—In extreme cases of malnutrition hereditary syphilis should always be suspected as a cause. Therefore the Wassermann test should be made as a routine matter, especially in institutional cases. X-ray examination of the long bones is an aid in this diagnosis.

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[2] "A Nutrition Clinic in a Public School." (Pamphlet No. 1 in List of Publications, p. 332.)

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Vaginitis of gonorrheal origin will also be found among cases admitted to institutions and out-patient departments.

Pyelitis is not uncommon, especially in girls. The detection of this condition often requires more than one urine examination because of its remissions and exacerbations.

An X-ray examination of the chest may discover obscure tubercular lesions, and the von Pirquet test should be employed to rule out tuberculosis.

Temperature charts are useful in determining obscure infections. Malnourished children frequently run a slight evening temperature, and in these cases observation in bed with a 4-hourly chart may be helpful. A sub-normal temperature is a sign of low vitality, and may indicate the need for rest in bed.

Intestinal parasites and their eggs should be looked for by an examination of the feces under the microscope. Eosinophilia may be another indication of worms.

An X-ray examination of the alimentary tract will assist in the diagnosis of cardiospasm, pyloric stenosis, intestinal adhesions, or chronic appendicitis.

Examination of the blood of malnourished children does not usually show anemia, al-

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though this condition may obtain as a result of the tea, coffee, or candy habit.

Where there is an eczema or skin eruption, accompanied by bronchitis or asthma, a condition of anaphylaxis is to be suspected, and the cutaneous proteid tests should be made. This is a not infrequent cause of malnutrition, and these tests are the best helps we have in arranging a diet on which the child will gain. Impaired ability to digest and assimilate food under this condition calls for longer rest periods and special guarding against overfatigue.

Defects at Various Ages.—In a recent study of 602 children, ranging in age from 2 to 15 years, we found an average of six defects per child. No evidence was shown of any particular period in which there is a greater tendency to defect, as there was remarkable uniformity in the number of defects at all the ages included.

The significance of various defects may vary, however, with the age of the child. Because of the small size of the naso-pharynx, for example, an excess of adenoid tissue may be a serious danger during infancy and the pre-school age, while tonsils do not as a rule become infected before the age of five or six. Failure to gain in weight is often one of the earliest and most re-

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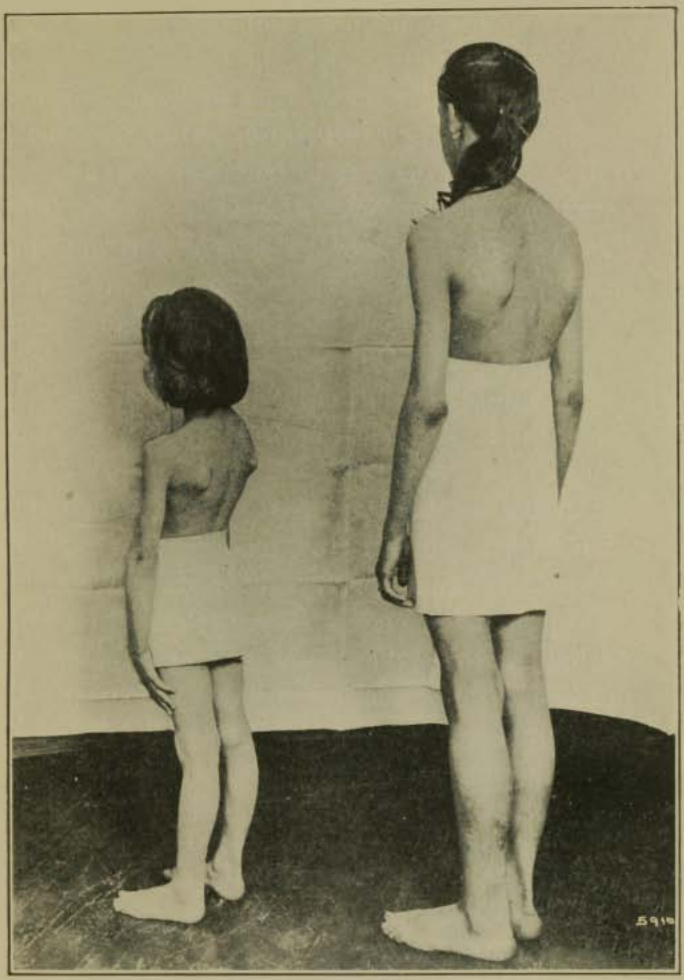

FIGURE 9. DEFORMITY AND MALNUTRITION

The true condition of these two school girls was brought out by the physical-growth examination in a nutrition class conducted by the Elizabeth McCormick Memorial Fund in Chicago. The usual medical inspection in schools does not discover such basic defects of growth.

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liable signs of absorption from infected tissue, and the early removal of diseased adenoids and tonsils is important in preventing pyelitis and endocarditis as well as other serious complications of the acute infectious diseases.

The Examination Form.—All the defects most commonly found are printed on the examination form used in our nutrition classes, and these are simply underlined as the examiner proceeds. The completeness of the form enables the parent or nutrition worker to check up the record and see that no detail is omitted. The advantages of this method of examination both in private practice and hospital work, may be summarized as follows:

1. Records become valuable because they are standardized, and there are no omissions.
2. Uniform and approved nomenclature is used.
3. Dictation can be taken by any one who can read and write as well as by a stenographer, and at the conclusion of the examination the complete record is ready for inspection without having to be transcribed.
4. This method makes it easier to equalize attendance at a clinic. New patients appreciate the completeness of the physical-growth examination, and are willing to come again by appointment in case the day happens to be unusually busy.

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5. It aids the work of the less experienced physician by listing completely the points to be observed. In general it may be said that mistakes are made not from lack of knowledge on the part of the doctor, but because he has failed to look.
6. It insures greater thoroughness. From 100 to 200 per cent more abnormalities are found by this method than by the usual examination, even when made by specialists in the best clinics.
7. It saves unnecessary repetition of examinations. Under the usual hospital procedure if a child returns to the clinic, he frequently has to be undressed and reëxamined because previous records are incomplete.
8. Such basic examinations are accepted when a patient is referred to another department, because the name of the examiner is on the form, and he can be held accountable for what he has signed.
9. It adds interest to the work of the examiner, and enables him to receive credit for good work. It also increases work in preventive medicine because defects are almost invariably found other than those which brought the patient to be examined.
10. It assists the administrative and medical social service departments of the hospital by definitely recording all abnormalities that need correction.

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The following case admitted to one of our nutrition clinics illustrates this point:

A child-helping institution inquired for a diagnosis of the condition of Charles S. The nutrition worker found his record, and was able to answer immediately:

"Charles S. was examined here December 27. His general condition was found to be poor. He was 12 per cent underweight for his height, had round shoulders, pediculosis, and two carious teeth. He had nasopharyngeal obstruction, and was apparently retarded mentally. Treatment has been prescribed for pediculosis and an appointment made to have him examined in the throat department. He is to report here in a week, bringing a list of food taken during 48 consecutive hours in order that his food habits may be determined. The examiner suggested that he be tested mentally, and that inquiry be made as to his work in school. After he gains in weight he should have corrective exercises."

The inquirer replied:

"That is just what we wanted to know,"

and added:

"We will have the dentist attend to his teeth, and see that the directions for pediculosis are carried out.

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TABLE I. COMPARISON OF THE RESULTS OF THE EXAMINATION OF FIFTY CHILDREN * (BOTH SEXES) AT A CHILDREN'S CLINIC AND AT THE NUTRITION CLINIC

Defects Found	(1) Defects Appearing in Diagnosis Summary	(2) Additional Defects Shown in Various Parts of Record	(3) Total of (1) and (2)	(4) Defects Found in Nutrition Clinic	(5) Per Cent (3) of (4)	(6) Per Cent (1) of (4)
Cases examined	50	50	50	50	100	100
All defects:						
Cases	42	38	50	50		
Defects	83	93	176	401	44	21
Naso-pharyngeal:						
Cases	12	28	32	50		
Defects	17	40	57	191	30	9
Teeth:						
Cases	15	17	32	32	100	47
Defects				150		
Postural:						
Cases	10	8	18	50		
Defects	11	9	20	108	18.5	10.2
Underweight:						
Cases	11	21	32	39	82	28

* Average age about 9 years.

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We had suspected a condition of diseased tonsils and adenoids, and shall be interested to receive a further report on that matter. We are glad to coöperate with you in regard to his food habits, and will arrange immediately for a special mental examination."

At the end of six months Charles S. had gained normal weight, and was in excellent physical condition. His adenoids and tonsils had been removed, and all the treatment recommended in the physical examination had been carried out. He was found to be mentally retarded, and special classwork was provided in school. This was a direct saving of the teacher's energy, for she had been giving him extra time after school in an effort to "keep him up with his class."

Contrast this report, and the constructive work accomplished in this typical case, with the reply that had been given in regard to the same boy following an examination made two weeks before he was admitted to the nutrition clinic:

"Yes, Charles S. was examined, but evidently the doctor found nothing serious the matter with him, as he simply gave general directions about his hygiene, and advised that if he was not all right he should report again in two months."

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The relative results of the two methods of examination is shown in the foregoing table of defects found in 50 children who were patients in one of our largest and best organized children's clinics, as compared with the record of the same children examined in the nutrition clinic according to the basic method here described. The table shows first, the defects appearing in the hospital diagnosis summary; second, additional defects mentioned in the general examination but not appearing in the summary; third, the sum of these two columns, or all defects recorded as a result of the general examination; fourth, the defects found in the examination made at the nutrition clinic; fifth and sixth, comparisons in the form of percentages.

It will be seen that the general examination recorded only 44 per cent, or less than half the defects appearing in the register of the nutrition clinic. When the number of defects appearing in the diagnosis summary is compared with the nutrition record, the disparity is even greater, the summary recording only 21 per cent, or less than one-quarter of the actual defects. In the naso-pharyngeal group the summary showed only 9 per cent of the defects found, and the nearest approach to the com-

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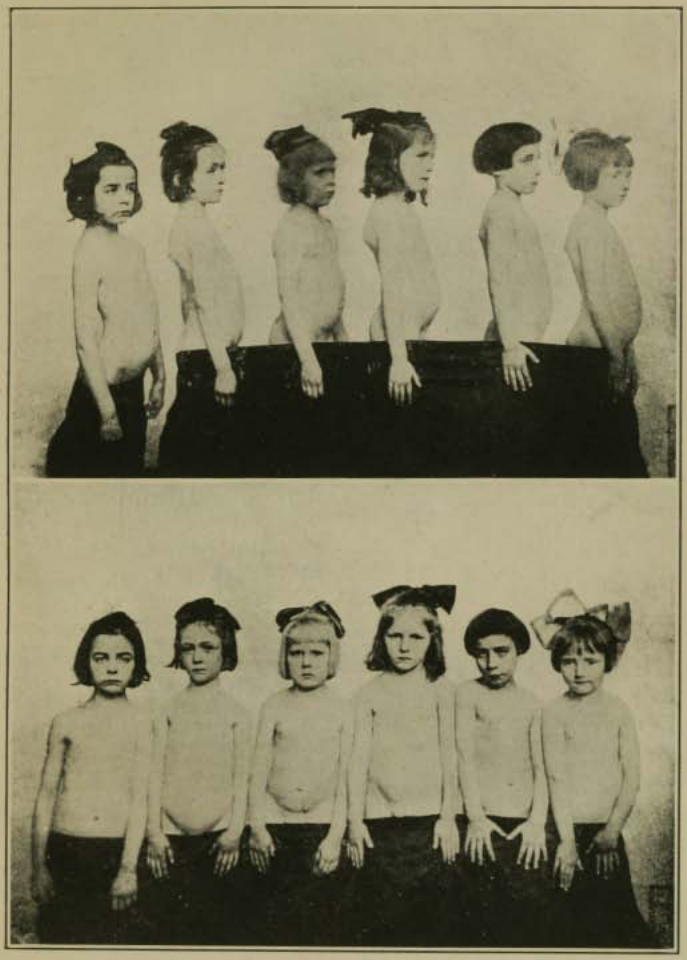

FIGURE 10. SIX MALNOURISHED GIRLS

This is a group at the Massachusetts General Hospital, taken as they sat in the nutrition class in the order of their gains for a week. Their serious expressions are characteristic, quite unlike those of happy, well children of normal weight. Observe the round shoulders, thin arms, and protuberant abdomens. The physical-growth examination convinced their parents of the need of immediate care.

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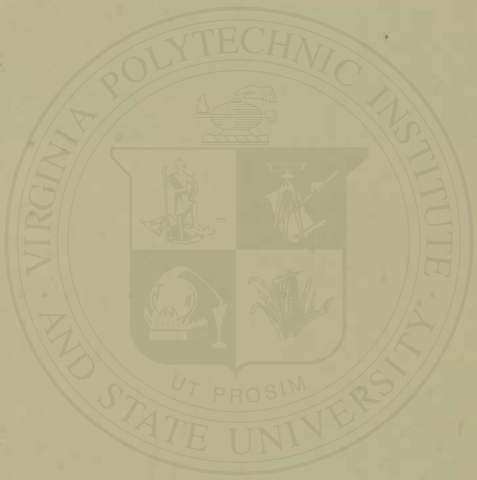

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pleteness of the nutrition examination was 47 per cent in the case of teeth defects.

This latter comparison with the diagnosis summary is a fair test of the two methods, because the results of an examination are almost sure to be overlooked if they are not brought down to the summary, from which the recommendations are usually made. It may be urged that the general examination is especially concerned with vital organs, and consequently omits less serious defects, but an inspection of the details of the more complete examination shows no defects included that do not have direct bearing upon the child's health.

"Before and After" Pictures.—Pictures of the child taken "before and after" treatment (as illustrated on pages 45, 184 and 186) make a valuable supplement to the physical examination. They should preferably be taken without clothing, but where this is not practicable any picture of the child will prove helpful. The "before" pictures should be taken at the time of the examination and not deferred until the child begins to show improvement; and the "after" pictures should be taken in the same relative position in order to show the contrast after the child has reached his normal weight line. Care

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should be taken to make these photographs represent true conditions.

In large clinics a single picture of several children in line can be taken. This picture will serve not only for group purposes by illustrating the prevalence of certain conditions, such as fatigue posture, but it can be cut, and the single picture attached to the record will serve to identify the individual child. (See Figure 10.)

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CHAPTER V

THE MENTAL EXAMINATION

MALNUTRITION does not cause mental deficiency, but it does result, at times, in a mental retardation closely resembling the actual state of defect. Many children who are under par physically manifest symptoms that are interpreted as indications of deficiency, when they are in reality signs of nervous strain and overfatigue, or irritability and dullness resulting from toxemia that has a physical and removable cause.

Such children do not have the strength to show interest in their studies, and falter and fumble at their tasks in a way that is exasperating to those in charge of them. Considered lazy, they are told, "Your fingers are all thumbs," or "You never get anything straight," or "If you have any brains, why not use them?" But such expressions merely add to the child's distress, and entirely fail to improve his condition, the real cause of which must be determined.

The malnourished child is frequently back-

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ward, forgetful, unhappy, over-sensitive, and unreasonable both in his likes and his dislikes. He may show signs of irritability, fretfulness, peevishness, inattention, and lack of concentration and yet be entirely normal in his mental development.

Similarly, such physical abnormalities as hare-lip, arched palate, ill-shapen head, ear, or limb, are not conclusive proofs of mental deficiency, although they are more frequently found in mentally defective than in normal children. Individuals vary, but any wide variation, either mental or physical, should be investigated.

It is the task of the nutrition clinic to determine by careful study and observation the significance of any of these symptoms that appear in the children admitted for treatment. Mental development closely parallels physical development, and any failure on the part of a child to show the interests and activities usual in children of his age should challenge attention. One of the best tests is the first impression made on the examining physician. If, in addition to this, the history shows that the child did not walk or talk at two years, that he has been difficult to get along with, or defiant of fundamental social law, this combined evidence justifies a thorough mental examination. In

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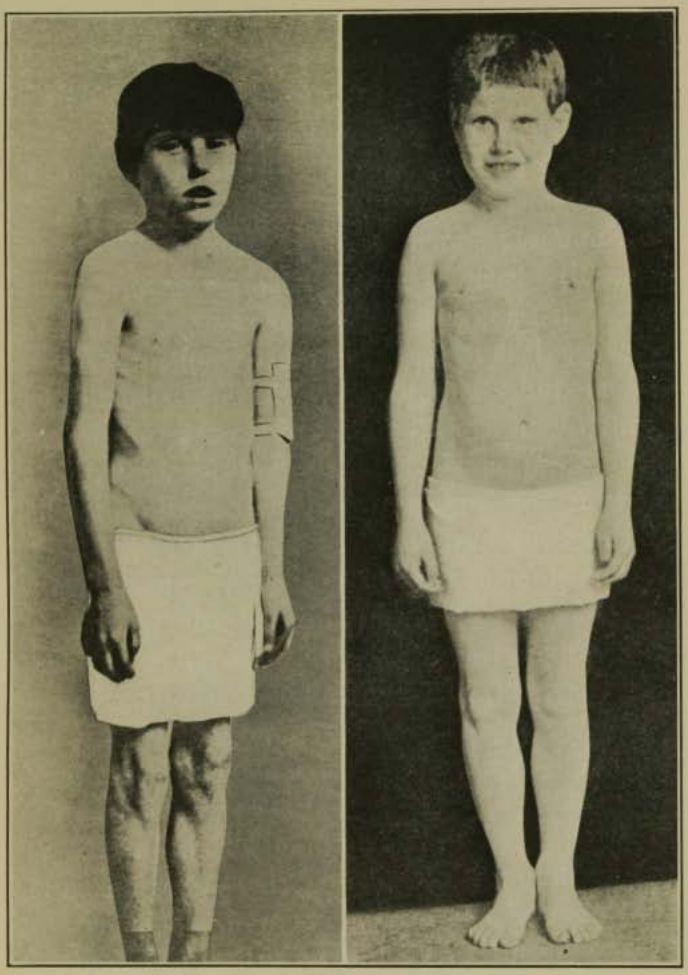

FIGURE 11. MENTAL RETARDATION OR MENTAL DEFICIENCY

Tom was 11 per cent underweight, a mouth breather, with round shoulders, flat chest, spinal curvature, and flabby muscles. He was considered stupid, and kept after school in a vain attempt to hold him up to his grade. The right half of the picture shows him after his diseased adenoids and tonsils had been removed and he had followed directions as to diet and rest. The transformation in his condition can be seen to be mental as well as physical.

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most communities there are trained experts who can pass authoritatively upon a child's mental condition. In consulting such a specialist all available data from the nutrition class should be supplied him to aid in his investigation of the child's mental health.

In questionable cases, however, the child should be given the benefit of the doubt, and an effort made to correct his malnutrition. It should be remembered that the unmanageable child is more often ill than bad or deficient. Any marked change in behavior suggests the onset of illness. Fretfulness from rickets, dullness and lack of memory from adenoids, irritable peevishness from digestive disorders, and the abnormal mental reactions of overfatigue all yield to treatment when their cause is once recognized, and a mental transformation frequently takes place along with the physical improvement.

Even where the child is found mentally defective, he will be happier and his mental condition will improve if his nutrition is brought up to normal. The condition should not be made an excuse for neglect or lack of control, which will merely aggravate his malady.

Home conditions and early training in self-control are important factors in leading the

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child to normal behavior. I have seen this illustrated in the case of a boy who was so utterly defiant of parental authority that he would actually fight his mother with feet and fists. It was thought certain the child was mentally deficient, but before accepting this explanation as final, it was decided to try what discipline and a change of environment would do. He was accordingly sent to a well organized boys' school, and at the end of the year the master reported, "He is a little gentleman."

Life for many undisciplined children is an almost unbroken series of dissipations. What they want they must have at any sacrifice of health, or even of character. Such children become past masters in the art of getting their own way, and play the game to its limit. Many of these spoiled boys and girls, persisting in the attempt to have their own way, later in life overstep the moral law or the written statute, and bring upon themselves disgrace or the penalty exacted by the state. While their conduct indicates mental impairment, it may be only the logical result of lack of training.

The mental progress of children from three years to 10 may be tested according to the following standards from the Binet-Simon series:

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THREE YEARS:

Points to nose, eyes, and mouth.
Repeats short sentence.
Picks out objects in picture.

FOUR YEARS:

Knows sex.
Recognizes a knife, key, etc.
Repeats three numerals.
Distinguishes between long and short line.

FIVE YEARS:

Distinguishes between two objects of different weight.
Copies a square.
Repeats sentence of eight or ten words.
Counts four.

SIX YEARS:

Knows morning and afternoon
Defines simple objects, giving the use as a definition, for instance, a fork is to eat with.
Carries out simple commands involving two or three things.
Knows right and left.

SEVEN YEARS:

Counts thirteen or more.
Describes pictures.
Copies other figures than squares.
Knows colors.

EIGHT YEARS:

Counts backward from twenty to one.
Gives the essential difference between such objects as glass and wood, fly and butterfly.
Knows the days of week.
Repeats five numerals.

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NINE YEARS:

Knows the date.
Names months of the year.
Makes simple change in handling money.
Gives definition of objects other than by expressing their use.

TEN YEARS:

Knows money values.
Repeats six numerals.
Gives intelligent answers to simple questions involving thought; for example, "What would you do if a playmate struck you accidentally?"

In suggesting these simple tests, that can be made by the mother in the home without the use of apparatus, Stearns says:[1] "Failure to respond to these tests . . . must be explained. Taken in conjunction with slow development in other things, they point toward permanent limitation of the possibility of intellectual development. Alone, they show that something is wrong, mental, physical, or educational."

As children grow older, progress in school is significant evidence of mental development. A delay of a single year in passing to the next grade deserves consideration, and two or more years' retardation is serious. If there are no

[1] A. Warren Stearns, "Practical Mental Examinations for Growing Children," No. 14 in List of Publications, p. 332.

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physical conditions interfering with the child's progress, such retardation points to the desirability of special training adapted to the needs of the individual child.

Borderline cases often escape observation because some mental defectives manifest qualities of affection and amiability which cause their deficiencies to be overlooked. A child may be sub-normal in only one or two respects, and if these happen not to affect the standards of efficiency that are expected of him, they are liable to be neglected. If, however, they are moral defects or such as affect his ability to gain a livelihood, they will more easily be discovered.

Unrecognized mental deficiency in malnourished children will sometimes explain the failure to get results in cases which appear to be "free to gain." If a child is mentally deficient, there is always the possibility that one of the parents is likewise defective, and in this case untrustworthy and misleading reports will be given as to the carrying out of directions. A family of this sort, with several members slightly defective, may take up the time of social workers from various institutions with little or no result. The mother will passively accept advice, but do nothing, rendering numberless visits to the home necessary.

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A study of the economic background and social relations of each child is important in determining accurately his mental as well as his physical condition. Such an investigation we call the social examination.

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CHAPTER VI

THE SOCIAL EXAMINATION

After the physical defects have been discovered through the physical-growth examination, and the child's mental condition has been investigated, the social examination is brought to bear on those factors that are concerned with the four remaining causes of malnutrition, namely:

Lack of home control
Overfatigue
Improper diet and faulty food habits
Faulty health habits

The history record already described is the first source of social information, and often gives useful hints about the organization of the home and the kind of control that prevails there. This must be expanded by a careful investigation of the child's life during the entire 24 hours, and a diagnosis cannot be complete that considers only a part of that time. As many of the causes of malnutrition exist merely because they are unrecognized, it is futile to attempt treatment without securing complete

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data as to the food and health habits of the child and all the conditions that may be causing overfatigue.

The 48-Hour Record.—A record of the child's interests, activities, and occupations for two consecutive days, with a detailed list of all food taken during the same period, is the best approach to a thorough understanding of the social causes of malnutrition. A single day may be exceptional, but a schedule covering two consecutive days will give a fair average of the usual routine. Friday and Saturday are good days to select because they will show the outside activities as well as the school schedule.

In order to gain a true knowledge of the child's habits this first record should be taken before any suggestions are made for their improvement. It is usually a surprise even to well informed and observant parents to face this record in black and white, and it becomes obvious at once that changes are needed.

The following schedules are typical of conditions appearing constantly in our nutrition classes:

A Private School Boy Who Bolted his Breakfast

Daniel C., 6 to 7:30 reads in bed; 7:30 rises; breakfast 7:45; bus to school at 8; in school 8:30 to

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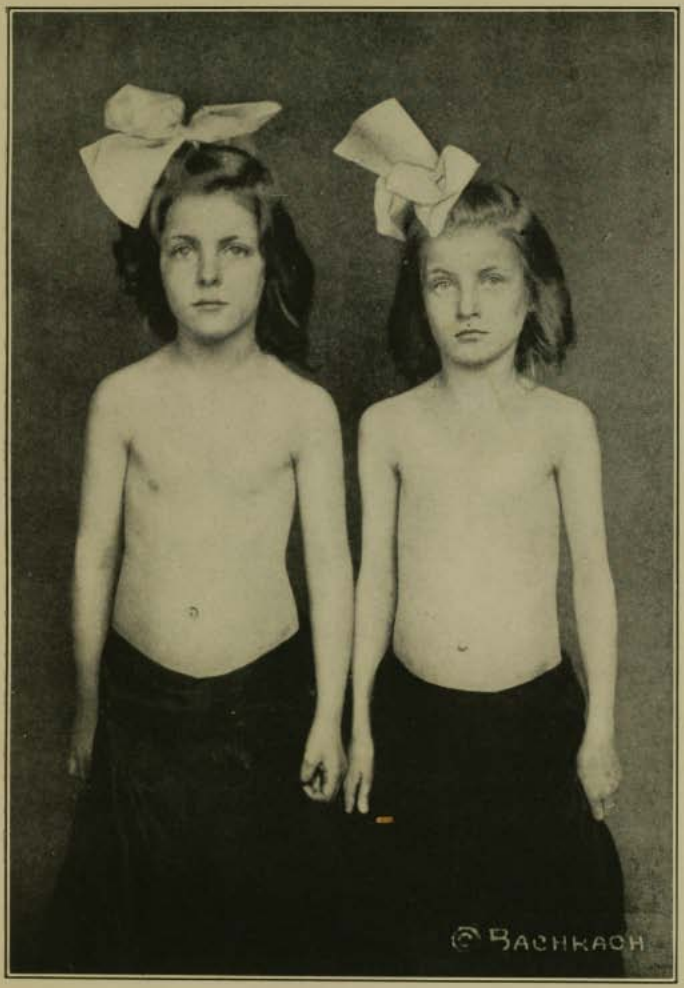

FIGURE 12. HEREDITY IS NOT USUALLY THE CAUSE OF MALNUTRITION

Mary and Alice are twins. At birth Mary weighed 4½ pounds, and Alice, 5½ pounds. Now, at the age of nine years, Mary weighs 14 pounds more than her sister because Alice omitted milk and cereal from her diet. Mary has also outstripped Alice in height.

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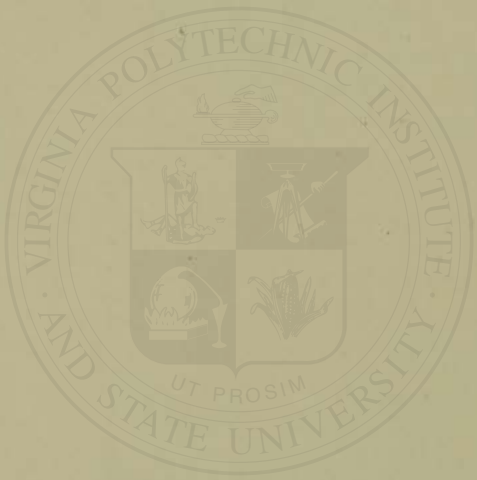

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12; half hour recess for lunch; 12:30 to 2 in school; 2 to 4 supervised play; home at 4:30 with lunch on arrival; 5 to 6 reading or games; 6 to 6:30 supper; 6:30 to 8 home study; retires at 8:30.

The hour and a half of reading in bed and the hurried breakfast made a bad start for the day, which was not offset by the advantages of an open-air school. The boy failed to gain until both these habits were corrected.

Too Much Indoor Occupation

Dorothy S., rises at 7; breakfast 7:30; school at 8:30; recess 10:30; home for dinner at 12; school at 1; out of school at 3:30; Hebrew lessons 4 to 6 every day except Friday and Saturday; supper at 6; assists with housework, studies lessons, goes to bed at 9.

This girl was on the waiting list at a neighboring settlement to take piano lessons as soon as there was a vacancy. With such continuous indoor occupation it was not surprising that Dorothy was sent to the nutrition class from a tuberculosis clinic.

Irregular Meals and Late Hours

James G., 5 to 7 rises, chores, breakfast; 7 to 8:30 trip to next town and half mile walk to rural high school; 8:30 to 12 in school with 15-minute recess at 10:15; 12 to 12:30 cold lunch eaten in basement with other boys; 12:30 to 2 in school;

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2 to 4 return trip home with cold lunch on arrival; 4:15 to 7 chores and supper; 7 to 9:30 or 10 reading, games, study, or moving pictures; 9:30 or 10 to 5 sleep.

A Fifteen-year-old Girl with a Sixteen-hour Schedule

Isabel B., 5:30 or 6 to 7:15 rises, breakfast, gets ready for school; 7:15 to 8:30 walks 15 minutes to car line, 30-minute ride on car, walks five blocks to school; 8:30 to 12:15 in school; 12:15 to 12:45 recess and lunch; 12:45 to 2:15 in school; 2:15 to 3:30 return trip home with cold lunch; 4 to 6 delivers milk to three neighbors, all on separate trips, making a walk of four miles; 6:30 to 7:30 supper, washes and wipes dishes for eight persons; 7:30 to 9:30 studies lessons; 9:30 to 5:30 or 6 sleep.

The advantage of making these records is evident. No one concerned in the care of these children had any idea how much they were attempting to crowd into the child's day. A study of the daily program of almost any boy or girl reveals similarly unsuspected demands upon the child's energy.

Overfatigue.—After analyzing the 48-hour record, further questions may be necessary to bring out the facts relating to overfatigue, such as: What part of the child's day is given to

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play, to work, and to school? How long is he actually in bed? How much of that time is he asleep? Has he learned to rest when not sleeping? What time does he go to bed? Does he rise in time to get to school promptly without hurry or worry?

Home Conditions.—What are the requirements made upon the child as a member of the family or household? Does he receive too much attention from older people? Does he receive enough? Does he like to play alone? Who are his chosen associates? What are his favorite forms of recreation? How is he punished? Is he obedient? What regular engagements has he in the way of scout duties, clubs, music or dancing lessons, gymnastic training, lessons in foreign languages or religion?

Food Habits.—What is the average number of minutes spent at each of his meals? What are the interests that hurry him away from the table? Does he wash down his food with liquids? Does he drink tea, coffee, ice water? How much money does he have to spend for candy? Has he any marked likes or dislikes in the way of food?

Health Habits.—How much of the child's day is spent in the open air? What are his sleeping conditions with reference to open win-

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dows, drafts, light, etc.? Does he sleep alone? Is he disturbed by other members of the family who retire later or rise earlier? Does he have a movement of the bowels at a regular time every day? Does he get his feet wet? How often does he bathe?

The New Program.—A careful study of the replies to these questions will throw light on many possible causes of the child's malnutrition, and suggest treatment for their removal. In making up the daily program as few changes as possible should be made, and these with full consideration for the tastes and prejudices of the child in order that progress may be made along the lines of least resistance. The really wrong conditions should be determined, and all the force that can be brought to bear focused upon their correction; but too much interference in unimportant details will only defeat the main purpose, which is to make sure that the *essentials of health* are obtained.

The new program should be checked up by a 48-hour record each week. Where the children meet in nutrition classes, individual conferences following the class meeting will afford opportunity for securing further information, and these may be supplemented by home visits where necessary.

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Foster Homes.—The 48-hour records have proved especially useful in the supervision of children placed in foster homes. In a class

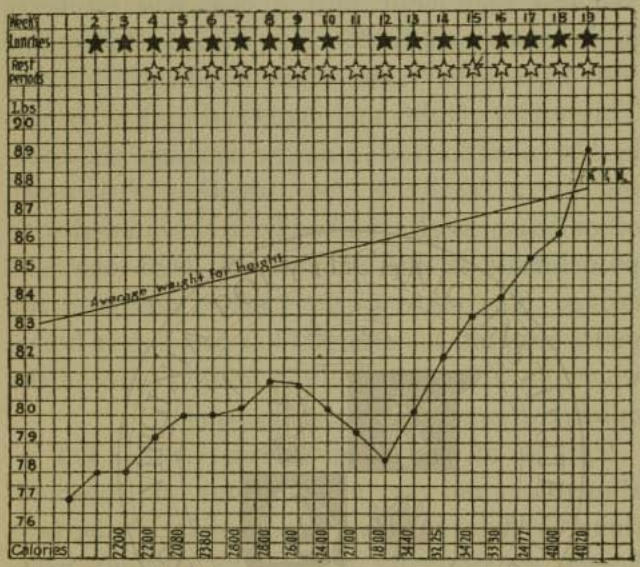

FIGURE 13. AN UNHAPPY HOME

Cynthia slowly gained in weight until the eighth week, when she became unhappy in her foster home. This caused a loss of appetite with a consequent loss in weight. At the end of the twelfth week she was transferred to another home where she was happy. Her appetite at once improved, she gained rapidly, and in 19 weeks went well "over the top."

composed entirely of older children from such homes one of the girls continued to remain at the foot of the class, although there was no evident reason for her marked loss of weight. She was taking sufficient food to gain, 2,400

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calories, and the foster mother could apparently offer no explanation. When the child was questioned by herself, however, as to just what she did each hour of the day, she suddenly broke down and disclosed a schedule that might well have been taken from a tale of Dickens. This underweight, malnourished girl of twelve had been compelled to do the washing and ironing for a family of five, together with much other heavy work, and had been threatened with punishment if she should tell what she was doing. The state worker, after verifying the girl's account, transferred her to a better home, where an immediate gain in weight showed the quick response to proper treatment.

This is, of course, an extreme case. Yet instances are not rare of ambitious and conscientious children in what are considered the best homes overworking themselves without pressure from either parents, or teachers—playing too hard, studying too hard, or working too hard.

Summary of a Social Investigation.—In a large group of children who came under our observation after having been previously under the care of visiting nurses and social workers for a considerable period of time, we found 72 per cent still using tea, coffee, or both; 64 per

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cent keeping late hours; 28 per cent taking insufficient food; 36 per cent eating too fast; and 54 per cent suffering from overfatigue due to extra work in clubs, classes, church, or industry. Several children in the group had scarcely a free half-hour in the whole week.

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PART II

MALNUTRITION AND THE HOME

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CHAPTER VII

THE ESSENTIALS OF HEALTH

The growing child requires open air, sufficient food for growth, adequate exercise, and proper rest. Yet with all these requirements provided, many children nevertheless fail to develop properly and become seriously malnourished. Open air will not help the child unless he can breathe it freely into the lungs. Sufficient food may be available, and it usually is, but if food habits are wrong he will still be undernourished; it is not so much what a child eats, but what he assimilates, that promotes his growth. He may have opportunity for exercise and rest, but unless properly employed, these in turn fail to insure normal growth and health.

To overcome all obstacles in the way of the child's progress, as indicated by the foregoing discussion of the causes of malnutrition, a comprehensive program must be adopted that includes all the *essentials of health*. Reduced to their simplest terms, these may be re-stated as follows:

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1. The removal of physical defects
2. Sufficient home control to insure good food and health habits
3. The prevention of overfatigue
4. Proper food at regular and sufficiently frequent intervals
5. Fresh air by day and by night

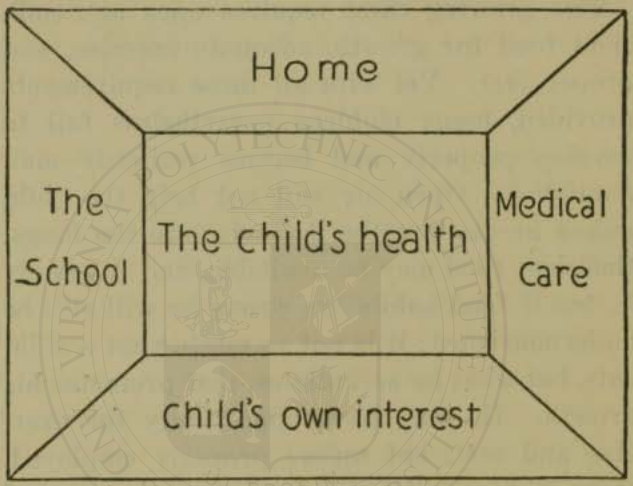

FIGURE 14. THE PARALLELOGRAM OF FORCES THAT SAFEGUARD THE CHILD'S HEALTH

An analysis of this list makes it apparent that the necessary conditions can be readily established provided all forces that control the child's health are brought into coöperation. These controlling factors fall into four groups, constituting a parallelogram of forces that safeguard the health of the child.

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The first factor is the *Home;* the second includes those relations that are *Medical* in nature; the third group consists of the *School* and other social organizations; while, connecting and uniting them all, is the fourth force, the *Child's Own Interest.* Disregard of any one of these four forces may defeat what the others might accomplish, while a program that takes full account of them all insures rapid improvement in health and growth.

A well organized nutrition class is the best agency for coördinating these forces in a program that provides a common appeal. Starting with a thorough physical examination, it undertakes to secure the coöperation of the home in carrying out the recommendations of the physician. Where school pressure is interfering with the child's progress, it assists the parent in securing a modification of the school program or such an adjustment of its schedule as will remove the occasion of overfatigue. By showing the needs of the malnourished children, and recommending their separation from the regular class until they are brought up to normal condition, it aids the school in maintaining its standards for the children who are well. The nutrition class also arouses the child's own interest so that he is willing to "train for

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health" and enter heartily into the plans made for his improvement.

The Home.—It is discouraging for a mother who has reorganized her home life, planned for lunches and rest periods, and in every way made a business of caring for her child, to find that something outside the walls of her home is blocking his progress. Thousands of children, it is true, are being made well by the earnest and intelligent efforts of mother and child working together with little outside help; but unfortunately it is also true that many of the best home programs fail because, however strong the chain that the mother has forged, there are essential links beyond her immediate control that break with any sudden strain.

The School.—In one instance, the child fails to gain because of long school hours or too short an intermission at noon. In another, the trouble is caused by the demands of clubs or other associations that it seems desirable the child should maintain. Even progress as a Boy or Girl Scout, or confirmation in church, requires extra study in a program already full to overflowing. The mothers and their children may be genuinely interested in health, but there is a conflict between the health essentials and

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these other interests that calls for adjustment and compromise.

Every mother is forced to recognize these claims. Some look upon them as occasions for irritation, to be resisted as far as possible, while others are unwisely ready to give over the power of decision to the school or social worker concerned, or even to the child himself. The central responsibility, however, must remain with the parents, and when they call in the aid of any special worker or organization, they must see that the new activity fits in with the rest of the child's program; otherwise, instead of being better off from the new association, he may be merely the victim of added and conflicting pressure.

Medical Care.—Many child-helping agencies whose efforts are well directed along one or more lines fail to secure substantial results because they do not recognize the inter-relation of these forces in the child's life. This is, perhaps, most true in the case of medical care, which is an essential feature of the nutrition class program. More children are kept from normal development by not being "free to gain" than by any other single cause. Obstructions to breathing and other physical defects are handicaps that offset the good that

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might otherwise result from careful instruction in food and hygiene. A complete physical examination is the only sure method of determining the medical causes of malnutrition, and no program that disregards this factor can bring about more than transitory improvement.

The Child's Own Interest.—It is not necessary to remind parents or teachers that children willingly exert themselves for something in which they are interested, while it is impossible to bring their forces into action when they feel no concern in the object to be attained. As the malnourished child is frequently a "difficult" child, and the carrying out of the health program demands both perseverance and self-sacrifice on his part, it will be seen how important it is to arouse his own interest in his health and to secure his coöperation. In the nutrition class the weight charts visualize the progress made and stimulate the children to a healthy spirit of competition; while the failure of those who do not follow directions, as well as the success of those who do, serves as a convincing demonstration to the whole group, and secures their coöperation and hearty support.

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CHAPTER VIII

HOME CONTROL

Malnutrition can often be traced to faulty home conditions, and in all cases the home is an essential factor in successful treatment. The physician can outline the important points of a health program, but its success will be in proportion to the degree of coöperation with which it is carried out by parent and child. It is well to consider what is the prevailing atmosphere of the home. Is it positive or negative, a place of hope and stimulation or one of repression and fear? Does its tone indicate hurry, injustice, worry, deception, or the opposite of these undesirable qualities? Do the children hear constantly, "Don't do this," and "Don't do that," or are they encouraged to try things out for themselves with a minimum of caution, but with help given freely when necessary?

Home conditions affect all children, but they are of special significance in the lives of the malnourished. Good government in the home, as in the state, makes for happiness and health, and the principle of self-government will bring

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about surprising results in the matter of health once the child's own interest is aroused, and his attention directed to the subject intelligently.

Training for Health.—There is powerful suggestion for good in such slogans as the Boy Scout phrase, "Be prepared." Children are natural hero-worshipers, and the desire to be a good athlete, or to excel in games or other accomplishments admired in others, will make many a boy and girl willingly accept self-discipline that could not easily be imposed on them by others. Appeal should be made to the child's ideals through the reading of tales of hardihood and vigor. Nothing counts for more than the painting of mental pictures that reveal the possibilities of strength, force, and health in such vivid colors that the child will be inspired to make them realities in his own case. The child must be made to take a personal interest in his health. He should not follow the health program merely as a matter of routine and obedience, but should be so convinced of its value that no external discipline is needed to make him carry it out.

This has been exemplified in numerous cases in our nutrition classes. One child will remind a forgetful mother of the time for lunches and rest periods; another will ask for more air in

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FIGURE 15. A DIFFERENCE OF FIVE YEARS IN AGE AND OF FOUR POUNDS IN WEIGHT

Paul is eight years old and weighs 33 pounds; his brother Ralph is three, and weighs 29 pounds. Paul is stunted both in height and in weight because of improper food habits. The nutrition worker found that he was taking less food than that required by an infant of one year. He did not like milk, bread, butter, fish, or meat; he washed his food down with liquids; and he was allowed to sit at the table and play with his food while the others were eating. His mother says he is "irritable and cranky." Ralph, on the other hand, is strong, good-natured, and happy.

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the sleeping room; others give up tea and coffee, and teach themselves to like foods to which they previously had an antipathy. Children even persevere in their efforts when the coöperation of the home is lacking, or when unable to continue attendance at the classes. After the summer vacation many reports of good gains are brought in to the clinic. In one case, a girl of 13 who had been absent over a year gained 15 pounds and came to claim her certificate, which she had won by her own efforts while her mother was away from home.

Winning the Child's Confidence.—There is nothing of greater importance to a child than to feel that he is understood. The wise mother knows when a child is over-taxed, and makes proper allowance for him. She realizes that his disposition changes under stress, and says, truly, "He is not himself." She studies to recognize the occasions on which this is a valid excuse, and tries to find the cause and remove it.

A frequent cause of malnutrition is found in the child's feeling that he has been unjustly treated, and the fact that he may be mistaken makes the result no less serious. If the weekly weighing is made something of a ceremony, and the child sees that both parents are really interested in his condition, he will respond with

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an unusual degree of confidence. It is important to find out what the child really cares for and fears. Some trifling matter may be causing a distress that interferes with normal growth. Counter-suggestion, it should be remembered, is much more effective than repression, and it has only recently been recognized how much fear, apprehension, and distress in later life are due to repression in childhood.

The Correction of Bad Sex Habits.—Many mothers are much concerned about the effect upon the children's health of bad sex habits. This is naturally a matter about which it is not difficult to have misunderstanding. A feeling of delicacy and reticence often leads to suspicions that read into some simple statement or act much more than belongs to it. It is easy to look at these matters from an excessively moral standpoint, and to fail to see the normal physical and mental aspects that may need attention. Boys and girls are, on the whole, a level-headed lot, and they usually understand such matters in a healthy way.

With a little child a tendency to masturbation should be met in the same manner that one would deal with biting finger nails or sucking thumbs. It may require some simple punishment to prevent the formation of this habit, but

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the child should not be led to focus attention upon the subject.

An older child suffers more from the effects of worry about what he fears may be wrong than from any other cause. This worry is often serious, and the air of mystery and secrecy with which adults treat the subject only makes a bad matter worse. It may be comforting to parents to know that in a most careful investigation that we have made recently we have not found a single instance in which bad sex habits had caused malnutrition. Among mentally deficient children, the presence of these habits is an effect of their mental condition, and is rarely, if ever, the cause.

Selfishness in Parents and Children.—Much of the self-indulgence that wastes a child's life grows out of the self-indulgence of older people. The mother who lets her child "have his own way" is often gratifying her own pleasure. By making a pet of him she seeks to make him dependent solely on her for his happiness and comfort. She encourages him to come to her with little ailments and symptoms, and sympathizes with his sensitiveness instead of teaching him to meet small hurts and disappointments with self-control. The problem of the

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spoiled child is too often the problem of the spoiled mother.

The thought that even little children can do something helpful for other members of the family will do away with many tendencies towards selfishness. The child should be encouraged in the normal wish to help by having his activity directed into useful avenues. His desire to be useful begins to show itself when his actual accomplishment amounts to little, but his attempts should nevertheless be encouraged. The failure to help later when his work would be worth more may be due to the fact that the earlier impulse was not turned into a habit of helpfulness.

Self-reliance and readiness to coöperate furnish the best basis for health as well as for happiness. The child should be taught to assume responsibility from his earliest years. Apart from the value of the service, there is the importance to him of having a constructive and responsible attitude towards life. How many parents, instead of giving the child the needed instruction, will say, "I'd rather do it myself than be bothered with him." On the other hand, it is possible to go too far in this direction, and to lay burdens upon a child heavier than his strength should bear.

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Many cases of malnutrition are a direct result of over-indulgence for which the "spoiled child" pays a heavy penalty. The malnourished child is apt to be the only child, or else the youngest or the oldest—the "pet" who has got the upper hand of the father and the mother. It is evident in many homes that the child is in control, and the parent his willing or unwilling slave. If he does not wish to do a thing, he has no idea that there is any reason why he should, or any power to compel him. Nothing can be accomplished in such a home until it is made clear that there is some one besides the child who is directing the course of his program.

The tendency to undue self-assertiveness appears naturally at a certain age, and would soon disappear if properly met and handled. Displays of temper are usually practiced because they have proved a successful means of getting what the child wants. If encouraged in his defiance of authority, he may become saddled for life with a disagreeable and unfortunate habit.

The Influence of Suggestion and Competition.—Malnourished children are especially susceptible to suggestion, and fears once impressed upon them are almost impossible to eradicate. Their condition should always be spoken of hopefully in their presence. They should be

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impressed with the fact that it is normal to be well, and should not be allowed to think of themselves as invalids.

Among the poor we find many children who are kept from normal growth by worry over the payment of rent, the care of younger children, the fear of the father's losing his job. Even in the homes of the well-to-do, young children come to know too much about the anxieties and difficulties that oppress their parents. They should not be allowed to enter into the discussion of family problems, or made to share anxiety over conditions that they cannot help to control.

Perhaps the most powerful influence in a child's life is the approval of his associates. He is quick to detect what is considered "good form" in the group to which he belongs, or wishes to belong. The spirit of competition makes a strong appeal, and a boy will spur himself on to achieve what others of his group have accomplished. This is one of the great advantages of association in nutrition classes. But even when the child is alone, he has his own normal weight standard with which to compete, and this is the goal that will help to enforce the rest periods, extra lunches, early hours, and other features of a good health program.

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Punishment Should Be Constructive. — It should never be forgotten that punishment is always an individual problem. A little study of the child's nature will show how to be just and fair to him, and only on that basis can his respect and affection be retained. The right kind of punishment tends to do away with the necessity for its repetition, and the aim should be to make it easier for the child to do what is best for his health rather than to "have his own way" and do himself harm.

Happiness has a positive health value, and wrong methods of punishment are a frequent cause of malnutrition. In the ideal home there is a healthy, normal attitude that seems to keep the child away from acts that call for punishment. When the need does come, it should be met in a constructive spirit, with no evidence of retribution or bad temper.

One of the most serious cruelties practiced upon a child is the withholding of an expected punishment until the following day. Punishment should be prompt, although if there is any reason for doubt, justice should not be sacrificed to promptness. To punish justly it is necessary to know the reactions of the individual child. Unfortunately, much punishment is given as a matter of form, with little more than

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superficial results, and many mothers show a singular lack of imagination when confronted by a situation requiring discipline.

Physical punishment is rarely necessary, and should be used experimentally, and only as a last resort. When it is really needed and is well used, it may prove very effective.

Sending a child to bed without supper is inexcusable, and is particularly ill-advised in the case of the malnourished child. On the other hand, taking away privileges is a sound method of discipline. This may take the form of advancing the usual bedtime for a short period, which will have the benefit of reducing the child's activities and increasing his time for rest. Especially good conduct may be recognized by shortening the time of the early-to-bed sentence, and further misdemeanor punished by extending its duration.

Responsibility of the Parents.—In the complicated conditions of modern life parenthood is more than ever an art calling for great skill and judgment. Where bad control has existed for some time, it may be necessary to separate a mother and child for a short period. We have had many cases in which children failed to gain, or continued to lose, while under the care of the mother, and began at once to climb to

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their normal weight line as soon as an aunt, or cousin, or grandmother took them in charge. Similar improvement is often effected when the child is placed in a well organized school.

To control all the factors affecting the health of their children the interest of the parents must extend beyond the home to church, school, playground, club, and every other center of their activity and interest. In Chapter I we list *lack of home control* as one of the principal causes of malnutrition, but it is, in fact, directly or indirectly responsible for all the others. If there are *physical defects* present, it is the parents' duty to see that they are removed; *faulty food and health habits* must be corrected in the home; and *overfatigue,* whether from work, study, or play, can be avoided only by the watchful supervision of thoughtful parents.

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CHAPTER IX

OVERFATIGUE

CONTINUED experience in the treatment of malnutrition leads me to the belief that there is no responsible cause for this condition more frequently overlooked than habitual overfatigue. It is hard for grown people to realize how many and how wearing are the activities of the child, and even where it is recognized that the child is overtired, the condition is assumed to be a temporary discomfort, rather than a serious cause of permanent injury.

Fatigue and Overfatigue.—It is necessary to distinguish between the fatigue that is a natural result of exertion, from which there is a quick recovery, and overfatigue, which carries the child each time farther from his normal condition, and makes his return to health more difficult. In this case the child is either overstimulated so as not to know that he is tired, or else he has a disinclination for exertion of any kind, and a feeling of being dragged out and exhausted.

The problem of overfatigue has been one of

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the most difficult problems of the physiologist. There is no single test or group of tests that will serve as an accurate measure of fatigue, and we must be guided therefore by practical observation of the physical condition of the child and his reactions to his various tasks. The weight curve is the most valuable test available to show the effect of fatigue. If the child fails to gain after other known causes for his loss of weight have been removed, overfatigue must always be suspected as the cause of his poor condition. Usually, a modification of the mental or physical program, with increased rest periods, will bring about a prompt gain and demonstrate that overfatigue has been the obstacle to progress.

No one experienced in the care of animals allows them to be over-exercised during the growing period. A valuable colt is never entered in long races until maturity, and it is recognized that a horse can be killed by overdriving or by being fed immediately after severe exercise. There is need for similar caution in the care of the growing child.

Causes of Overfatigue.—There are a thousand causes of overfatigue. The child will naturally overdo, and the brighter and more active he is, the greater the danger. The spirit of

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competition and the desire to stand well with his associates leads him to undertake tasks far beyond his strength. This may be seen most frequently in play, where many a child is led through the influence of his comrades to enter into contests calling for both mental and physical endurance, when he has no energy to spare for such strenuous exertion.

Adults seldom appreciate how much energy and strength are required in simply growing. They do not take into account how often the child is over-taxed in trying to keep up with older people, not only in walking, for example, but in adapting himself to the various tools and equipment of a world that is designed for grown-ups.

A written record of the child's activities for 48 hours will surprise almost any parent in its revelation of unnoticed occasions of fatigue. This is especially true during the earlier years. From the age of two to six the child is apt to be made the pet of the family, each member in turn entertaining him, seldom leaving him alone, and often interrupting his proper routine to gratify the wish to be with him. Spurred on by one stimulus after another, the child is tired out at the end of the day, but may have his bedtime delayed for the father's return,

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and his sleep disturbed again in the morning so that the father may see him before leaving home.

The 48-hour record (as described in detail under the Social Examination, Chapter VI) should be analyzed, and every item challenged to see if it is a necessary tax on the child's strength. His program should then be corrected so as to provide for an improved expenditure of time and energy.

Rest and Sleep.—The amount of sleep needed varies with the individual, but every malnourished child should spend at least from 10 to 12 hours in bed every night. Some get their best sleep early in the night, while others sleep better in the morning. The greater number of "nervous" children seem to be of the "morning" type. The same individuality is evident in all forms of fatigue. Each child has his own way of becoming tired, which may be very unlike that of other members of the family. The same cause may show effect in various ways and in different parts of the body. "Nervous" children frequently show fatigue by restlessness, tossing in their sleep, and nightmare.

In addition to the night's rest, regular rest periods in the middle of the morning and the

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middle of the afternoon are recommended for all children who fail to gain when following the nutrition program, and whose malnutrition is found to be the result of overfatigue. These rest periods have the effect of shortening the periods of activity, and therefore preventing further fatigue, while the rest and sleep restore the waste of past activity. The rest periods also increase the child's power of food assimilation. Fatigue interferes with absorption, and the child will benefit in both appetite and digestion if he has a short rest before eating.

The proper position for the rest periods is shown in Figure 16. The clothing should be loosened, the windows open, and the child should face away from the light. He should not be allowed to take either books or toys to bed with him. Children should be taught to rest even when not sleeping, although the regularity of the rest periods when faithfully followed seldom fails to induce sleep. The rest period should be for at least half an hour, but 20 minutes of complete rest are worth more than an hour spent tossing about in discomfort. The ability to sleep for short periods at any time is a habit that makes for health.

In extreme cases, absolute rest in bed for several days may be the means of causing the first

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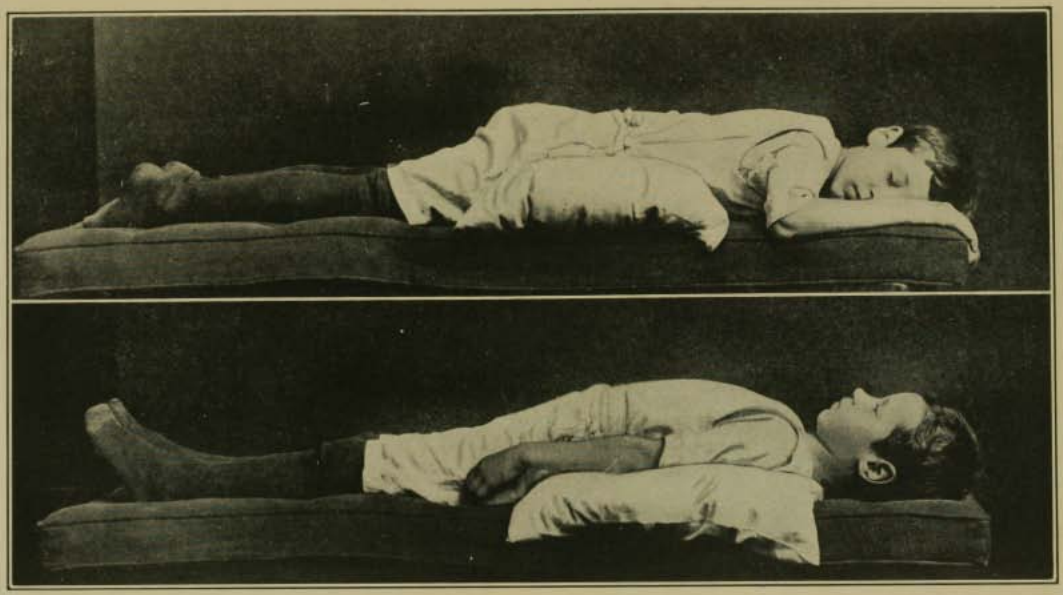

FIGURE 16. REST POSITIONS

The pillow below the shoulders when lying on the back, and under the abdomen when lying face down, helps to overcome the fatigue posture and to correct round shoulders and cramped chest. It is especially helpful on a sagging bed.

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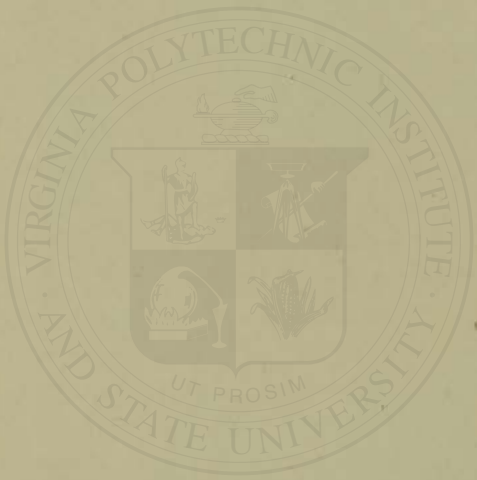

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gain. In other instances, it will be better for the child to have breakfast in bed at his regular hour, and then continue to rest until 10 or 11 o'clock. He should not be allowed to sleep through his usual breakfast time, and thus lose the value of regular meals.

During the early years of childhood discretion should be used in story telling at bedtime. At the age of four or five the imagination is especially active, and exciting stories often affect the child painfully, causing fear of the dark, of unusual sounds, and of strangers. The child should go to bed happy and contented, under conditions that assure warmth and comfort, and with the distinct idea of going to sleep at once.

As light is a powerful sensory stimulus, there should be no light in the sleeping room. It has been demonstrated that the depth of sleep is much greater during the dark nights of winter than during the lighter nights of summer. Children should not be permitted to sleep in underclothing that has been worn during the day. Their sleep should not be disturbed by the later retiring or earlier rising of other members of the family.

Among older children it is necessary to limit the activities that tend to prolong their day. After a full school schedule, with home study

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and some share in household tasks or chores, it is natural for the child to wish to have some amusement in the evening. With each succeeding year these social demands increase their pressure, and are fraught with the greatest danger for those children who are below normal weight. A short vacation filled with social distractions may offset the gain made during a whole year. Nearly 40 per cent of all malnourished children keep late hours.

The Strain of School Life.—It is difficult to gage or measure the utter fatigue of the malnourished child in his struggle to meet standards that are frequently too high even for those who are well. This is especially the case in school life, where our very efficiency in employing the spirit of competition is a source of peril to the undernourished. Children are urged on by such slogans as "Never give up" and "Always say, 'I'll try,' " while to this appeal to pride and honor their comrades add the spur of "Don't be a quitter."

A school committee chairman of long experience told me that in an investigation of the causes of truancy one of the children told him he stayed away from school because he "got tired of the teacher's voice." This child was suffering from overfatigue, and if this condi-

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tion had been better realized the matter of his school discipline might have been greatly simplified. Few adults feel equal to concentrated mental effort for more than an hour or two at a time, yet many schools expect three and four hours of continuous application from undernourished children.

That this long school program is not necessary for all children is proved by the fact that many of the children in our nutrition classes are able to keep up with their grade when excused at the middle of the morning session. The daughter of a physician was taken out of school entirely, but was able to make the same progress as her class upon an hour's tutoring a day. This subject of the school program is of so much importance that it will be separately discussed in Chapter XXII.

Outside Studies and Clubs.—During the late war many schools kept the children after hours for knitting, sewing, and other patriotic work. The fact that attendance was not compulsory did not remove the pressure of the suggestion that it would be selfish or unpatriotic to withdraw.

Even religion may be the occasion for checking growth. Long church services, Sunday school, choir rehearsals, revivals, and other re-

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ligious observances impose a greater strain than the malnourished child is able to bear. Among the Hebrews, children are expected to spend from four to eight hours each week studying Biblical history and the Hebrew language, and these classes are often held in badly ventilated and poorly lighted rooms.

Music lessons and dancing classes are other sources of strain and fatigue that should be omitted during the period of treatment.

The child's program is further complicated by the numerous clubs organized for his welfare or improvement. Each of these, however commendable in itself, takes its toll of strength and energy, especially from the child who is always stimulated to do his best and to keep up with his fellows in any undertaking. A little girl of ten in one of our nutrition classes was found to be connected with 11 of these organizations, and the price paid in one week was literally a pound of flesh!

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CHAPTER X

MEASURED FEEDING

The feeding of infants has become so thoroughly standardized that the amount of milk and other foods required is now prescribed with great exactness. In the case of older children this precision does not obtain, and the feeding of children above the age of two is still largely a matter of guesswork or caprice. This careless feeding of the older child is responsible for many of the serious diseases of early life, and especially for many disturbances of the nervous system, which are difficult to remedy. It is one of the most common causes of malnutrition.

Some one has well asked, "Why do physicians exercise so much care in prescribing drugs that are administered only occasionally, and so little care in prescribing food which is taken daily?"

To overcome this haphazard method of feeding something more than the general advice usually given is necessary. It is true that the child should have "good, nourishing food and

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plenty of it"; and that he should not take "anything indigestible." But the fact remains that every growing child needs a certain total amount of food daily to supply him with the energy required for his normal activities and growth, and the only way to determine whether he is taking this amount is by a careful method of measured feeding.

Food Values.—For the proper feeding of the child both parent and physician should have an adequate knowledge of food values, covering at least the principal items of food in common use. Three methods for determining food values are available. One in portions of 100 grams with a table of equivalent caloric values; a second, taking as a unit the ordinary serving; and a third, in portions of 100 calories, with an equivalent table of weight by ounces. As food is bought by the ounce or pound, the first method requires a mental readjustment, which makes it difficult of adoption by most persons concerned with the diet of children. All infant feeding in this country is by ounces, and change to another standard of measurements is impractical except for laboratory work. The second method is unreliable because what is an ordinary serving for one person is a very different quantity for another.

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In our nutrition clinics we have therefore adopted the third method, which is that proposed by Irving Fisher in 1906, and is called the calory per cent method. Professor Fisher's tables indicate the amount of each kind of food necessary to furnish 100 calories of food value, and these amounts are used as standard portions. For example, one slice of bread has a value of 100 calories; also, one pat of butter, the lean meat in an ordinary lamb chop, one slice of bacon, or five ounces of milk. A table covering the principal items of food in 100 calory portions, with the proportion of proteid, fat, and carbohydrate, will be found at the end of this chapter.

These units or multiples of units can readily be made the basis for the serving of food, and an accurate record can be kept without difficulty. Liquid measure is convertible into ounces on the basis of eight ounces to the glass and one-half ounce to the tablespoonful, and the rough measure by size, tablespoonful, etc., can be verified by finding on postal scales the actual weight of the portion served. Where the exact measure of proteid, fat, or carbohydrate is desired, as in cases of nephritis, jaundice, or diabetes, the total number of calories of proteid or carbohydrate may be divided by four, and

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the total amount of fat by nine, to give the equivalent value in grams.

One of the great advantages of this method of measured feeding is that it gives a basis for visual comparison of food values, and a knowledge of the caloric value of the foods that it is necessary to consider in a given case can be acquired in a comparatively short time.

A Food Exhibit.—A food exhibit arranged in 100 calory portions will help to fix relative values in the memory.[1] Figure 17 shows such an exhibit, from which it will be seen that such inexpensive foods as cereals are high in food value, and that it takes a quart of thin soup to equal in value a pat of butter, an egg, or five ounces of milk.

A Diet Record.—The food habits of children are so constant that a record of the food taken during two consecutive days each week is a sufficiently accurate indication of the child's customary diet. If he eats less on one day, he will make it up the next, and *vice versa*. We therefore require from each child a 48-hour record of all food taken, measured according to the directions given, and the average of these two

[1] Excellent food models can be obtained from The Plastic Art and Novelty Company, 1495 Third Avenue, New York City.

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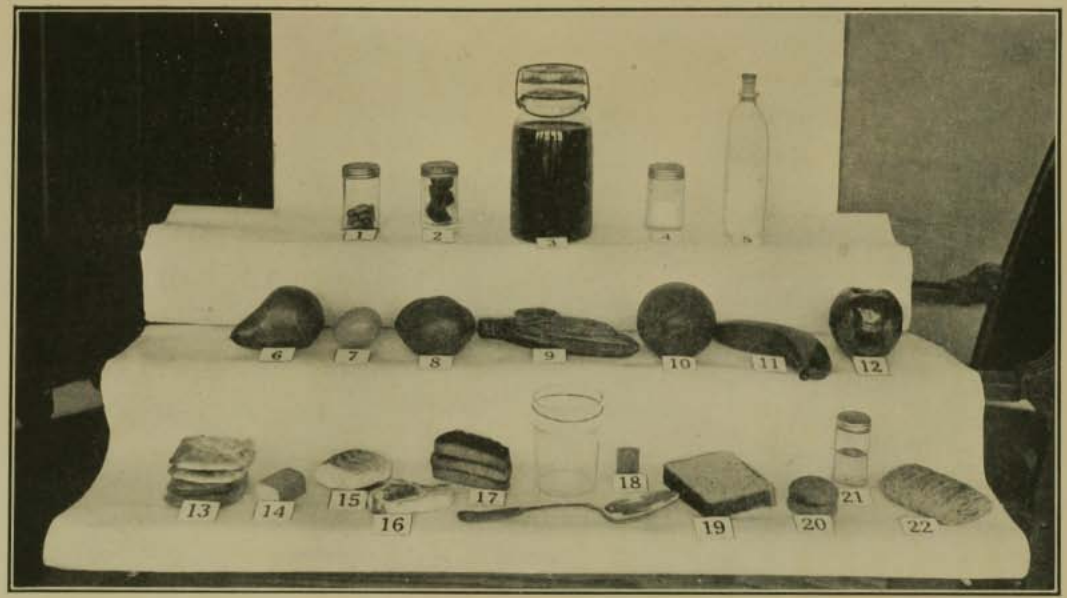

FIGURE 17. FOOD EXHIBIT OF HUNDRED-CALORY PORTIONS

1, thirteen double peanuts; 2, three large prunes; 3, twenty-nine ounces clear soup; 4, four teaspoonfuls sugar; 5, five ounces milk; 6, one large pear; 7, one large egg; 8, one average potato; 9, one large ear of corn; 10, one large orange; 11, one large banana; 12, one large apple; 13, four Uneeda biscuits; 14, one cubic inch cheese; 15, three and one-half ounces codfish; 16, one lamb chop; 17, three zwieback; 18, one pat butter; 19, one slice bread; 20, two macaroons; 21, four-tenths ounce olive oil; 22, one shredded wheat biscuit. One tablespoonful = one-half oz. liquid; one glass = eight oz. liquid.

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days represents the habitual daily intake of food.

In the application of this method it is important to secure the first record before making any suggestions as to change in diet, in order to learn the patient's previous habits. This preliminary record will show, not only the kind of food indulged in, but how much is habitually taken, and, more important still, the likes and dislikes of the child. It is always well to defer to taste as much as possible, retaining in the diet such wholesome foods as are agreeable to the child and making the necessary adjustment by substituting other foods for those that should not be taken.

The preliminary list is often the first reliable knowledge obtained by parent or physician on which to base an attack on the fundamental cause of the child's malnutrition. Mistaken ideas as to food values are also revealed by this method, with its record in plain figures. A girl of 14 came under my care because she was undersized and delicate. For years she had taken daily a large serving of clear soup, the stock of which was made from the most expensive cuts of meat, which her father thought especially nutritious, not knowing that it requires nearly a quart to equal the value of a pat of butter.

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After taking this soup she ate very little else at the principal meal of the day, which lessened the

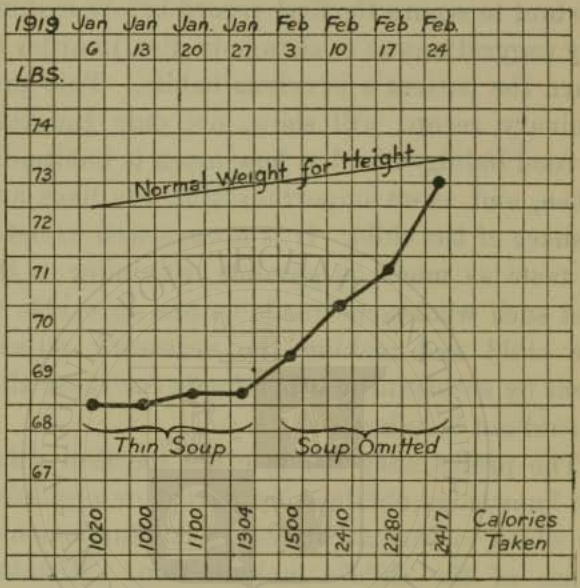

FIGURE 18. INSUFFICIENT FOOD—THIN SOUP

Lillian was in the habit of taking a large bowl of thin soup at the beginning of her dinner. This spoiled her appetite for the rest of the meal, and her diet list averaged only about 1,100 calories. When the soup was omitted, she ate more nourishing foods, and her chart shows an immediate and rapid gain in weight.

value of her 24-hour ration by an appreciable amount. This effect was not apparent to either parent or physician until the total amount of food was measured. By omitting the soup

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other foods of higher caloric value were naturally substituted, and the child at once began to gain. Two years later she returned for treatment because of overweight.

It is surprising what gross errors are made in diet until one is faced with the exact list of what is eaten. One mother remarked of her son's list: "John calls this his diet list; I call it his confession."

How to Make Changes in the Diet.—Having obtained from the 48-hour record a knowledge of the kind and quantity of food taken, it is an easy matter to increase or decrease the 24-hour total by simple changes. For example, in the diet list of a nine-year-old child in one of our classes a very inadequate breakfast was recorded, which, by simple changes, was doubled in value.

BREAKFAST I

		Calories
Cream of wheat	4 tablespoonfuls	100
Sugar	2 teaspoonfuls	50
Egg (soft boiled)	One	100
Roll	One	100
Butter	Half-pat	50
Tea (milk and sugar)	1 cup	50
Total calories		450

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BREAKFAST II

		Calories
Cream of wheat	4 tablespoonfuls	100
Cream (16%)	3 ounces	150
Sugar	2 teaspoonfuls	50
Egg (scrambled—1 egg, 1 ounce cream, ½ pat butter)		200
Toast	1 slice	100
Butter	1 pat	100
Cocoa	6½ ounces	200
Total calories		900

By taking cream with the cereal, and scrambling the eggs with cream and butter, 250 calories were added to Breakfast I. By substituting cocoa for the tea, and taking a whole pat of butter with the toast 200 calories more were added, thus doubling the value of the meal. These changes were made without conflicting with the child's taste and without upsetting the home menu.

Such changes do not force the child to take too much food at one time, and there is, therefore, little danger of causing indigestion. The undernourished child is like a person convalescing from a severe illness, requiring two or even three times as much food as is needed

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when he is in normal condition. Children who are underweight seem to have a remarkable ability to digest food, while on the other hand, in the case of those who are overweight, symptoms of indigestion disappear with a diminution of the day's ration.

An Aid to Diagnosis.—Undernourished children almost invariably take too little food, and underfed children all show signs of malnutrition. If a prompt advance in weight does not follow increased feeding, it is probable that some organic disturbance or other unfavorable condition is the obstacle to progress. Measured feeding is therefore a valuable aid in medical diagnosis.

It is a futile but common expedient to give children tonics, transport them to different climates, and subject them to all kinds of treatment, in order to cause a gain in weight, when a record of their diet often shows that they are taking not more than 1,000 calories per day. This amount represents the food requirements of a healthy infant, and could not provide for gain in an older child unless he were actually confined to bed.

Increasing the 24-Hour Amount.—During the time the child is under treatment the amount of

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food can be increased most easily by adding mid-morning and mid-afternoon lunches to his usual three meals a day. He will assimilate more food in five light meals than in three heavier ones. These lunches should consist of easily digested food that will not destroy the appetite for the next meal. Sandwiches, bread and milk, or oatmeal crackers with fruit are suitable and satisfying. Sweets should be avoided unless in the form of prunes, figs, or dates. These extra feedings should have a value of 200 to 400 calories, and should be as regularly timed as the principal meals.

The Amount of Food Needed.—The following table shows the approximate caloric requirements for a child of normal weight. The growing child's need is relatively greater than that of the normal adult, because of his increased activities and growth. For a malnourished child of six to 14 years of age, who is seven or more per cent under weight for height and continuing his usual activities, between 2,000 and 3,000 calories per day are necessary for proper gain, but such children frequently take as much as 5,000 calories daily. The amount of food needed is measured by the growth to be accomplished and the energy to be spent in work and in play.

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TABLE II.—APPROXIMATE CALORIC REQUIREMENTS IN HEALTH

Age	Calories per pound	Total Calories in 24 hours
1	40-50	350- 950
2	40-45	900-1100
3	38-43	1100-1300
4	35-40	1300-1400
5	34-39	1400-1500
6	32-38	1500-1600
7	32-38	1600-1700
8	32-38	1700-1900
9	32-38	1900-2100
10	33-38	2100-2300
11	33-38	2300-2500
12	33-38	2700-2900
13	33-38	2900-3200
14	32-38	3200-3400
15	28-38	3300-3900
16	26-36	3200-4100
17	24-33	3100-3900
18	23-30	3000-3700
Adult *	18-24	2600-3300

* Male 150 pounds. Female 130 pounds.

The large range in the number of calories is required on account of differences in activity, power of assimilation, and rate of growth. At any given age the greater the weight the smaller the number of calories needed. Therefore the smaller number of calories in the table should be the guide for heavier children and the maximum the standard for children of lower weight.[2]

Every child requires sufficient calories to keep his weight at the point that is normal for him, and this is usually the weight at which he feels best. The 48-hour record should be

[2] See table of average weights for given heights in Appendix I, p. 305.

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kept, and the patient weighed once a week, until his food requirements are known. The normal child can then be made to gain, lose, or remain stationary in weight as desired.

TABLE III. QUANTITIES OF FOOD NECESSARY TO YIELD 100 CALORIES, WITH THE PROPORTION OF PROTEID, FAT AND CARBOHYDRATE *

ts = teaspoonful
h = heaping
sq = square
tbsp = tablespoonful
aver = average
quar = quarter

Fish and Meat

		Oz.	Calories P. F. Ch.
Cod, boiled	3 oz = size 3 chops	3.6	90-10-0
Haddock, broiled		3.3	90-10-0
Bluefish, broiled		2.4	71-29-0
Halibut, broiled		3.	61-39-0
Mackerel, broiled	2 oz = size 2 chops	2.6	56-44-0
Salmon, canned		1.8	45-55-0
Roast veal		2.7	71-29-0
Roast chicken		1.9	73-23-4
Dried beef		1.7	67-33-0
Boiled mutton		2.1	74-26-0
Round steak, broiled		1.9	48-52-0
Roast pork		1.7	55-45-0
Tripe		2.4	46-54-0
Roast lamb		1.8	41-59-0
Tenderloin steak	1 oz = size 1 chop	1.3	34-66-0
Roast mutton		1.1	33-67-0
Ham, boiled		1.2	29-71-0
Corned beef, boiled		1.2	21-79-0
Tongue		1.2	27-73-0
Roast beef		1.2	46-54-0
Lamb chop		1.	40-60-0
Roast turkey		1.	40-60-0
Roast duck		1.	30-70-0

* These analyses are based for the greater part upon Bulletin 28, Office of Experiment Stations, U. S. Department of Agriculture. The values of cooked foods are necessarily approximate and allowance should be made for dressings, sauces, etc., especially the fat in which foods are cooked.

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TABLE III. QUANTITIES OF FOOD NECESSARY TO YIELD 100 CALORIES, WITH THE PROPORTION OF PROTEID, FAT AND CARBOHYDRATE—*Continued*

Fish and Meat

		Oz.	Calories P. F. Ch.
Sausage	two-thirds	.7	20-78-2
Bacon	1 slice	.5	13-87-0
Salt pork	1 in sq	.5	4-96-0
Clams	12 to 16	4.7	56-8-36
Oysters	twelve	7.	49-22-29
Sardines	four	1.3	34-66-0
Lobster	3 h tbsp	4.1	78-20-2
Scallops	2 h tbsp	2.5	80-1-19

Lean part lamb chop weighs 1 oz.
Fish and meat vary in value according to fat present.

Dairy Products

Butter	1 pat	.4	1-99-0
Cheese:			
American	1 cu in	.9	25-73-2
Cottage	2 h tbsp	.1	76-8-16
Cream, full	1 cu in	.9	25-73-2
Neufchatel	1 cu in	.9	22-76-2
Pineapple	1 cu in	.9	25-73-2
Roquefort	1 cu in	.9	25-73-2
Swiss	1 cu in	.9	25-74-1

Soups

Cream:			
Asparagus	30 cal to the oz	3.9	12-70-18
Celery		3.8	10-73-17
Corn		3.2	12-43-45
Pea		3.2	16-48-36
Tomato		3.5	10-70-20
Clam chowder		3.8	20-38-42
Fish chowder		3.9	34-35-31
Thick:			
Bean	20 cal to the oz	5.4	20-20-60
Chicken		6.	72-12-16
Split pea		6.	26-2-72
Meat stew		4.3	23-49-28
Oyster stew		5.	23-57-20
Clear:			
Bouillon	4 cal to the oz	32.	84-8-8
Consomme		29.	85-0-15
Vegetable		25.	85-0-15

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TABLE III. QUANTITIES OF FOOD NECESSARY TO YIELD 100 CALORIES, WITH THE PROPORTION OF PROTEID, FAT AND CARBOHYDRATE—*Continued*

			Calories
			P. F. Ch.
	Vegetables		
Asparagus:		Oz.	
Fresh	20 stalks	15.9	32-8-60
Cooked	7 h tbsp	7.	34-6-60
Beans:			
Baked	1 tbsp	2.7	21-18-61
Lima, fresh	2 tbsp	4.4	21-4-75
String	10 tbsp	8.5	22-7-71
Beets	6 h tbsp	7.7	14-2-84
Cabbage	60 h tbsp	11.	20-8-72
Carrots	4 h tbsp	5.8	10-5-85
Cauliflower	24 h tbsp	11.5	23-15-62
Celery	1 bunch	19.	24-5-71
Corn:			
Canned	2 h tbsp	3.5	11-11-78
Green	2 ears	3.5	13-10-77
Cucumber	2 large	20.	18-10-72
Lettuce	2 large heads	18.	25-14-61
Mushrooms	8 large	7.6	31-8-61
Onions	4 h tbsp	7.2	13-6-81
Parsnips	5 h tbsp	5.8	10-7-83
Peas:			
Green	4 h tbsp	3.5	28-4-68
Canned	4 h tbsp	4.4	25-3-72
Potatoes:			
Sweet, baked	½ aver	1.5	6-9-85
White, baked	1 aver	3.6	11-1-88
Rhubarb:			
Stewed	2 h tbsp	1.7	1-2-97
Spinach, boiled	4 h tbsp	21.	12-8-80
Squash	4 h tbsp	7.4	12-5-83
Succotash	3 h tbsp	3.5	15-9-76
Tomatoes:			
Canned	12 h tbsp	15.6	21-8-71
Fresh	4 aver	15.5	16-16-68
Turnips	6 h tbsp	8.7	13-4-83
	Cereals		
Corn flakes	10 h tbsp	1.	6-4-90
Cream of wheat	4 h tbsp	6.	12-3-85
Farina	4 h tbsp	6.	12-4-84
Grape nuts	2 h tbsp	1.	13-2-85
Hominy	3 h tbsp	4.2	11-2-87
Indian meal	3 h tbsp	6.	10-5-85

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TABLE III. QUANTITIES OF FOOD NECESSARY TO YIELD 100 CALORIES, WITH THE PROPORTION OF PROTEID, FAT AND CARBOHYDRATE—*Continued*

			Calories P. F. Ch.
	Cereals		
Macaroni:		Oz.	
Boiled	4 h tbsp	4.	15-2-83
Oatmeal	4 h tbsp	5.6	17-16-67
Puffed rice	10 h tbsp	1.	9-1-90
Rice, boiled	4 h tbsp	3.1	10-1-89
Shredded wheat	one	.9	13-5-82
	Bread		
White	3x3½x1 in	1.3	14-6-80
Whole wheat	2½x2¾x½ in	1.4	16-3-81
Corn	2x2x1 in	1.2	10-24-66
Biscuit	one	1.3	11-27-62
Roll, Vienna	one	1.3	12-7-81
Zwieback	3 pieces	.8	9-21-70
Pilot	¾ cracker	.9	11-12-77
	Crackers		
Boston	one	.9	11-19-70
Educator	twelve	1.	40-3-57
Graham	two	.8	9-20-71
Oatmeal	seven	.8	11-24-65
Oyster	twenty-four	.8	7-24-69
Saltines	six	.8	10-26-64
Uneedas	four	.9	9-20-71
	Fruits (fresh)		
Apple	1 large	7.3	3-7-90
Banana	1 large	5.5	5-5-90
Blackberries	4 h tbsp	6.1	9-16-75
Canteloupe	one-half	8.6	6-0-94
Grapefruit	one-half	11.4	3-12-85
Grapes, Concord	1 bunch	4.8	5-15-80
Lemon	1 large	7.6	9-14-77
Orange	1 large	9.4	7-2-91
Peach	3 aver	10.5	6-3-91
Pear	1 large	6.3	4-7-89
Pineapple	2 slices	8.2	4-6-90
Raspberries	9 h tbsp	5.3	10-14-76
Strawberries	10 h tbsp	9.	10-15-75
Watermelon		11.7	5-6-89

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TABLE III. QUANTITIES OF FOOD NECESSARY TO YIELD 100 CALORIES, WITH THE PROPORTION OF PROTEID, FAT AND CARBOHYDRATE—*Continued*

Fruits (dried), edible portion

		Oz.	Calories P. F. Ch.
Dates	3 large	1.	2-7-91
Figs	1 large	1.1	5-0-95
Prunes	3 large	1.4	3-0-97
Raisins	10 large	1.1	3-9-88
	Desserts		
Cakes:			
Sponge	2x2x1 in	.9	11-19-70
Chocolate layer	2x1½x1 in	1.	7-22-71
Frosted	2x1½x1 in	1.	6-22-72
Gingerbread	2x2x1 in	1.2	8-22-70
Lady fingers	two	.9	10-12-78
Macaroons	two	.8	6-33-61
Cookies	two	.8	7-22-71
Chocolate éclair	½ small	.8	4-33-63
Doughnut	2/3	.8	6-45-49
Pies:			
Custard	1/5 of a quar	1.9	9-32-59
Lemon	1/5 of a quar	1.4	6-36-58
Squash	1/5 of a quar	1.9	10-25-65
Apple	1/6 of a quar	1.6	3-41-56
Mince	1/6 of a quar	1.2	8-38-54
Puddings:			
Bread	1 h tbsp	1.6	10-20-70
Baked custard	2 h tbsp	2.6	17-37-46
Rice custard	2 h tbsp	2.7	8-13-79
Apple tapioca	2 h tbsp	3.	1-1-98
Indian	1 h tbsp	2.	12-25-63
Ice Cream	1 h tbsp	2.	6-55-39
	Sweets		
Cocoa	4 h ts	.7	17-53-30
Chocolate	½ sq	.56	8-72-20
Fruit sauces	2 tbsp	2.	1-3-96
Jellies, all	1 tbsp	1.	1-0-99
Marmalade	1 tbsp	1.	1-2-97
Honey	1 tbsp	1.	1-0-99
Sugar:			
Granulated	4 ts	.9	0-0-100
Powdered	4 h ts	.9	0-0-100
Cube	4 lumps	.9	0-0-100
Domino	6 small or 3 large	.9	0-0-100
Maple	4 ts	1.	1-0-99
Maple Syrup	1 tbsp	1.2	0-0-100

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TABLE III. QUANTITIES OF FOOD NECESSARY TO YIELD 100 CALORIES, WITH THE PROPORTION OF PROTEID, FAT AND CARBOHYDRATE—*Continued*

Nuts

		Oz.	Calories P. F. Ch.
Almonds	eight	.5	13-77-10
Brazil	three	.5	10-86-4
Chestnuts, Italian	seven	1.5	10-20-70
Filberts	ten	.5	9-84-7
Peanuts	13 double	.6	20-63-17
Pecans	eight	.5	6-87-7
Walnuts, English	ten	.5	10-83-7

Miscellaneous

Olives, green	seven	1.6	1-84-15
Alcohol		.5	.....

Foods Used for Infants and in Illness

	Cal. to oz.	Oz.	Calories P. F. Ch.
Albumin water			
1 white to 8 oz	3.5	28.	100-0-0
Barley Water			
1 oz to qt			
(.13 .07 2.44)	3.1	32.	4-6-90
Barley gruel			
2 oz to qt			
(.27 .15 4.89)	6.2	16.	4-6-90
Rolled oats water			
1 oz to qt			
(.26 .14 1.67)	2.5	40.	12-14-74
Rolled oats gruel			
2 oz to qt			
(.52 .28 3.34)	5.	20.	12-14-74
Beef broth	1.1	88.	100-0-0
Chicken broth	1.	100.	30-55-15
Beef juice:			
Cold process	14.	7.	100-0-0
Warm process	19.	5.3	78-22-0
Orange juice	14.	7.	0-0-100
Olive oil	250.	.4	0-100-0
Malt soup (Keller's)			
(12 1.2 12.1)	20.	5.	12-16-72
Human milk			
(1.25 3.5 7.0)	20.	5.	8-52-40

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TABLE III. QUANTITIES OF FOOD NECESSARY TO YIELD 100 CALORIES, WITH THE PROPORTION OF PROTEID, FAT AND CARBOHYDRATE—*Continued*

Foods Used for Infants and in Illness

	Cal. to oz.	Oz.	Calories P. F. Ch.
Cow's milk (3.5 4.0 4.5)	20.	5.	20-52-28
Rich milk (3.5 5.0 4.5)	22.	4.5	18-59-23
Cream:			
Top milk, 40% (2.2 40 3)	100.	1.	2-95-3
Top milk, 16% (3.25 16 4.05)	50.	2.	7-84-9
Top milk, 7% (3.5 7 4.5)	27.	3.75	15-66-19
Skimmed milk (3.6 1.8 4.5)	14.	7.	30-33-37
Butter milk (3.6 .5 4.06)	11.	9.	41-13-46
Condensed milk (Eagle brand) (8.43 6.94 50.69)	100.	1.	11-20-69
Six parts water (1.20 .99 7.23)	13.	7.5	11-20-69
Nine parts water (.84 .69 5.1)	9.5	10.75	11-20-69
Whey			
From whole milk (.94 .96 5.49)	10.5	9.5	11-25-64
Eiweismilch (13-25-15)	12.	8.5	30-56-14
Koumyss:			
From cow's milk (2.66 1.83 4.09)	12.5	8.	24-38-38
Sugar, gran 4 ts:		.86	0-0-100
Powdered, 4 h ts		.86	0-0-100
Milk sugar		.9	0-0-100
Dextri maltos, 3 h ts		.9	0-0-100
Mellen's food, 3 h ts		.9	12-6-82
Malted milk, 3 h ts		.83	15-19-66
Wheat or barley flour		1.	12-3-85
Apple sauce, 2 tbsp		2.2	1-4-95
Prune sauce, 3 med w juice		3.8	2-1-97
Scraped beef		2.	61-39-0
Egg, one large:		2.1	36-64-0
White, seven		6.4	97-3-0
Yolk, two		.94	17-83-0
Zwieback, three		.8	9-21-70

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CHAPTER XI

DIET AND FOOD HABITS

It is universally recognized that diet is an important factor in nutrition. What is not sufficiently recognized is that other factors of equal importance must be controlled before malnutrition can be removed and proper growth established. Attention must be given, not only to the character of the foods selected, but also to the fuel value of the amount taken, and to the child's habits of eating.

The problem of an "optimum" or ideal diet is receiving the attention of the chemist, the biologist, and the anatomist, but it has not yet been discovered just what amount of each food element is needed by the growing child. This is especially true of the vitamins, and even were it known how much of these is needed, it would still be necessary to determine under what conditions they are best absorbed. Few investigations, other than clinical research, have yet been made to determine the influence of physical defects, fatigue, and toxins on absorption. Emotional reactions, such as fear,

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anger, hurry, worry, and stress must also be taken into account as affecting the child's power of assimilation.

If the body is not in these respects in a condition favorable for absorption, the diet may be an "optimum" one, the amount taken double or treble that necessary for growth, yet the child's weight will remain stationary, or may even decrease, for weeks and months at a time.

Recent investigations have demonstrated the harmful effect of the too exclusive use of degerminated foods such as milled flour, polished rice, and artificially prepared products in causing a deficiency of valuable constituents. New evidence of this kind must not be neglected, but there is no cause for alarm except where good milk cannot be obtained in sufficient quantity to supply the deficiency. Our present knowledge indicates that if a child takes a sufficient amount of the usual foods of the average American table, including a pint of milk a day, he will have all the dietary essentials for proper growth. It is a safe rule to require the child to take a little of each food provided for the family table in order that he may not get the idea that he cannot eat this or that, and thus be deprived of an essential food element.

The 48-hour record that is used to check the

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total amount of food taken is also the best guide to possible food deficiencies and to faulty food habits. In checking and correcting many thousands of diet lists we have found the chief errors to be:

1. The omission of cereals and milk
2. The use of tea and coffee
3. The taking of sweets between meals
4. Irregular meals, and irregular amounts at the different meals
5. Insufficient 24-hour amount of food

The Balanced Diet.—It is not necessary to provide an unusual or peculiar diet for the malnourished child. Elaborate dishes and delicacies intended to tempt the appetite are of less value than plain wholesome food in proper amounts. Catering to childish whims is one of the chief causes of the surprisingly large percentage of malnutrition found among the children of the rich. The child should be allowed to experience the healthy satisfaction of clearing his plate and asking for more. Experience shows, fortunately, that children thrive on simple and comparatively inexpensive foods—milk and milk products, whole cereals, corn, rye, and whole wheat bread, fish and the cheaper cuts of meat, such vegetables as potatoes, onions,

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carrots, and greens, and fruits and berries as they are available.

In normal health the question of a balanced diet, or the proper proportion of proteid, fat, carbohydrate, and salts, needs attention only in a general way, because this is largely regulated by taste and custom. For example, bread, which contains proteid and carbohydrate, requires butter (fat) to make it palatable; meat, composed of fat and proteid, requires potato (carbohydrate) to please the taste. The customary combination of bread and butter, meat and potato, bread and milk, represents physiological needs which taste recognizes and controls. Mineral salts are secured through milk, fruit, and the green vegetables.

Essential Foods.—Certain foods are, however, essential to proper growth, irrespective of the child's taste. If milk and cereals are omitted from the diet, it is difficult to keep the daily total high enough for continued gain. Children should have food of high caloric value, and milk supplies this need as well as providing all the required food elements. Every child should have at least a pint of milk a day throughout the period of growth, and for the undernourished a quart is better. When the taste of plain milk is not agreeable, the milk

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may be flavored with a little malt or cane sugar, or taken in the form of cocoa, with bread, crackers, or cereal, in the sauce for vegetables,

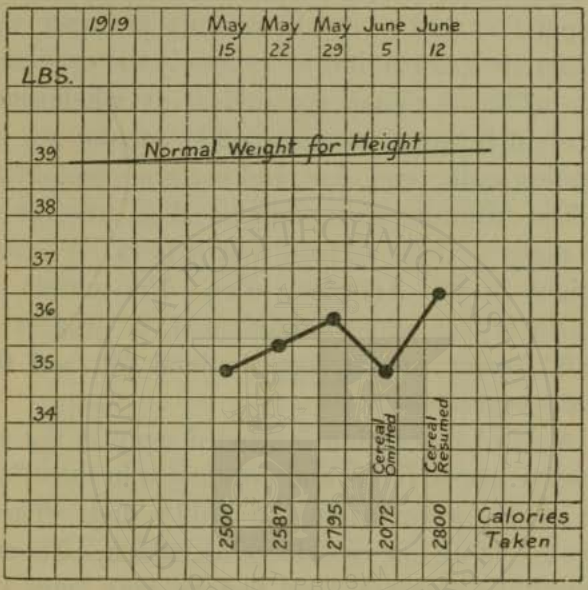

FIGURE 19. CEREAL OMITTED

Bertha's mother feared oatmeal was too "heating" and omitted it from Bertha's diet the first week in June. The chart shows a consequent loss in weight which was immediately regained when the cereal was replaced in the diet.

or in purées and thick soups. When used in cooking it is useful in increasing the nutritive value of various dishes.

Proteid is an essential food constituent, as

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new cells are produced by proteid only. The tendency, however, even among the poor, is to take too much rather than too little proteid. Young children may be given beef juice as an appetizer, and a small amount of meat will stimulate growth, but at no age is the excessive use of meat either economical or wholesome. Proteid is found in many other substances, including milk, eggs, fish, and certain vegetables.[1]

The vitamin Water-soluble B is present in so many articles of food that it is rarely insufficient in the American diet. Fat-soluble A, which is less widely distributed, is present in milk, butter, cream, eggs, animal fat, and the leafy vegetables.[2]

A word of caution is needed against the excessive use of fruits and vegetables in the effort to supply vitamins in the child's diet. These are foods of low caloric value, which, although supplying essential food factors, may leave the child undernourished due to an insufficient 24-hour amount. It is better to safeguard the child in this respect by the use of milk, which contains all the necessary elements and is a food of high fuel value.

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[1] See Table of Food Values with percentage of proteid, fat, and carbohydrate on pp. 100-106.

[2] See Table of Accessory Food Factors, p. 177.

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The coarse vegetables are valuable for fiber and bulk, to offset the danger of too concen-

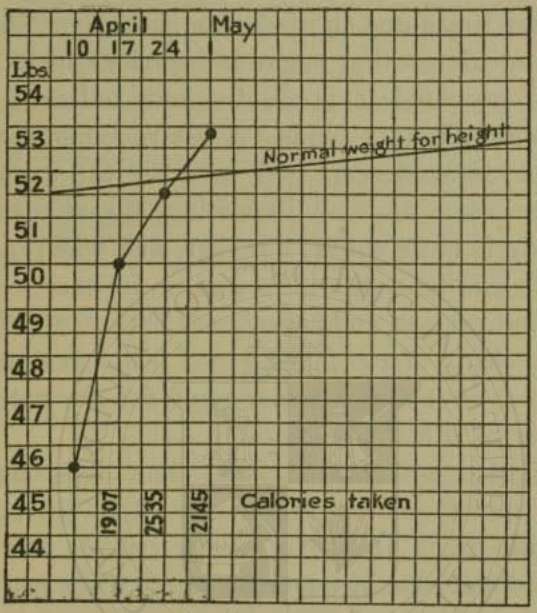

FIGURE 20. CANDY HABIT

Marion ate a light breakfast, and when she became hungry in the middle of the morning, satisfied her appetite with candy. This spoiled her appetite for the midday meal. Becoming hungry again in the afternoon, she ate more candy. The chart shows her prompt gain after omitting the candy and eating a proper amount of wholesome food—an increase of 7¼ pounds in three weeks.

trated foods. Potatoes are especially wholesome, and should be eaten at least once a day, preferably at the midday meal. They can be prepared in many ways, and are one of the best

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vehicles for the consumption of milk, cream, and butter.

Sweets.—Sweets are not harmful if taken at proper times and in moderate amounts. There is no evidence that sugar is injurious in its effects provided it is diluted and balanced by proteid and other foods. A few pieces of candy taken as a dessert will add to the number of calories without impairing the digestion. Candy is clear sugar, however, and when taken on an empty stomach acts as an irritant, causing indigestion and consequent loss of appetite. The taking of too much sugar leads to a craving for sweets and a disregard for the natural flavor of other wholesome foods.

Liquids and Mastication.—The child needs two quarts of liquids a day, and therefore should drink plenty of water, which may be cooled but should never be iced. This may be taken before and after meals, and during the meal, provided there is no food in the mouth at the time.

Food should be chewed as long as there is taste in it, and should be moistened by the natural secretions of the mouth, which aid digestion. The habit of washing down food with liquids leads to imperfect assimilation, and where this practice has been established, all

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liquids shoud be placed out of the child's reach until the habit is broken.

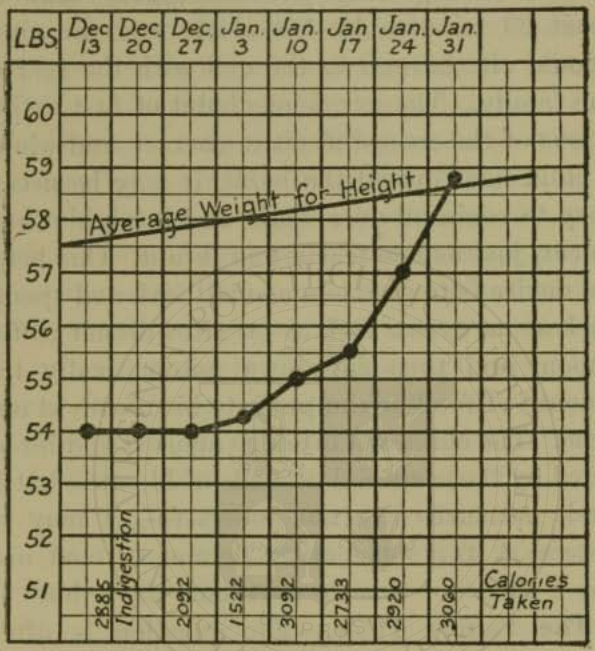

FIGURE 21. FAST EATING

Charles, at the age of eight, was underweight nearly 10 pounds. At 54 pounds he stopped gaining. Such a failure to gain indicates a relative loss, as weight should increase steadily during childhood. The cause in this case was fast eating. When Charles was induced to eat slowly, his weight increased rapidly.

Milk is a food, and therefore should not be used to quench thirst. It should be taken slowly, preferably with a spoon; for example, on cereal or in the form of bread and milk.

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Growing children should not be allowed to drink tea or coffee.

Fast Eating.—Every meal should take at least 20 minutes by the clock, and the child should sit through to the end with the rest of the family. The pernicious habit of fast eating is one of the most difficult to correct, and where a child has formed the habit, it may be necessary to begin all over again and teach him how to eat, just as one teaches an infant. One helpful device is to give him a small fork and spoon, such as an oyster fork or an after-dinner coffee spoon, and thus cut down automatically the amount of food he can put into his mouth at one time. The child will often be amused and interested by these special utensils of his own, but if such measures are not successful, it may be necessary for some other person to feed him for a sufficient time to overcome the habit.

The Family Table.—The question is often asked whether it is better that a child should eat alone in the nursery or have his meals with the other members of the family. Children need companionship at their meals as at other times, and there is an educational value in the ordinary associations of well regulated family life which should not be overlooked. A child will imitate an older boy or girl, and thus learn

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to eat new kinds and quantities of food that would be refused under other conditions.

Loss of Appetite—Its Cause and Its Cure.—If a growing child has no desire to eat, there is always an adequate cause for his lack of appetite. The small appetite is often a provision of nature to prevent overeating when tired, thus causing indigestion. "Too tired to eat" is a frequent condition with malnourished children. Another cause of poor appetite is irregular eating. For example, a small breakfast and a heavy dinner is like giving an infant two ounces at one feeding and twelve at the next. Irregular intervals between meals, and the practice of nibbling food all through the day interferes with the appetite for the next meal. The serving of too large a portion will sometimes cause a child to eat less than he would if a smaller amount were offered.

The state of the child's mind may prevent his eating properly. Many children would rather play than eat, and, with minds intent upon their games, will run from the table before they have taken sufficient food. Unhappiness and worry, often unsuspected by parents, are also causes of a loss of appetite. While the parents should know what is best for the child, and should see that their program is car-

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ried out, the joy and satisfaction of the meal should not be spoiled by constant nagging.

A large group of "no appetite" cases are caused by the effect of drugs. The most common of these is caffein from coffee and tea. A third of a cup of tea contains about one grain of the drug, as much as is given in an average dose for medicinal purposes. Records from our clinics in Boston, New York, and Chicago show that about 85 per cent of the malnourished children treated used tea or coffee or both, one or more times each day.

Among older children there is more trouble from nicotine than most parents realize, especially among boys and girls who are allowed to smoke at the age of sixteen to twenty, before their period of growth is complete. The most remarkable fact about all these drugs is their baneful effect upon growing tissue, while considerable amounts can be used in later life with no apparent harm. An exception to this latter statement must be made in the case of coffee, where the aromatic oils are frequently the cause of indigestion.

There are disadvantages arising from the arrangement of many modern homes, in which the kitchen is so far removed from the scene of the child's activities that he does not get the

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healthy stimulation of appetite that comes, for example, from the odors of baking. If he can see and smell food in the process of preparation, the desire to taste will naturally follow. This is exemplified in camp life where children eat plain coarse food with more zest than they have for the dainties of the richest home table. The gains made in these summer camps are due quite as much to the increased food and normal associations with other children as they are to the air and exercise.

It is fatal to force feeding when the child is not hungry. If he does not feel equal to eating a proper amount, his activities should be limited so that he will not use up his scant supply of energy. He should be restrained from activity before breakfast in particular, as inadequate breakfasts are more frequently reported in the diet lists than insufficient meals at any other time. When the child refuses his breakfast he should be put to bed, and kept there until his appetite returns or the cause is found. It should be made certain that this lack of appetite in the morning is not due to bad air in the sleeping room, or to a catarrhal discharge from the naso-pharynx during the night.

Food Aversions.—In the case of undernourished children, food prejudices, aversion to

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form, taste, or smell, or the association of certain foods with unpleasant events, may be almost insurmountable obstacles in securing proper nutrition. Among girls, especially, the appetite is fickle, leading them to choose carbohydrates almost wholly, and to take far too low a percentage of proteid and the leafy vegetables for proper growth.

This distaste for certain vegetables can often be corrected by a change in the method of preparing or combining them. A creamed sauce will not only add agreeably to their flavor, but also enhance their food value. By combining peas with carrots, and corn with potatoes or beans, the child can be trained to like vegetables in increasing variety. With the ordinary standard foods it is proper to require the child to take a small portion of something which he thinks he dislikes in order to rid him of the idea that he cannot eat it, but to compel him to make a whole meal out of foods for which he has no taste is to risk establishing a permanent antipathy.

There is great danger that the child with a poor appetite will unconsciously eliminate one good food after another, so that, amidst plenty, he may come to live, as stated by McCollum,[3]

[3] E. V. McCollum, "The Newer Knowledge of Nutrition."

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on a dangerously restricted diet consisting of muscle meat, white bread, and potato, with only the variety that results from other foods of a like nature such as degerminated cereals, sugar, and the tuber vegetables.

Food should never be used as a vehicle for medicine. This practice sometimes causes aversions that persist throughout life, which are all the more serious in their consequences because the foods disliked are apt to be those of high caloric value.

There are other food aversions due to the idiosyncrasy of the individual in regard to particular foods, which must be regarded as cases of food poisoning and be treated as such under the advice of a physician. For example, some children are poisoned by strawberries, eggs, lobster, or the proteins of various other foods. This condition, which is known as anaphylaxis, cannot be traced to its cause in many cases without a series of cutaneous food tests. It should not be assumed as the basis for the food prejudices of the child until such an examination has proved it to be the case.

It is universally recognized that the appearance and health of an animal depend on the food and the care which he receives; but a child may be "dragged out," irritable and fault-finding,

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and it is assumed that this is a natural state for the growing boy and girl. More progress has been made in the feeding of animals than in that of man. Regularity, smaller and more frequent feedings, enough food without waste, and the importance of clearing up at each meal what has been provided are recognized standards in animal feeding. All these principles are equally applicable to the feeding of children. Many parents resent being reminded that their children are young animals, but there would be less malnutrition if this truth were better realized.

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CHAPTER XII

HEALTH HABITS

In bringing the undernourished child up to his normal weight, attention must be focused, not only upon food and food habits, but upon such other fundamentals of health as rest, fresh air, bathing, and proper clothing. It is necessary to look into every detail of a child's life to find the cause of malnutrition, and except where there is a single conspicuous obstacle to health, this cause is frequently found to be the neglect to establish sound health habits in simple but essential matters.

Dr. René Sand of Brussels reports that the war has caused at least a year's retardation in the growth of children in Belgium. With this heavy burden added to the malnutrition already present before the war, a condition exists that no mere supplying of additional food will correct. It can be cured only by special instruction in rest and other fundamental health habits.

The subject should be approached in the belief that nature always makes for health, and

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usually succeeds unless there are conditions too unfavorable for her to overcome.

Fresh Air.—In the treatment of malnourished children we have found that those who sleep on porches or under window tents gain in weight faster than those who sleep in a room with several windows open. It is of equal importance that as much time as possible should be spent in the open air during the day, and the hours of sunlight are particularly desirable. This was illustrated in the case of a group of 12 children, who had been gaining well until there came a week of daily storms. These children were in an institution where the ventilation was as nearly perfect as possible, and in their playroom the windows were wide open; yet every child stopped gaining, and some began to lose because they were not able to be actually out of doors.

Open-air schools were originally intended only for children below par, but it is now realized that conditions which make the sick well are favorable for all. It has been found that pupils who make rapid gains in weight in open-air classes begin to lose as soon as they return to the ordinary shut-in type of schoolroom. Open-air schools do a further service in reducing contagion, which is of importance at all

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times, but especially during such a widespread danger as the influenza epidemic of 1918. An open-air school observed at that time went through the epidemic with scarcely a case

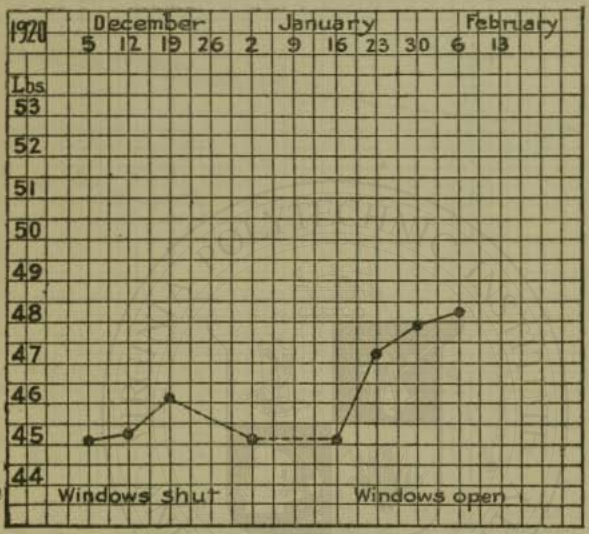

FIGURE 22. BAD AIR

Esther slept in a room with four other persons with the windows closed. She also had the habit of keeping her head under the blankets. Her parents were prejudiced against cold air at night, but agreed to have the windows open when Esther failed to gain. This also induced her to keep her head outside the bed clothing, and she soon made a good gain in weight.

among teachers or pupils, while neighboring schools were obliged to close.

Indoor temperature should not be kept above 68 or, at most, 70 degrees. Experiments show

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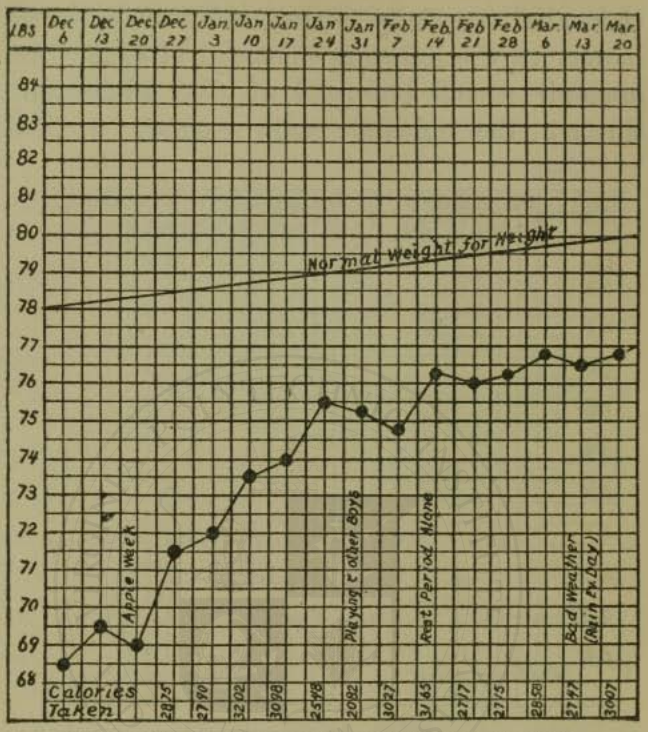

FIGURE 23. A SO-CALLED "PRE-TUBERCULAR" CHILD

Perry C. was under constant observation at the New England Home for Little Wanderers, and his chart illustrates a number of the most common causes that affect nutrition. His first failure to gain occurred in the week of December 20, and was traced to over-indulgence in apples between meals. A barrel that had been sent as a holiday gift was left open where he could help himself. By eating apples freely he took less of more nourishing foods, and lost one-half pound. January 31 and February 7 he failed to gain because of playing with another boy during rest periods. February 21 was a week when the extra lunches were omitted. The week of March 13 it stormed every day, and he could not play outdoors. During "apple week," the week when lunches were omitted, and

that both children and adults fall off in their working efficiency as soon as the temperature

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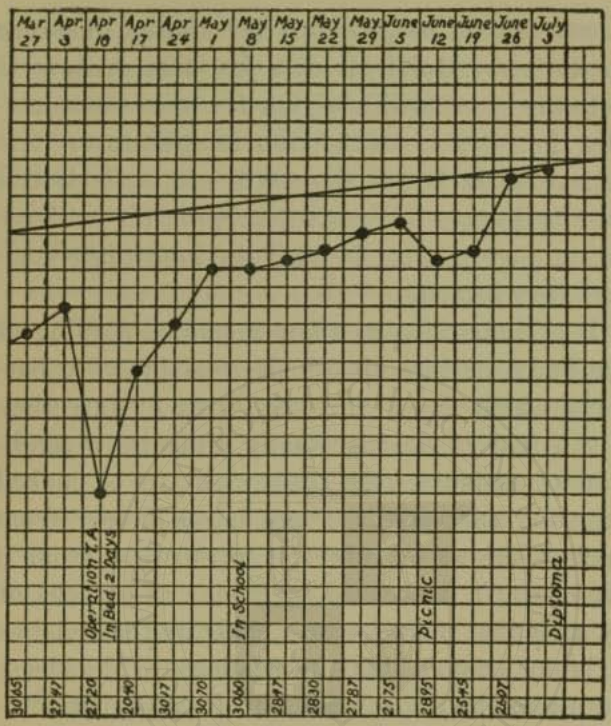

FIGURE 23.—*Continued*

the week of bad weather all others in the class failed to gain for the same reason.

As Perry had made no marked increase over the normal rate of gain from January 24 to April 3, it was decided that his tonsils, which were cryptic, might be the disturbing cause. The tonsils were removed, but he was kept in bed only two days, and lost five pounds. He regained this weight, and continued to gain until May 8, when as a result of returning to school he made no gain. June 12 shows the effect of overeating at a picnic. July 3 he reached normal weight for his height, and was in excellent condition. Perry's mother had died of tuberculosis. Good nutrition is the best safeguard against this disease.

rises above this point. Another bad condition is the dryness of an overheated room, and some

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means should be provided for adding moisture to the air. Moist air at a low temperature is not only more healthful, but far more comfortable, than dry air at a high temperature. Air in motion is better than still air, and electric fans and other devices for keeping air in circulation have a value beyond the immediate comfort they afford.

It is dangerous to allow a sudden chilling of the body, as this lowers the resistance to bacteria which cause various forms of infection. But a fear of drafts usually indicates a condition of sensitiveness that ought to be looked into and corrected. There is no danger from open windows at night if protection from a direct draft is secured by means of screens or by a blanket placed over a chair by the bedside. It is not enough that the windows of the sleeping room should be open, but the air must actually circulate. For this reason windows on two sides, which permit a cross current, are desirable. Where the bed is in a corner or an alcove, it should be drawn out at night, because several hours may otherwise pass before the air about the bed is completely changed.

Drugs Unnecessary.—In many families it is still the custom to give a child medicines strong

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enough to do injury to an adult. The temptation most commonly appears in a supposed need for tonics and laxatives. Tonics are rarely necessary, and should be given only when there is an adequate reason. If the child has a sufficient variety of food, he will be supplied with all the iron and salts he requires.

Good health habits and proper food make the use of laxatives unnecessary. There should be a regular time for the bowels to move, at least once a day, preferably just after breakfast, when the mother should see that the child is free from hurry, worry, or nagging. Many mothers are so fearful that the child's bowels will not move that they continue to give cathartics when there is no possible need. If the daily movement is skipped occasionally, it does not necessarily mean harm.

If a drug has been used and the habit formed, the dose should be gradually reduced until the habit is entirely broken. The only exception that should be made is in a case of acute indigestion, when a tablespoonful of castor oil given immediately will remove the undigested food and enable the child's digestion to begin anew.

The growing child does not need drugs, all

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of which are pernicious when taken habitually. There should be an abundance of fruit and coarse vegetables in the diet, and a further help is the drinking of plenty of water, especially before breakfast.

Care of the Teeth.—Children should be taught the use of the toothbrush from their earliest years, and at the first signs of decay they should be taken to a dentist to have the teeth filled or extracted. Even baby teeth can be treated and cared for. Infections about the roots interfere with growth and if neglected may lead to serious complications.

The Right Kind of Clothing.—The malnourished child needs more clothing than the well child in order to keep the body warm. One of the physical signs of malnutrition is cold hands and feet, which indicates impaired circulation. Extra care should be taken in winter, especially when the child sleeps in the open. Blankets or newspapers should be put under the mattress, because if there is insufficient protection from below, no amount of covering will keep the child warm. As a matter of routine, a hot-water bottle should be put into the bed at night, well down in the corner where the feet will not touch it unless its warmth is needed.

During the day there should be only enough

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indoor clothing to keep the body warm without causing perspiration. Coarse-meshed cotton or linen underwear is better than woolen, because it permits greater circulation of air; but in winter the outer garments should be of wool, and woolen stockings should be worn. Sudden changes of clothing must be avoided, such as the change from heavy to light underwear, and from high to low shoes.

Above all, children's clothing should be comfortable, and adapted to the changing demands of play, rest, indoor and outdoor activities. Many mothers are too much concerned with appearances. Irritating, stiff collars, and clothes which the child has to worry about, are a direct cause of ill health. Children outgrow their clothes faster than may be realized, and tight clothing is a cause of serious discomfort. This should be specially guarded against in collars and shoes.

Children's shoes should be of the straight last type, with ample room for movement of the toes so that the joints will not be displaced or the circulation impaired. The feet should not be allowed to become chilled from dampness, and rubbers or rubber boots should be worn whenever the ground is wet. In unavoidable cases of wet feet, both stockings and shoes

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should be changed without delay. Many serious infections result from the neglect of these simple precautions.

Bathing.—The child should be taught to bathe properly. He should be thoroughly clean in the morning and at night, and the hands should be washed carefully before every meal. A cold chest bath in the morning serves to harden the skin and to protect against changes in temperature. A warm neutral bath at night is good, and if the child is very tired a hot bath will restore the circulation and give rest without over-stimulation.

The malnourished child often has poor circulation. For this reason swimming in cold water, either fresh or salt, should be indulged in with great caution. The test is the condition shown when he comes out of the water. If he is shivering and blue, the bath does him harm. On the other hand, if his reaction is good, his skin glowing and red, the effect is beneficial.

Rubbing is of special value in connection with all bathing, as it increases the activity of the skin, and helps in eliminating waste matter from the body. The bath and rub-down which have become a regular feature of college athletics are equally to be recommended for the child who comes in perspiring and tired from

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his play. In either case a short rest immediately after the bath will add to its good effect.

Habits and Health.—It has been rightly said that one who is well at eighteen will probably remain well the rest of his life. This is but to recognize the influence of habit, and it should also be recognized that it is as easy for the child to form good health habits as bad. If good habits are established in childhood, we may be confident that good health will result. When a child is not well, irregular and wrong habits must be looked for; and, on the other hand, where we find healthy, happy children, well nourished and up to normal weight, it is almost certain that *the essentials of health* are being maintained by regular meals, regular work and play, regular rest and sleep, and regular bodily functions.

The matter of rest and sleep is of so much importance that it is treated separately in the chapter on overfatigue.

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CHAPTER XIII

EXERCISE AND RECREATION

In caring for an undernourished child it is easy to forget the importance of exercise and play. Children who are not strong naturally turn to reading and indoor occupations, and thus are deprived of the benefit of outdoor activity. But they need, even more than the well child, to spend as many hours of the day as possible in the open air. In cold weather they should play games with sufficient activity to keep them warm, but at all times they should be guarded carefully against overfatigue.

Training in Play.—There is wonderful training for the powers of the growing child in play. Free play is constructive, and calls into operation the various mental and physical capacities. Children should be encouraged to work out their games in their own way without too close or too constant supervision by adults. In this way they learn to discipline themselves and one another. During the early years interest centers in imitating the activities of older persons, but at the age of seven or eight the spirit of com-

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petition develops, and foundations are laid for association and team play.

In the World War it was shown that the strategy worked out in games was adapted to the serious purpose of war maneuvers. The play of the boy became the work of the man, and some of the best achievements were made by young athletes of trained eye and muscle but with no previous military experience.

Nothing is more pathetic than the child who has never learned to play. Many of the nervous breakdowns of later life occur because men and women who failed to form the habit of play in childhood pursue their work intensely without recognizing the need for adequate recreation and exercise. The habit of play is a permanent safeguard to health.

The Need of Moderation.—The danger in play for the undernourished child is that he will engage in games beyond his strength, or indulge in them for too long a time without rest. It is better for him to begin with simple and easy games, and gradually work up to those which make greater demands upon him. A boy who is underweight should not take part in tournaments or in such strenuous games as football, wherein much endurance is required. Running races should also be avoided, and bicycling

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should be limited to short rides without heavy grades.

Skating, coasting, sailing, canoeing, baseball, tennis—if the time is limited in each case to the child's endurance—are all beneficial and productive of growth. Cross-country walking is an excellent form of exercise, bringing many muscles into service. The hard pavement of city streets, however, results in a monotonous repetition of the same steps, thus exercising fewer muscles and causing early fatigue. Nurse maids often allow a child of pre-school age to exceed his strength in this way, and thus cause serious harm.

In general, the underweight child should avoid competitive games and should be encouraged to turn to sports requiring skill rather than strength.

Gymnasium work is not to be recommended for underweight children, and is never a desirable substitute for play in the open air. For older boys and girls formal gymnastics and rhythmic exercises are useful as a means of securing poise and control, and provide a source of body development during the seasons when the opportunity for outdoor sports is limited. Dancing, especially folk-dancing and the forms that bring about a higher degree of muscular

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control, may be safely indulged in with moderation.

All forms of exercise should be made an education as well as a recreation. There is always a right and a wrong way to do things. One can learn to climb a mountain, "taking it easy," with less fatigue than will follow a shorter climb taken impetuously and without proper rests. The field contests outlined by the Boy and Girl Scouts offering opportunity for planning and invention are particularly suitable for underweight children because they require less physical energy than ordinary sports.

Corrective Exercises.—There has been a tendency to over-rate the importance of corrective exercises. It should be recognized that most cases of bad posture are due to the general weakness of a body with too little weight to support its height. Where this condition exists, the first need is to start the child on a program that will bring him up to his normal weight, when it will be found that as weight increases, the posture improves.

Where formal exercises are needed to correct wrong postural habits, or to remedy deformities, it should be made certain that the child takes extra rest periods to offset the fatigue of the exercises. But where the postural defects

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are due to overfatigue and underweight, the extra strain of corrective exercises will simply add to his burden and aggravate his condition. Here, as elsewhere, any constant expenditure of energy that is greater than the amount produced can only result in lowered vitality and failure to attain the object sought.

After the child has gained normal weight and his muscles have recovered tone, then corrective exercises are of great benefit.

Indoor Amusements.—The movie and theater habits are unsuitable forms of entertainment for the growing child on account of the bad air, danger of eye strain, over-stimulation of the nervous system, and fatigue from prolonged attention.

Reading and table games afford recreation without bodily fatigue, and are a valuable alternative to physical activity. There is danger of excess even here, however, and neither games nor books should be made the excuse for late hours. Reading is not resting, and the child should not be allowed to read when lying down. Instead of bringing rest and repose this habit strains the eye muscles and stimulates nervous reactions.

A Health Program for the Summer.—Summer time is especially favorable for physical

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growth, and the best season in which to start a program to bring the malnourished child up to his normal weight. Freedom from the strain of schoolwork and many other conditions that cause overfatigue, together with the greater opportunity for outdoor life and more varied diet, result in height and weight gains beyond those of any other time of the year. Porter has shown by the measurements of thousands of Boston school children that two-thirds of the gain in weight for the year is accomplished from June to January.[1]

During the summer season it should be possible for the undernourished child to spend practically all his time out of doors. Arrangements for sleeping out can easily be made. If there is no available porch, a small shelter tent can be erected and equipped in the yard, or a camp can be organized in a vacant lot within reach of the home.

Vacation trips to the mountains, the shore, or the country bring new opportunities for exercise in the open air, and develop an interest in new forms of sport. When longer vacations are not possible, a day's outing, or even an after-

[1] W. T. Porter, "The Seasonal Variation in the Growth of Boston School Children," *American Journal of Physiology*, Vol. 52, No. 1, pp. 121-131, May, 1920.

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noon's walk in the country, can be made an occasion for real refreshment if it is taken in a holiday spirit, with the children's interest directed into new channels. Eating out of doors is always an aid to appetite, and, if a further excursion is not possible, a porch picnic will prove to be a pleasant break from the indoor routine.

The element of enjoyment is necessary for the best results from any of these forms of recreation, just as it is the spirit of play in games and sports that makes them more beneficial to the participant than formal exercises and gymnastics.

The Benefits of the Summer Camp.—Even a brief stay in a well organized summer camp is a valuable experience, and may be the means of breaking up bad food and health habits, and giving the child a new interest in his own health. The temporary separation from home and family is beneficial in introducing the child to a larger world in which his comfort will largely depend on his own efforts. The "only child" who has suffered from the excessive care of a too indulgent home has a fear of independent action which camp life quickly removes. He soon learns to "paddle his own canoe" and if he finds himself lacking in the vigor required

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for the hikes or sports of his mates, he will at once begin to take a keen interest in his physical development.

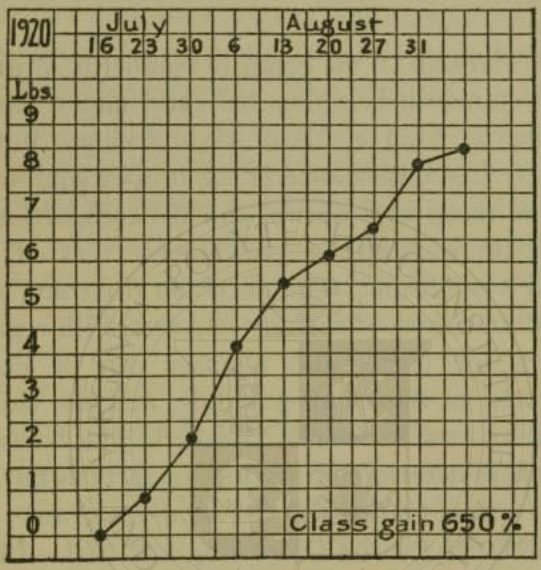

FIGURE 24. GAIN AT A GIRLS' CAMP

This chart shows the average gain of a group of 30 girls at the Arden Shore class of the Elizabeth McCormick Memorial Fund, Chicago, maintained for those who apply for working certificates but are not up to normal weight. The girls were put on our nutrition program, and their activities were regulated according to their individual weight charts. The group gain of 650 per cent of the average rate of growth illustrates the results that can be obtained by such a program without additional expense for food.

Here, too, he learns what real hunger means, and has to do his share of the necessary tasks before his appetite is satisfied. A boy or girl

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who spends even a fortnight in direct relation with the necessities of life, taking part in the preparation of food and the provision of shelter and warmth, has a different outlook ever after.

Leadership in the camp personnel is of great importance in bringing the child under the influence of high ideals of right living. But of hardly less importance is the proper equipment of the camp with scales, and the recognition of periodic weighing as the surest test of the child's condition. The nutrition program, with its alternations of activity and rest, with regular hours for meals and lunches, can be easily adapted to the camp schedule, and the child's gain or loss in weight should be the basis on which is determined his fitness to take part in the various features of the camp program.

Athletics for the Older Boy and Girl.—Physical training means such mastery and control of the body that it will execute the will and carry out the mind's ideals. When a boy learns to run, swim, or play any organized game he is acquiring that confidence, independence, and self-control which make for health, and which will stand him in good stead in his future life. The increased participation of girls in physical games and sports argues well, not only for

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their own happiness, but for the welfare of the families they will later have in charge.

Young people when they come to a certain age tend to assume more and more responsibility for their own actions, and this is the time when they should begin to take a personal interest in their health. The spur of "making the team," or the aim to excel in classwork, may be the means of first bringing home to the young student the necessity of conserving both his nervous strength and his physical powers.

The student should never come to a period of study tired out by physical exercise, nor should a person who is exhausted from mental effort turn at once to severe physical exertion without rest. There is a curious notion that physical and mental fatigue are quite separate and distinct, and that one in some way relieves the other. We have only a limited amount of energy, and if it is spent in one way it is not available in another. It is advantageous to change from one form of activity to the other, but if the point of fatigue has been reached, rest is necessary before further effort, even in a new direction, will be really productive.

A student who is trying to excel along mental lines should avoid the strain of trying to excel physically at the same time, although he needs

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regular exercise and general physical training. A boy who tries to train for football, baseball, and track, one after the other, will grow stale and excel in nothing except at the risk of permanent physical or nervous injury.

All training, whether mental or physical, should stop before the point of overfatigue.

Health in Industry and Business.—A thorough physical examination at the entrance to every form of organized employment would prevent many later failures and breakdowns. For the young person who starts his career with the handicap of underweight, permanent success is unlikely unless he takes steps to remedy the condition promptly. The proper program is the same as that outlined for the malnourished child with such adjustment as may be necessary to meet the conditions of his particular job.

All young people who are employed indoors should make it a point to follow some outdoor game or sport all the year round, and the Saturday half-holiday, and Sunday as far as possible, should be spent in the open. A "vacation" thus taken systematically throughout the year will do more to promote health than a single break of a few weeks or months annually, with a return to bad habits of daily living.

The natural ambition of the young should be

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encouraged. Although there is danger in overwork, there is also danger in underwork and in the dullness that comes from under development of one's powers. It is not work that kills, but overwork complicated by friction, worry, and poor hygiene. To offset such conditions proper rest and recreation are a necessity. Recreation that is derived from physical exercise is better than the passive entertainment of the theater or the movies, or even of the bleachers at a ball game.

Indoor exercise consisting of five or ten minutes of "setting up" or stretching exercises daily will keep the muscles from becoming soft and flabby. Unaccustomed exercise causes stiffness and lameness, and the body can be kept in trim only by steady exercise at regular intervals.

The extent to which adults use exercise and play in their own lives makes it easier for the child to start right, and tends to raise the standards of health for all. Parents who share in the sports and games of their children will come to a better understanding with them in all other matters. It is fortunate that recreation for the adult, which was formerly considered something to be indulged in quietly or even secretly, is now coming out in the open and taking its part in every well planned health program.

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CHAPTER XIV

THE PRE-SCHOOL CHILD

The age from two to six is the most neglected period in the life of the child. Knowledge of infant feeding and hygiene has become so wide-spread that children in all circumstances of life now receive intelligent care during infancy. There is the trained nurse to advise and instruct the mother at the time of birth, and the specialist to be consulted either at the clinic or in private practice. This care represents the greatest advance of recent years in the science of medicine, and it is reflected in a steadily diminishing infant death rate. Even in so large a city as New York the work has been so thoroughly established that infant mortality is lower there than in the rest of the state. This same close attention to the health of the child is needed throughout the growing period.

Following infancy, however, measured feeding is gradually discontinued, and there is a tendency to break away from the program so carefully planned for every hour of the day. By the time the child is two or three years old

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he is usually allowed to choose his own food both as to kind and quantity, and his activities are regulated by his whim or the convenience of older members of the family. Faulty food and health habits are consequently formed, and there is too little attention to the matter of sleep. Physical defects are often neglected at this time in the belief that the child will outgrow them or that he is too young to be operated upon.

Yet these are critical years in the matter of health, as a glance at the mortality statistics will show. Ninety per cent of the cases of measles and whooping cough occur under the age of five, as well as more than 95 per cent of the deaths caused by these diseases. Almost the same is true of diphtheria and scarlet fever. More than 50,000 children succumb to these diseases each year in America, and 70 per cent of this number die before they reach the age of five. One-fourth of all deaths occur before the end of the fifth year, or six times as many as in the next 10 years of life.[1]

Moreover, it is not merely the actual death rate of this period that is to be seriously considered, but the complications and after-effects in those who survive the contagious diseases of

[1] Frederick S. Crum, "Medical Inspection of Schools—a Factor in Disease-Control."

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childhood. In the case histories of children treated for malnutrition, the source of this condition is traced over and over again to an attack of measles or whooping cough. Other diseases to which the pre-school child is subject are otitis, tonsillitis, bronchitis, and pneumonia. Since the malnourished child is especially susceptible to infection, it is particularly important to guard against underweight during the years when the child is least immune to contagious children's diseases. These infections with their complications not only lower the resistance of the child, but retard his growth in both weight and height.

Considering, then, the five chief causes of malnutrition as they affect the pre-school child, the prevalence of *physical defects* is nearly as great among children between two and six years old as in any other age group. This is a fact of great significance, as is also the high percentage of naso-pharyngeal obstruction, which is the most frequent cause of malnutrition. Although, as has been stated, the tonsils do not usually become diseased before the age of five, adenoid tissue is more liable to cause obstruction while the nasal cavities are small. This mechanical interference with breathing leads to congestion in the naso-pharynx, which is an-

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TABLE IV. AVERAGE NUMBER OF PHYSICAL DEFECTS AT VARIOUS AGES

Age	Little Wanderers' Home			Massachusetts General Hospital		
	Per Cent of Total Group	Average Number Defects		Per Cent of Total Group	Average Number Defects	
		All Kinds	Naso-pharyn-geal		All Kinds	Naso-pharyn-geal
3 and under.	12	5.0	3.9	9	6.0	3.6
4-6	21	5.0	2.5	23	6.9	3.5
7-9	23	5.1	2.3	30	7.2	3.6
10-12	18	6.0	3.3	28	6.9	3.8
13 and over.	17	4.3	2.4	6	6.0	3.0
Unknown ...	9	3.5	1.3	4	6.4	3.5
Entire group.	100	5.2	2.5	100	6.8	3.5

other step towards infection. Many young children have almost constant naso-pharyngitis and frequent "colds." It is of the greatest importance that such obstruction be removed before the sinuses are largely involved or before the child becomes infected with any of the contagious diseases.

It is to be remembered that the position as well as the size and amount of adenoid tissue is of importance in causing obstruction; therefore, the removal of a small adenoid may give as great relief as the excision of a larger mass of tissue situated on the lateral walls of the pharynx.

Table IV gives the results of a study of defects according to age in two groups totaling 602 children.

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Lack of home control, which is second among the causes of malnutrition with older children, is a less important factor in this group because the problem of control is simpler during this early period than with the child of school age. This is partly due to the natural dependence of the child on the mother, and to her relatively greater physical authority. It is also easier to continue or regain the firm control established during infancy than to begin anew after the boy or girl has been independent for a longer period.

Overfatigue is, however, a more frequent cause of malnutrition with the younger child, and is a source of greater danger to growth and development than at a later period. This is the age when the child is especially imaginative, and when he reacts quickly to every new association. The responsiveness of childhood is so attractive that it leads to over-stimulation on the part of older members of the family, who delight in exhibiting the child's growing capacity. Visitors and even the chance passerby manifest an interest in his acts and sayings, to which he naturally responds with his best endeavors. At no age is there greater risk of nervous overfatigue than during these early years of rapidly expanding observation and experience.

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Children from the age of two to six are especially prone to form *faulty food and health habits,* as previously stated, because of the lack of a fixed routine, and of the inadequate training and supervision usually given at this period. Irregular eating is permitted, and the child is given sweets and other food at any hour of the day in order to please him or to keep him occupied. Some accidental experience at this time may lead to an aversion for certain necessary foods, which increases the susceptibility to rickets and other deficiency diseases. While the child is becoming accustomed to new foods it is of the utmost importance that milk and cereals should not be omitted from the diet. This is perhaps the most serious dietary danger to which the pre-school child is subject.

It is generally recognized that as little medicine as possible should be given during infancy, but there is an increased tendency to use laxatives and other drugs as a short-cut after the age of two, instead of taking the trouble to train the child in proper health habits. The convenience and pleasure of adults frequently lead to late hours for the child who is too young to be left at home alone, or who is afraid to go to bed without the companionship of an older person. Too often a tired child is allowed to

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fall asleep on a couch in the living room, or is carried out to an evening entertainment without any consideration of its possible injury to his health and growth. The excitement of Sundays and holidays, which are often occasions also for over-indulgence in rich and sweet foods, is almost invariably reflected in the child's weight chart.

The effect of these various errors in diet and hygiene may pass unnoticed for a considerable time because the regular weighing which has been part of the infant's routine is no longer considered necessary. The nutrition class therefore meets an urgent need of both the preschool child and his mother, and this is the time when the nutrition program can be applied with the greatest immediate benefit and the most far-reaching effect.

Although the class meetings may not always appeal to the child of this age to the same degree that they do to the older boy and girl, there is nevertheless sufficient interest in the weight chart and the stars to hold his attention. Since growth is relatively greater during the years from two to six, the actual gain in pounds is small, and therefore the chart can be made more graphic if the scale is doubled by allowing two squares for each pound of gain.

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In the case of the mothers, the opportunity for getting results through their coöperation is greater than at any other period. The younger the child, the greater is the maternal solicitude for his welfare. It is not lack of interest, but lack of knowledge on the part of the mothers that has made these early years a period of neglect. They have had the aid of the milk station and the infant clinic in the past, and the nutrition class is welcomed as a further opportunity for health education. The weight chart is a link with the earlier experience of the parents in considering weight the standard of the child's condition. Even parents of foreign birth who have difficulty in acquiring the English language can follow the weight line on the chart with understanding, and know whether the child is making progress towards his normal standard.

The requirements as to mid-morning lunches and rest periods can be more easily carried out at this period, when the child has not yet become subject to school routine. This is a matter of considerable consequence in localities where nutrition work has not the hearty coöperation of the schools. In such cases the older child is hampered by a school program that not only produces overfatigue but interferes with its

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effective remedy by a strict adherence to the full schedule.

No child should be admitted even to the kindergarten until every effort has been made to bring him up to normal weight. This can be accomplished best through the nutrition class for the pre-school child, and his weight chart is the best evidence as to when he is ready to take up the full school program. When the malnourished child is not given such care during the pre-school period, the added strain of school life makes it increasingly difficult to regain the ground lost, and he risks the danger of falling farther and farther below his normal standard of growth and health. The almost even percentage of malnutrition found up through the various grades indicates that this retardation in growth tends to continue, and that such children remain stunted throughout their lives.

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CHAPTER XV

THE OVERWEIGHT CHILD

Overweight in children has not received the attention from either parents or physicians that its serious menace to health warrants. It has been the custom to think of it as a hereditary condition, or one that the child would naturally outgrow. Because of the lack of complaint from the victims themselves and also the fact that overweight is not accompanied by the conspicuous physical defects that are characteristic of underweight, obesity has been viewed as a discomfort rather than a danger, and little has been done to standardize either diagnosis or treatment.

What Constitutes Overweight?—The human being is a wonderful animal, equal to a great range of adjustment and adaptation. He seems to be capable of preserving a fair degree of health under conditions of great excess of fat and of remarkable leanness. It is difficult, therefore, to draw an exact line to separate these overweight children from the normal. Clinical evidence, however, corroborates the ex-

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perience of life-insurance companies that 20 per cent above the averages now in use may be considered the limit of normal weight, and any excess should be investigated. In certain children there is a natural tendency to excess of fatty tissue, just as in others, to bony structure or to muscular development; but when the excess passes beyond 20 per cent, we call the condition obese.

Comparison of Overweight and Underweight Children with Respect to Physical Defects.— Practically every case of underweight has physical defects directly bearing on the condition, and also nervous symptoms that are easily demonstrable. Overweight has no such apparent physical defects. Its symptoms are shown in the tax put upon the heart and other vital organs by the extra burden of weight carried. From this condition come lessened powers of endurance and diminished activity. In the matter of disposition, the fat child is usually good natured and amiable.

As a result of the physical examination of a large number of children, we have found the underweight child averages nearly six defects, while the overweight child averages less than two. Cases are common in which it is impossible to find a single physical defect in the over-

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weight child. Table V gives the results of one study of comparative defects.

TABLE V. COMPARISON OF DEFECTS IN 24 OVERWEIGHT AND 24 UNDERWEIGHT CHILDREN

Kind of Defect	Number of Defects in Overweight Group	Number of Defects in Underweight Group
Obstructions to breathing	29	105
Gingivitis	0	1
Carious teeth	5	20
Alveolar abscess	1	1
Cerumen in ear	1	7
Otitis media, chronic	0	2
Phlyctenular keratitis	0	1
Eczema	0	1
Albuminuria	0	3
Vaginitis, gonorrheal	1	0
Syphilis, hereditary	0	1
Enuresis	0	1
Lateral curvature	0	2
Round shoulders	2	17
Adherent prepuce	1	2
Pediculosis	1	13
Endocarditis	2	0
Anemia	1	0
Bronchitis	1	0
Tuberculosis	1	0
Infantilism	1	0
	47	177

In this study the overweight children ranged from 20 to 133 per cent above the average weight for their height, and the underweight group was made up of an equal number of unselected children 10 per cent or more underweight. It will be seen that the average number of defects for the overweight children was under 2, while the average for the underweights was 7.3. What is of even more signficance,

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only two of the first group had more than 3 defects, while only three of the underweights had less than 6. Four of the obese children had no physical defects, and six had only one each, while twelve of the second group had 8 or more each.

Danger of Overweight.—Although the overweight children are especially free from defects that interfere with respiration, the extra burden put upon the lungs and circulation by their condition makes them less likely to recover from pneumonia, or other acute illness. In the case of infantile paralysis obesity is a handicap that often prevents recovery. Joslin states that overweight is a predisposition to diabetes. "The overweight is at least twice and at some ages forty times as liable to the disease."[1]

The body is constantly trying to eliminate the excess food taken. What cannot be eliminated is stored as fat. The effect of this condition is a tendency, in greater or less degree, to toxemia, which results in a disinclination to physical or mental exertion, and hinders normal development.

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[1] E. P. Joslin, "The Prevention of Diabetes Mellitus," *Journal of the American Medical Association*, Vol. 76, No. 2, January 8, 1921, pp. 79-84.

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In general it may be said that the younger the child, the less is the danger from overweight.

The Cause of Overweight.—The chief cause of obesity is the habitual intake of more food than is burned up. As a rule, this is the result of an appetite for foods of high caloric value, especially fats and sweets. The fat child, however, may take less food daily than is eaten by a thinner child, and yet put on weight. This is explained only in part by the greater activity of the latter. A more important factor is that such defects as are found in fat children are usually those which do not interfere with nutrition.

It is remarkable how general is the idea even among physicians that the usual cause of obesity is some abnormality of the endocrine glands. Such abnormalities do occur, but with the exception of those of the thyroid, are so rare that this cause may be disregarded except in large hospital clinics where such cases may be considered medical curiosities. The use of thyroid extract in the treatment of obesity is a short cut attended with danger to the growing tissues and is seldom, if ever, necessary.

The Remedy for Overweight.—The remedy for overweight is measured feeding. The child

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should be weighed, and a careful record, in calories, should be kept of his food for a week, with a second weighing to show how much fuel the body is able to consume in that period. A reduction of one-third of the daily average should then be made, which will afford an opportunity for the burning up of some of the stored tissue. If the loss in weight each week does not exceed two pounds, the child will feel better while the reduction is going on, and will show a constant increase in efficiency.

If there is no loss of weight with a reduction of one-third the amount of food usually taken, a further reduction of 100 calories per day should be made, until it is found what amount of food will bring about the desired rate of loss. The total amount may be reduced to 800 or 900 calories per day, if necessary, without causing symptoms of starvation.

The character of the food habitually taken should be changed so as to reduce or eliminate all foods of high caloric value, such as fat meats, butter, cream, candy, "made" dishes, pastry, and chocolate, and to substitute in their place lean meats, fruits, and vegetables, salads with little oil, bran muffins and bulky foods which will satisfy the appetite and prevent constipation.

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FIGURE 25. AN OVERWEIGHT GIRL.

Louise at twelve years was 100 pounds overweight. Her physical growth examination failed to disclose a single defect, nor did an X-ray examination of the sella turcica, etc., show any abnormality. Her overweight condition was due to faulty food habits. The right half of the picture shows the result of restricting her diet to about 800 calories per day—a loss of 75 pounds in 32 weeks. An increase in height at the same time brought her into better proportions. Her progress is shown graphically in Figure 26.

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Although successful treatment is essentially a matter of diet, physical exercise which is not overfatiguing will also assist the process of reduction. Swimming, rowing, walking, and moderate exercise of any kind should be encouraged, but it is necessary to remember that many overweight children do not have sufficient strength for hard exertion, and have to train gradually for heavier tasks.

Influence of Heredity.—While the natural tendency to excess of fatty tissue in certain children must be admitted, and this often appears as a family characteristic, overweight is far more frequently caused by habit than by heredity. Many children are allowed to indulge themselves in overeating on the ground that they were born to be fat, and that nothing can save them from this condition. A similar condition in one of the child's parents may be the direct result of like habits uncorrected in youth. In our clinics we have had many cases of children believed to be destined to thinness by a resemblance to one or the other parent, who, when given special treatment and care, go beyond normal weight and actually become obese. On the other hand, the fat children who have followed the directions here given show that there is no need of their continuing to suffer

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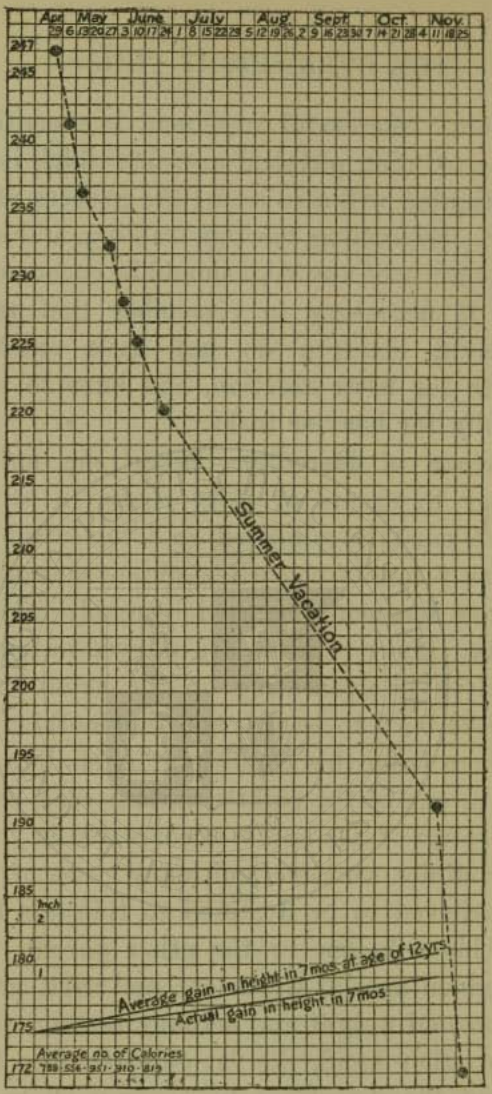

FIGURE 26. THE CASE OF LOUISE

This is the chart of Louise whose picture appears in Figure 25. It shows that while she was losing weight, she grew in height at nearly the average rate, illustrating that there is a physiological force that makes for the normal.

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from overweight. Every child should be considered as an individual, and be given all possible aid to a normal and healthy development.

Figures 25 and 26 illustrate the results of a faithful reduction in food during a period of seven months. In spite of the marked loss in weight there was nearly the average increase in height, which operated to reduce the percentage of overweight in this case. Normal growth in height during the period of treatment tends to offset a certain amount of excess fat, and to bring the body into better proportions.

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CHAPTER XVI

QUESTIONS COMMONLY ASKED

We have had occasion to answer thousands of questions in our nutrition classes, in the consultation room, and in letters from parents. While these inquiries cover a wide range of topics, certain questions are sure to appear wherever a group of mothers begin to talk about malnourished children. From this experience the following representative questions have been selected, which it will be noticed center about the five principal causes of malnutrition, namely: *physical defects, lack of home control, overfatigue, improper diet and faulty food habits,* and *faulty health habits.*

1. *Is underweight serious in a child who seems healthy, has a good appetite, and is as active as any child of his age?*

When the body weight is not sufficient to sustain the height, the muscles are apt to show lack of tone, and the nervous system is almost invariably unstable. An underweight child has less resistance to disease, and is less able to withstand nervous strain, as he lacks the re-

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serve provided by a normal body weight. If his food habits are corrected, his activity reduced, severe physical exercise omitted, and rest periods taken morning and afternoon, it will soon be found that his weight has increased. His general condition will also show an improvement similar to that which appears after a long vacation, and you will realize that your standards of health for the child have been inadequate.

2. *At what age is it safe to remove diseased adenoids and tonsils?*

In the case of adenoids we advise removal as early as they are found to be diseased or to cause obstruction. Under the age of five their removal is usually sufficient to relieve obstructed breathing. The tonsils may be enlarged, but do not usually become infected earlier than the age of four or five. They should be watched, however, and if they become diseased, it is better to remove them at once. The child should be kept in bed five days to accomplish full recovery and prevent loss in weight.

3. *Are enlarged cervical glands a sign of tuberculosis?*

Enlarged glands are an indication of various infections. The glands become enlarged in an

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effort to resist invading organisms. Enlargement of the posterior cervical glands may be caused by organisms that come from the scalp due to local irritation, but enlargement of the anterior cervical glands is usually secondary to diseased tonsils. The infecting organism may also be that of tuberculosis, and therefore the condition should receive prompt attention, especially in a debilitated child.

4. *Are carious teeth a serious cause of malnutrition?*

Small cavities in the teeth do not apparently affect nutrition, but alveolar abscesses and large cavities which affect approximation disturb the digestion and produce poison products which are absorbed. The teeth, therefore, should be given the best possible care, and even small cavities should receive prompt attention by a dentist.

5. *Is tuberculosis in children always permanent?*

It is found that the majority of children under sixteen have had tubercular infection at one point or another, and although such infection is permanent, healing takes place about the tubercular process and it may cause no further trouble. The greatest safeguard against fur-

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ther extension is to keep the nutrition up to normal standards, and when this is done there is no reason why the child should not become strong and well.

6. *Is it proper to expose children to whooping cough and other infectious diseases in the summer time in order that they may not take them at a more unfavorable season?*

Children should never be exposed to infectious diseases intentionally. Whooping cough, measles, and scarlet fever often have serious after effects, and the younger the child the greater the danger. Where these diseases cannot be avoided, the patients should be given special care to prevent loss in weight and consequent malnutrition.

7. *What do you mean by a "defect"?*

A defect is an abnormal organic physical condition. Most defects fall into two large classes; those due, first, to inflammatory processes which cause malnutrition, such as diseased adenoids or tonsils, carious teeth, otitis, pyelitis, and the inflammatory conditions caused by pediculosis and worms; and, second, those deformities that are a result of malnutrition, such as fatigue posture, round shoulders, lateral curvature and flat feet. We also include as de-

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fects such nervous disturbances as enuresis and chorea.

8. *Should a child be made to lie down when he cannot sleep?*

The child who does not fall asleep naturally after several hours of activity is probably suffering from nervous over-stimulation as a result of fatigue. This is an indication that he has special need of rest. There may be cause of his failure to sleep in the conditions of the room as to light, heat, or noise. Frequently the wakefulness is due to the mistaken notion that he will go to sleep more quickly if he is allowed to take toys and books to bed with him. He should be taught to lie quietly for a short period and then gradually lengthen the time. Rest does not necessarily mean sleep, but when a child has once learned to rest quietly he usually drops off to sleep. It is valuable training to acquire in early life the habit of being able to turn the tide of fatigue during the day by a few minutes of thorough rest.

9. *Does a child get really "good sleep" in the daytime? How much sleep is necessary?*

The number of hours a child may sleep to advantage varies within what may be called a zone

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of safety. Long hours of sleep will not necessarily prevent overfatigue. A child may sleep 14 hours a day, and yet suffer from too great or too continuous mental or physical activity during the other 10 hours. Overfatigue is best prevented by the use of rest periods during the day, which provide a new supply of energy before the child has gone beyond the limit of his strength.

People living in tropical climates have learned to divide their sleeping time by taking a siesta in the middle of the day, thus increasing the amount of time for other purposes in the freshness of the morning and the cool of the evening.

Because so many hours are spent in sleep it is important that the air in the room should be as fresh as that outdoors.

The child of school age should have from 10 to 12 hours of sleep at a regular time, aside from his rest periods.

10. *What does it mean when a child grinds his teeth in sleep?*

This may be a sign of worms, adenoid or tonsil infection, indigestion, overfatigue, or nervous disturbance. Whenever it is noticed, the cause should be sought and removed. A

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careful following of the nutrition program will meet the need in the case of any of these causes except worms, for which special treatment is necessary.

11. *What is the best treatment for "worms"?*

In case intestinal parasites are suspected, a physician should be consulted, as it is easy to mistake shreds of cellulose in the stools for thread worms. When worms are found, treatment should be carried out under a physician's directions. Do not trust "worm cures" or other patent medicines. Injury is frequently caused by repeated injections and purges. Treatment should continue until all traces of either worms or eggs have failed to appear for at least two weeks. When treatment is stopped before this is accomplished, conditions are soon as bad as ever.

12. *Why do certain foods disagree with one child and not with another?*

This may be due to a food idiosyncrasy which in most cases is gradually outgrown. The symptoms may be convulsions, a rash resembling eczema, or throat difficulty similar to bronchitis and asthma. The foods most apt to dis-

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agree with children are egg albumen, cow's milk (rarely), oatmeal, nuts, strawberries, raw apples, and shell fish. Proteid tests by a physician will determine the kinds of food which it is necessary to limit in a given case.

Children have varying ability to digest certain kinds of food. For example, butter fat may be perfectly digested, but cream will cause indigestion. Such variations are within normal limits, but care should be exercised in forcing a child to take too much of any food for which he has an aversion.

13. *Why are tea and coffee injurious? What is the effect of cocoa?*

Drugs have a very serious effect upon growing tissue. There appears to be a lack in childhood of the immunity that usually develops with maturity. Tea and coffee contain about two grains of caffein to the cup or glass. Even weak tea or coffee gives to a child nearly as much of the drug as would be contained in an ordinary dose.

The theo-bromine in weak cocoa does not show any bad effect, and a small amount of cocoa gives a flavor to milk and thus renders it palatable to many children who would otherwise have difficulty in taking as much milk as they

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need. When cocoa is given for mid-morning and mid-afternoon lunches, it should be only slightly sweetened, as the sugar diminishes the appetite for the next meal. The most important difference between cocoa and the other drinks is that there does not seem to be any desire to increase its strength, and children do not form a "cocoa habit."

14. *How can constipation be cured without drugs?*

The child should be trained to a regular movement of the bowels at the same time every day, preferably just after breakfast. A suppository or an injection of an ounce of liquid petroleum may be used to start the habit. One or two glasses of water taken before breakfast are helpful, and coarse cereals, vegetables, and fruit will also act as laxatives. Bran stirred into the cereal is beneficial, or cooked bran eaten with cream and sugar. Oatmeal and cornmeal bread sweetened with molasses are good foods. Prunes and figs are also useful. Concentrated foods such as rich cakes and pastry should be carefully avoided.

Constipation is usually a symptom of indigestion; therefore, plenty of time at meals and good food habits are important. Until regular

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bowel habits are established liquid paraffin may be used, as it is not a drug and does not form a habit. It should be given to the child in doses of two to four teaspoonfuls before meals or on retiring.

These measures should be sufficient, but if constipation persists other causes must be looked for, such as intestinal obstruction, adhesions, or sub-acute appendicitis.

15. *How can enuresis be cured?*

Enuresis, or bed-wetting, is not a disease but rather the persistence of an infantile condition or habit. Most children gain control of the bladder by the end of the third year when properly trained. The "wet habit" is a serious matter in any family, but when it is found among children for whom foster homes are being sought, it seriously affects their opportunities for adoption or for placing in desirable families.

Most cases can be cured within a week by the following treatment:

No liquids or fruit to be taken after 4 p.m.

A rather light dry supper; for example, a cereal with not more than a tablespoonful of milk.

A bland diet; no tea, coffee, or highly seasoned foods at any time, and no candy or desserts between meals.

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The bladder emptied on going to bed and at intervals of one hour until midnight, and of two hours from then until morning. These periods should be lengthened one-half hour each night. An alarm clock is useful at night, and a chamber should be placed on a rug at the bedside convenient for use.

When it is found that a child wets himself at a certain hour, the bladder should be emptied half an hour before that time for several days until the habit is cured. This is especially apt to occur about one hour after going to bed.

The child should be encouraged by stars and other rewards for every dry day and dry night. He should not be punished for bed-wetting, as it is involuntary and he does not know when the act occurs. Encourage him to be alert to feel the need of emptying his bladder. Guard against overfatigue and excitement. Be insistent upon the mid-morning and mid-afternoon rest periods. Drugs are of little or no use. Patience and persistence will win out in practically every case.

16. *If a malnourished child is brought up to standard, does he stay up to standard?*

In order to bring a child up to normal weight it is necessary to find the cause of his poor nutrition, to remove the cause, and to teach him

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good food and health habits. Therefore, after he gets well the knowledge and habits thus acquired serve to keep him so. Relapses do occur due to causes over which neither children nor parents have control; but otherwise the malnourished boy or girl's chances of keeping well are equal and possibly better than those of a child who has never been malnourished.

17. *Is it safe to omit milk from the diet of a growing child?*

No. Milk is the only complete food for human beings, and is the greatest safeguard against any deficiency in either the character or amount of the diet. The well child should have a pint of milk every day, and the undernourished child should take a quart in one form or another. At least a pint of milk should be taken daily all through the growing period, that is, until maturity. Some of the most pronounced and serious cases of malnutrition are found among those children who have omitted milk from their diet.

18. *What are vitamins, and in what foods do they occur?*

The term "vitamins" is used to designate certain accessory food products necessary for

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normal growth. These accessory factors are of three kinds.

"Fat-soluble A" is known as the antirachitic factor, and occurs mainly in: (*a*) certain fats of animal origin, and (*b*) in green leaves. The most notable deposits are in cream, butter, beef fat, cod liver oil, and egg yolk. The leafy vegetables that contain it are chiefly celery, lettuce, onions, cauliflower, cabbage, Brussels sprouts, spinach, Swiss chard, and beet tops.

"Water-soluble B," known as the anti-neuritic (beri-beri) factor, is found in almost all natural food products, its principal source being the seeds of plants and eggs of animals. Yeast cells are a rich source, also the germ and outside layer (the bran) of cereals, but it is absent in polished rice and white wheat flour.

The antiscorbutic factor occurs in fresh vegetables, and largely in lemons, oranges, raspberries, and tomatoes. Potatoes, milk, and meat possess a definite but low antiscorbutic value.

The following table, taken from that prepared by the British committee appointed by the Medical Research Committee and the Lister Institute for use during the war in famine-stricken districts, shows the distribution of these accessory factors in the commoner foods.

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TABLE VI. DISTRIBUTION OF THE THREE ACCESSORY FACTORS IN THE COMMONER FOODSTUFFS *

Classes of Foodstuff	Fat-Soluble A or Antirachitic Factor	Water-Soluble B or Antineuritic Factor	Antiscorbutic Factor
Fats and oils:			
Butter	+ + +	0	
Cream	+ +	0	
Cod-liver oil	+ + +	0	
Beef fat or suet	+ +		
Peanut butter and nut butter	+		
Margarine from beef fat	See note †		
Margarine from vegetable fats or lard	0		
Meat, fish, etc.:			
Lean meat (beef, mutton, etc.)	+	+	+
Liver	+ +	+ +	+
Kidneys	+ +	+	
Heart	+ +	+	
Fish, white (cod, haddock, etc.)	0	very slight if any	
Fish, fat (salmon, herring etc.)	+ +	very slight if any	
Fish, roe	+	+ +	
Tinned meats	?	very slight	0
Milk, cheese, etc.:			
Milk, cows', whole, raw	+ +	+	+
Milk, cows', skim, raw	0	+	+
Milk, cows', whole, dried	less than + +	+	less than +
Milk, cows', whole, boiled	undetermined	+	less than +
Milk, condensed, sweetened	+	+	
Cheese, whole milk	+		
Cheese, skim milk	0		
Eggs:			
Fresh	+ +	+ + +	?0
Dried	+ +	+ + +	?0

* Hess considers this list too restricted, and emphasizes the value of potatoes, and also of canned tomatoes, which his experiments show are rich in the antiscorbutic factor. Preserving does not necessarily injure the vitamins provided the foods are fresh when canned. Powdered or canned milk may prove of great value where a good supply of fresh milk cannot be obtained.

† Value in proportion to amount of animal fat contained.

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TABLE VI. DISTRIBUTION OF THE THREE ACCESSORY FACTORS IN THE COMMONER FOODSTUFFS*—*Continued*

Classes of Foodstuff	Fat-Soluble A or Antirachitic Factor	Water-Soluble B or Antineuritic Factor	Antiscorbutic Factor
Cereals, pulses, etc.:			
Wheat, maize, rice, whole	+	+	
Wheat, maize, germ	+ +	+ + +	0
Wheat, maize, bran	0	+ +	0
White wheaten flour, pure cornflower, polished rice, etc.	0	0	0
Dried peas, lentils, etc.		+ +	0
			0
Vegetables and fruits:			
Cabbage, fresh, raw	+ +	+	+ + +
Cabbage, fresh, cooked		+	+
Lettuce	+ +	+	+ +
Spinach	+ +	+	
Carrots, fresh, raw	+	+	+
Carrots, dried	very slight		
Potatoes, cooked			+
Tomatoes, canned			+ +
Lemon juice, fresh			+ + +
Lemon juice, preserved			+ +
Orange juice, fresh			+ + +
Apples			+
Bananas	+	+	very slight
Nuts	+	+ +	+ +
Miscellaneous:			
Yeast, dried		+ + +	
Yeast, extract and			
Yeast, autolyzed	?	+ + +	0

A glance at this table will show that the wide distribution of these elements clearly indicates their liberal use in the average American diet. McCollum says:[1] "It is now well demonstrated that with the diets employed in Europe and America there is no such thing as a 'vitamin'

[1] E. V. McCollum, "The Newer Knowledge of Nutrition," p. 138.

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problem other than that of securing an adequate amount of the substance, Fat-soluble A." He accordingly recommends milk and the leafy vegetables as "protective foods," including eggs in the same class.

In our nutrition classes at least a pint of milk a day is prescribed for every child, and when the diet lists have been checked and corrected according to the methods described, I have never known a case of malnutrition that could properly be diagnosed as "lack of vitamins."

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PART III

A NUTRITION PROGRAM FOR THE COMMUNITY

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CHAPTER XVII

THE NUTRITION CLASS

Although many features of our nutrition program can be applied with excellent results in the care of the individual child, a well organized nutrition class is the most effective agency in the treatment of malnutrition. This is true in the case of the rich and the well-to-do as well as among the poor, for children are alike in their response to the stimulus of the class and the spirit of competition.

The class method is based on the principles of group association and visual instruction. Children are quick to imitate, and to learn from one another. They recognize and respect "good form" in any group to which they may belong, and the business of getting well assumes a new importance in their minds when they see it as the aim and purpose of their associates. The rising line of the weight chart and the improved appearance of those who gain teach a lesson that is clear to all.

The child's own interest is so aroused by the chart's record of his progress that on several

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occasions I have known children to burst into tears when they failed to gain. Often, when the weather is so severe that scarcely a patient appears in the other divisions of the hospital, the nutrition class registers full attendance.

Class Organization.—The simple procedure of weighing and measuring forms the basis of selection. Classes of not more than 20 children each are formed from those whose weight is seven or more per cent below the average. Each child is then given thorough physical, mental, and social examinations, as previously described, and receives such advice and instruction as his condition requires. The object of the class is to check up the results of the instructions given, and to make further recommendations as they may be needed.

A weight chart is made out for each child, with his name, age, height, and weight at the top, and a line showing the average weight for his height. Since a normal increase in both weight and height is to be expected throughout the growing period, this average weight line does not represent a fixed number of pounds, but is a curve allowing for an expected increase of from three to thirteen pounds per year, according to the age of the child. His actual weight line is made by connecting the dots rep-

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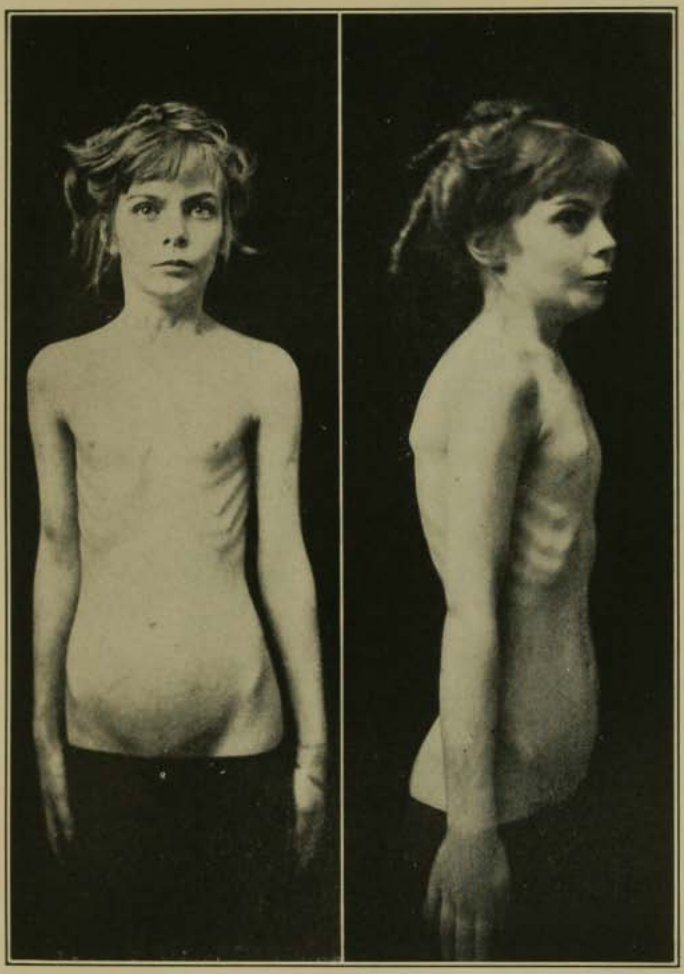

FIGURE 27. THE CASE OF DOROTHEA, BEFORE TREATMENT

Dorothea, aged eleven, became tired on slight exertion, so tired that it took her nearly an hour to dress in the morning. She would sit and dream, rarely smiled and her face looked distressed. She passed the school medical inspection, but was given a tonic by her family physician. The hospital diagnosis was "No disease." The nutrition diagnosis was: underweight 21 per cent; naso-pharyngeal obstruction; cervical adenitis; carious teeth; spinal curvature; fatigue posture. Nutrition treatment was begun with the result shown in Figure 28.

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resenting his first weight and the subsequent weekly weighings.

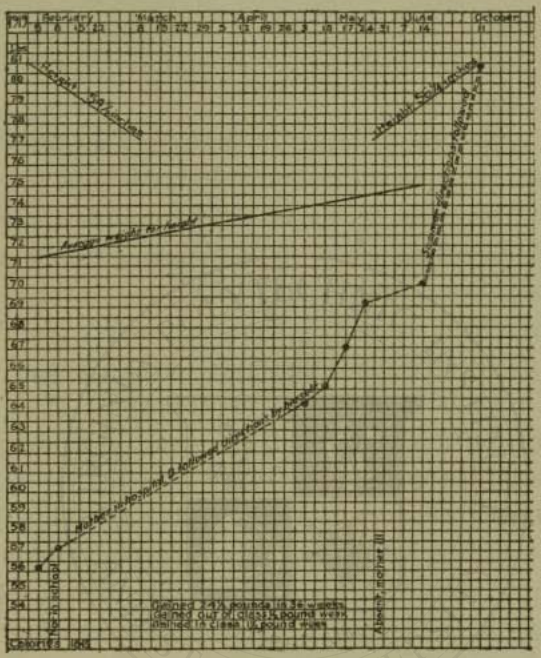

FIGURE 28. THE CASE OF DOROTHEA

After the second weighing her mother was in the hospital for 11 weeks, but Dorothea continued by herself to follow all directions, gaining at the rate of half a pound a week. This was increased to over a pound a week when she returned to the class, but reduced to half a pound again at a summer camp which did not supply mid-morning and afternoon lunches. Her total gain was 24½ pounds in 36 weeks.

When the actual weight line reaches the average weight line a new average weight must be

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computed on the basis of the actual height of the child at this time, in order to allow for the probable growth in height while he has been in the class. It is only when the child attains this new weight that he is considered ready for "graduation."

A quiet room large enough to accommodate about fifty persons should be provided for the nutrition class, where it will be free from interruption. The class meets once a week at a regular hour, and the children come to the classroom accompanied by their parents. No child should be admitted regularly to the class except at the request of his parents, because their cooperation and interest are essential factors in successful treatment.

Class Procedure.—As the children arrive they are weighed by the nutrition worker, and their weight recorded on the charts. Each child brings a 48-hour diet list, which is checked up by the nutrition worker or her assistants, not only with reference to its total food value, but also for the kinds of food taken, and especially to note whether it contains in sufficient amount milk, cereal, and other essential foods. The average number of calories is recorded on the weight chart, where it often affords significant comparison with the rise or fall of the weight

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FIGURE 29. THE CASE OF DOROTHEA, AFTER TREATMENT

Notice the transformation in both mental and physical condition following the increase in weight shown in Figure 28. Dorothea's mother says, "Her whole disposition has changed, she laughs, and is cheerful and happy." She overcame her finicky likes and dislikes and faithfully carried out the directions given because she was anxious to become well and strong.

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line. The nutrition worker also questions the child in regard to his activities during the preceding week, and seeks to find the cause in case of failure to gain. Notes of her findings are added to the child's record for the doctor's information.

A blue star is affixed to the weight chart to indicate that rest periods have been faithfully taken during the week, and a red star provides a similar record in regard to lunches. A green star may be used to record the attendance of one or both parents. This encourages regular attendance on the part of the parents, and may be of interest in showing that the best gains are made by those children whose parents are interested enough to come to the class regularly.

The charts are then hung on the wall in the order of the gains made, and the children are seated in the same order with their parents behind them, all facing the charts. A gold star is added to the chart of the child who has gained the most during the week and is sitting in the place of honor at the head of the class.

These preliminaries are completed before the stated time for the doctor's arrival, and he is thus enabled to see at a glance the results accomplished during the week. Much of the instruction needed can be given in general advice

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to the whole group, and individual recommendations based on the record of the charts will be useful to all. Many a mother comes to see more quickly what should be done for her own child when its effects are pointed out in the case of another boy or girl.

There is great teaching value in comparing the child at the head of the class with one who has not gained, and explaining the reason for the results in each case. The force of public opinion in the class group can in this way be made a powerful ally in removing such simple causes of failure as the neglect of rest periods or lunches, prejudice against open windows, and overfatigue arising from late hours or unnecessary tasks. Care must be taken, however, not to discuss openly matters about which either parent or child is rightly sensitive.

Food and Rest.—During the period of treatment in the nutrition class the child should be placed in an open-air, or at least an open-window, class, and school pressure should be reduced. Most children need only sufficient additional time for a lunch and rest period at 10:30; others will work to best advantage on a half-day schedule; a few need to be limited to two hours a day; while in certain cases the child cannot safely attend school at all for a time.

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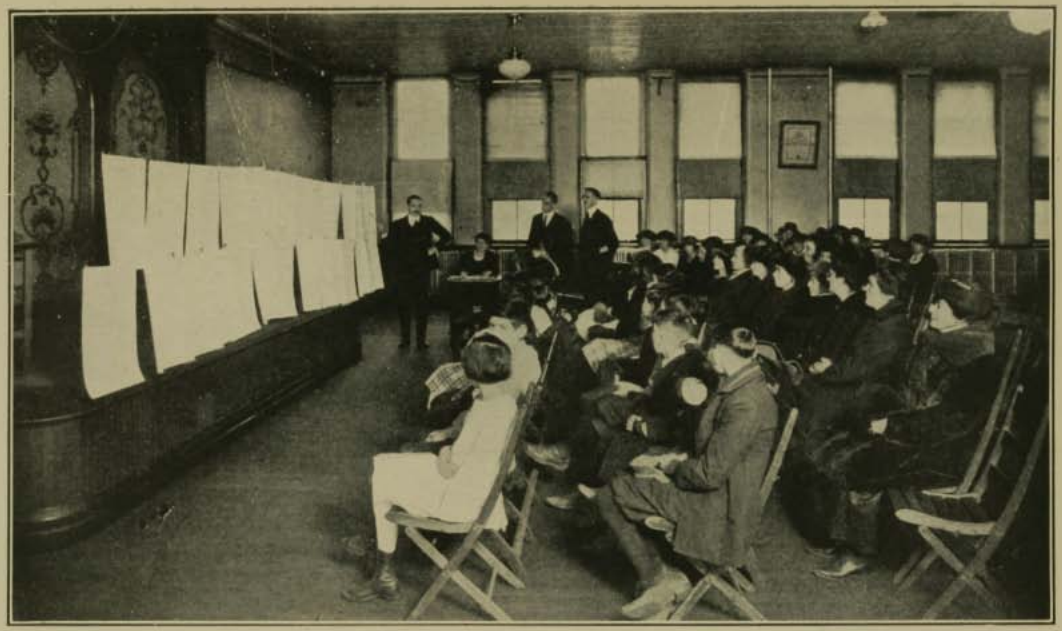

FIGURE 30 A NUTRITION CLASS IN SESSION

The children are seated in the order of their gains facing their charts. Behind the children are the parents. The physician is pointing out the results accomplished during the week while the nutrition worker takes notes. The school principal and physical director are interested spectators.

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One rest period of at least half an hour should be taken before the midday meal, and in the middle of the afternoon a longer rest, in order to save the child from overfatigue. The rest periods should be taken as described in Chapter IX.

Mid-morning and mid-afternoon lunches are recommended for all undernourished children.

In addition to the general advice given to all, both the physician and the nutrition worker endeavor to discover every obstacle to each child's progress, and recommend such changes as the needs of the individual require. The nutrition worker visits the home to assist the parents in planning for *the essentials of health,* and to see that recommendations have been understood and carried out.

The special work of the physician and of the nutrition worker in connection with the class is discussed in the chapters following.

Results Secured.—Successful treatment in the majority of cases is both easy and sure, provided either the physician, the nutrition worker, or the teacher has the ability to create the vision of health in the child's imagination, and thus secure his complete coöperation. Where there is, in addition, the hearty coöperation of the home and the school, the child should reach

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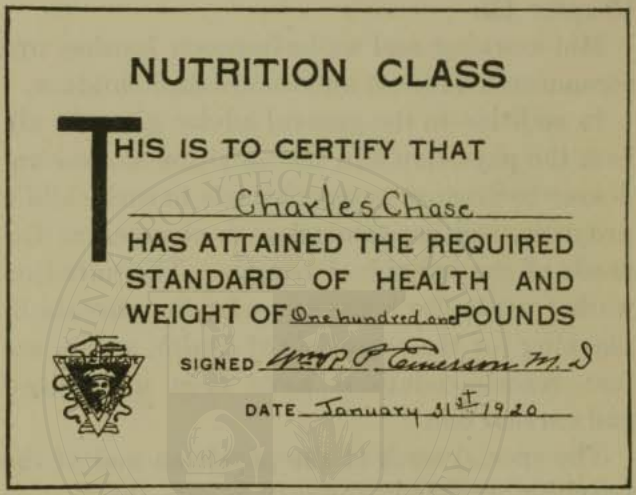
his normal standard of weight in 10 or 12 weeks.

It is recognized that the nutrition program demands from the child a self-denial and steadfastness of purpose to which he has not been


NUTRITION CLASS

THIS IS TO CERTIFY THAT

Charles Chase

HAS ATTAINED THE REQUIRED STANDARD OF HEALTH AND WEIGHT OF One hundred and POUNDS

SIGNED Wm P. Emerson M.D

DATE January 31st 1920

FIGURE 31. NUTRITION CLASS DIPLOMA

This certificate is given when the child reaches the average weight for his height. It is highly prized by the "graduates" as a recognition of their own efforts to get well.

accustomed. For this reason the matter of "graduation" from the class is made something of a ceremony, and he is made to feel that the certificate given is a well-earned diploma.

In the early stages of this work we considered we were getting good results when we were able

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to double the average rate of gain as shown by the tables. We now expect an average increase of 300 to 400 per cent, and have class records showing a group gain of 1,400 per cent of the expected rate of increase. These results, contrasting with the published reports [1] of gains made in diet classes, school-lunch campaigns, and other partial efforts to combat malnutrition, justify the comprehensive program of our nutrition classes, and emphasize the importance of the medical foundation of the work.

Summary.—The class method in the treatment of malnutrition has many advantages, which may be summarized as follows: It

Economizes the time of all concerned by bringing the parents to the class, and thus minimizing the necessity for home visits;

Secures the coöperation of the parents—a vital factor in making results permanent;

[1] There was a gain of 170 per cent in an experiment conducted by Teachers College, Columbia University. (Mary S. Rose and Gertrude G. Mudge, "A Nutrition Class in Cooperation with a Summer Play School," *Journal of Home Economics*, February, 1920, Vol. 12, No. 2.)

The gain was 125 per cent in an experiment conducted by the Hampden County Improvement League, Chicopee Falls, Massachusetts. (Minnie Price, "School Lunches and Educational Work to Overcome Undernourishment." Massachusetts Department of Health, *The Commonhealth*, July-August, 1920, Vol. 7, No. 4, pp. 262-267.)

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Pools the experience of all families for the benefit of each;

Favors study and correction of home difficulties by contact with parents under friendly circumstances;

Introduces a healthy form of competition;

Utilizes the approval of companions to influence the child to follow directions;

Visualizes the essentials of health—an effective method in health education;

Removes prejudices and fears through knowledge of results obtained, and convinces in a moment when hours spent in argument have failed;

Overcomes obstacles too great for the authority of the parent and for the undeveloped reason of the child, which yield in a surprising manner to the interest developed in the class;

Provides a program whereby children can be made well in their own homes without adding to the family budget;

Furnishes a basis for coöperation on the part of educational, medical, and all child-helping organizations in a practical community health program.

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CHAPTER XVIII

THE NUTRITION WORKER

THE successful nutrition worker must have the following qualifications:

1. Executive ability for organization and administration
2. Genuine interest in children and ability to teach
3. Practical experience in a children's medical clinic
4. Training in the principles of nutrition work, in chart-making, and the keeping of records
5. Practical experience in conducting nutrition classes

It is her chief duty to see that each child who comes under her care has *the essentials of health.* In order to accomplish this she must coördinate the efforts of the parents, the physician, the teacher, and the child himself.

Her first contact with the parents comes at the time of the weighing and measuring, and she should use this opportunity to help them understand the significance of underweight. At the first class meeting she has a further oppor-

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tunity to interest them in their child's condition by means of the weight chart and by explaining the need of the physical-growth examination.

When the class is definitely organized, she is no longer dealing merely with a single family unit, but has the larger social problem of creating a class spirit with its alternating influences of mutual aid and competition. She must interest the physician in the class as a group, and help him become identified with its varied problems.

Adjustment of the daily programs should be made at once and steps taken for the removal of defects that all children may become "free to gain" as soon as possible.

Everything should be planned to lead directly to the chief object in view—bringing the children up to the normal weight line. In the arrangement and equipment of the classroom consideration must be given not only to the needs of the children and the convenience of the physician, but also to the problems of the school or hospital in which the class is conducted. Foresight in planning the details of the work will save time for the physician, the parents, and all concerned.

The nutrition worker arranges to have the physical-growth examination made as promptly

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as possible. She takes the dictation of the examining physician that she may know exactly what defects are found. The parents should be made to see that she understands every remark made by the physician so that later she will be able to interpret authoritatively anything that may not be clear to them. In these and many other ways she must seek to gain their interest and confidence.

In the removal of physical defects brought out by the examination many difficulties are encountered. School, home, and clinic schedules must be brought into harmony that the recommendations of the physician may be carried out without delay. The worker's records must show clearly what has been accomplished so that the physician will have an intelligent understanding of each case at the weekly meeting of the class.

The Nutrition Worker and the Physician.— The class should meet at least half an hour in advance of the arrival of the physician. The nutrition worker assumes all responsibility for making and keeping the weight charts, checking the diet lists, and attending to the class records. It is only by adequate preparation on her part that the physician is able to conduct the class in the short space of half an hour.

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Upon the thoroughness and accuracy of the information that she supplies will largely depend the instructions that he gives for the ensuing week's program.

No part of her work calls for more judgment and tact than her relations with the physician. Not only must she assist in carrying out his recommendations, but when this has been done and the child still fails to gain, she must put him on his mettle to look deeper into the cause. Instead of being satisfied with the 75 or 80 per cent of the class who are making the desired progress, she must direct special attention to every child who fails to gain, so that the physician will feel the challenge and devote special attention to these problems.

Individuals will be found who require a long period of observation and study by both nutrition worker and physician before a definite diagnosis can be made. In one of our classes a boy was under observation for a year and a half before his trouble, cardiospasm, was discovered. The cause must be found in every instance before recovery can be expected.

Visitors.—Although visitors should be welcomed, they should not be allowed to interrupt the class exercise. The best service that can be rendered to a serious inquirer is a convincing

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demonstration of what can be accomplished in a class period. The nutrition worker should not allow herself to be diverted by "the gallery," but may explain the work in detail to those who are willing to remain after the class is dismissed.

A Social Diagnostician.—The nutrition worker is so closely concerned in the social examination that she may be called a social diagnostician. With the exception of physical defects, the chief causes of malnutrition have their roots in the social conditions that surround the child. It is the business of the nutrition worker first to discover, and then by her teaching to endeavor to remove, *lack of home control, overfatigue,* and *faulty food and health habits.* She must become the focus of all the social forces affecting the welfare of the child, conferring with parent, teacher, clergyman, or other person in authority in any particular case. She is the intermediary between the physician and the parents, and must represent his authority both in class conferences and home visits.

Previous training and experience in a special field may make it difficult for the nutrition worker to see the whole problem without prejudice in favor of the single factor with which she is most familiar. This tendency is most com-

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mon with reference to diet. After repeated demonstrations to the contrary, many workers still fail to realize that while improper diet is a significant item, it is not the first or chief cause of malnutrition, but actually fourth in the list, and shares even this place with faulty food habits.

Home Visits.—When the nutrition class is properly organized, the necessity for home visiting is reduced to a minimum. We have found one nutrition worker able to care for more children by the class method than would usually be assigned to three or four social workers where home visiting is the chief feature of the program. This is accomplished by group teaching when the class is in session, and by individual conferences with the mothers before and after the class. When instruction is made graphic by the weight chart and results are apparent in the case of other children, the mothers become thoroughly convinced. Nevertheless, a certain amount of home visiting is not only necessary but desirable.

The nutrition worker should go into the home in the same spirit in which the doctor makes his visit. It is recognized that the physician's call is for the definite purpose of removing illness and getting the patient well. He allows nothing

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to divert him from this purpose, and never betrays the family's confidence. The nutrition worker must observe the same scrupulous regard for the dignity of the family and her own professional standing.

Where she has won the full confidence of the parents in the class conferences, she can usually make her visit to the home the result of a direct invitation. Her inquiries here should be confined to the definite business which brought her to the home, and center about the *essentials of health* for the particular child under her care. Hygienic policing is no part of her work. She may incidentally observe a case of infectious disease that calls for control by the Department of Health, or a matter that requires the attention of the Society for the Prevention of Cruelty to Children; but she must stick to her job, and refer these cases to the organizations that have been established to meet such needs.

As nutrition work develops, the need for visits to the homes of the rich is increasingly recognized. One of the chief objects of the home visit is to observe the child's sleeping arrangements, and this need is sometimes as great in the homes of the wealthy as among the poor. For example, two growing girls in a family of wealth were found to be sleeping in a room

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lined with heavy draperies, with their beds close against the wall in corners filled with dead air. Their father was so afraid of drafts that he was in the habit of getting up in the night to close all windows that chanced to be open.

One of the daughters later went around the world to search for the health that could have been found at home by remedying the conditions just described. Her sister has had severe attacks of pleurisy, and is probably tuberculous, but, although she is now a trained social worker, she is not able to get away from the habits and prejudices of her childhood, and still sleeps with her windows tightly closed.

An occasional visit to the home at night will often lead to a better understanding of the child's case. Frequently, children will be found to sleep facing the light, with beds against the wall in a dead air space and only one window open, which, moreover, may be away from the prevailing wind. Even that single window is often kept closed until the parents retire, which may be several hours after the children have gone to bed. Growing children need fresh air every hour of the twenty-four.

In dealing with those in less favorable circumstances it must be borne in mind that the

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more ignorant a person is, the easier it is to hurt his feelings. It is a good rule to meet all parents in such a way as to bring out their best qualities, and to see as much good and as little bad in the situation as possible. The nutrition worker must "know people," and realize the significance of human relationships. She must be able to appraise the resources that are available, and to grasp quickly the needs of a situation.

Encouragement should be given for what the parents are trying to do. Even capable persons become like children when over-strained or ill, and require advice and assistance to start a constructive program of action. The mother's point of view is based on experience with her own children, while the worker's ideas are the result of clinical training. This wider vision should be used to give clearer definition to the part the mother must bear in carrying out the child's program.

Family Types.—The families with which the nutrition worker has to deal fall into two groups. The first, and fortunately by far the larger, seeks to coöperate and shows appreciation of help in meeting difficulties that have proved too complicated to be solved alone. This group is made up of what we may call "good

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mothers," while the second includes all those who are, in one way or another, "difficult."

There is the stubborn, obstinate, and prejudiced type who does not really wish to learn. Others look for some one else to do the hard work, yet expect praise at every turn. Many are overindulgent, easygoing, and quite lacking in home control. Here we find the "spoiled child" and the spoiled mother as well! Others are simply lacking in common sense, and are irresponsible to such an extent that one can never "put his finger on them." Still others are overanxious and fearful. There are always a few who are shiftless, vicious, or mentally deficient. The latter class includes many forms of subnormality which are menaces to the community, and the nutrition worker should see that they are turned over to agencies having experts especially trained to care for them.

To meet such problems the worker must have an understanding of human nature, and be able to grasp the strong and weak points in every situation. By some means each family with which she has to deal must be controlled until there is a beginning of order and responsibility. The force of public opinion, school, church, and every other helpful factor must be brought to bear when needed.

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In caring for families of this latter kind the worker must not neglect others of the first group with whom results can more readily be obtained. In one clinic several workers were exhausting their resources on a family in which the mother was found to be so mentally defective that their efforts were largely wasted. Another mother had been on the roll of the same clinic for six years, receiving medicine from time to time but so little definite instruction that her children did not improve. This mother was intelligent and ready to coöperate fully. When she brought her children to the nutrition class, and received definite instruction as to their food and health habits, they went "over the top"[1] in a few weeks' time.

In one nutrition class we were told it was impossible to secure the attendance of the mothers. On investigation it was found that the nurses in charge were issuing orders for food and other supplies for these homes, and therefore could have had the whip hand, although they were letting the mothers hold the club over them. As a result, the children in this clinic were averaging only 112 per cent of the ex-

[1] This expression is used to acknowledge the child's achievement when his actual weight line reaches the line representing the average weight for his height.

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pected gain in weight, while a few blocks away, where the coöperation of the mothers had been insisted upon, children from the same type of families were gaining at the rate of 369 per cent.

Nutrition work has for its foundation the love of the parent for the child, but the nutrition worker, to be successful, must see that this natural affection is directed into the proper channel, and the parents held responsible for their part in every instance.

Interest in Children.—All that the worker can do in the way of organization, administration, and teaching, however, counts for little unless she understands and cares for the children themselves. She must have a zeal for getting children well, guided by intelligence and a sense of proportion. These latter qualities are particularly important, for nothing is more discouraging than to spend one's self without stint, only to find that lack of essential knowledge has rendered all this labor unavailing. The indomitable spirit which is bound to carry a child through to normal standards of health must not be allowed to waste itself through inadequate methods.

There is also the danger that the worker may become so attached to a particular child that

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she unconsciously seeks to keep him under her care rather than to use her best efforts to find out what it is that the child really needs. Certain borderline mental cases show an excessive affection which appeals to the worker for an undue share of time and attention. All these complications should be considered in the light of the highest good of the individual and full justice to the whole group.

The Appeal of Nutrition Work.—What is attracting high grade workers from other fields to this new form of service? The first answer is that there is real satisfaction in doing work that has results that can be definitely measured. The weight chart gives evidence that cannot be denied. When the weekly weighing has been finished, the nutrition worker knows how many of the children are on the right track, and also, what is equally important, how many unsolved problems remain to challenge her best powers.

Another aspect of the work is seen in the comment of a young college woman, "The work is so human!" The nutrition worker enjoys her association with mothers and children in the class group, and is as happy as they over the gains made. There is no greater satisfaction than that of seeing a sick child return to health. A malnourished child who has been

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retarded physically and mentally, a trial to himself and his teachers, shows an actual transformation when he is brought to normal development. The improvement in his condition is reflected in the atmosphere of both home and school, and the nutrition worker may justly feel that her efforts have contributed to the welfare of the community.

The opportunity that comes to the nutrition worker is as truly significant in saving life as that afforded by some dramatic surgical operation. In setting children upon the road to health she is saving them from permanent physical unfitness and rendering a high form of public service.

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CHAPTER XIX

THE PHYSICIAN AND THE NUTRITION CLASS

A NUTRITION class is not conducted for diversion or amusement, for academic discussion, or for the purpose of philosophizing about the general value of health. It is a strictly business gathering, and the business to be accomplished is to get the children well. If this purpose is to be realized with anything more than ordinary efficiency, the physician should be present at every meeting. He need not spend more than half an hour with the class, for in that time he can bring out as many points as can be remembered.

By the time the physician comes in, the nutrition worker has weighed the children, checked up the diet lists and the week's activities, given the stars for lunches and rest periods, and arranged the children and their mothers in the order of the gains made. The charts are hung in a line in the same order, to show the physician the progress made since his last visit. The class meeting is a vital feature of nutrition work, and presents a psychological opportunity

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in which much can be accomplished with a minimum of effort.

The nutrition worker has had conferences with the parents and the children. She knows their problems, their efforts to overcome difficulties, and, in many cases, the causes of failure. The physician comes in as the final authority to observe the results of recommendations previously made and to give further advice as needed.

He first notes the gains made, taking pains to give each child who has gained proper credit for his effort. The child is entitled to such praise as "That's a good record," "You have done well," etc. These words should be spoken clearly so that all may hear and the child may feel that his efforts have been recognized. The children are thus encouraged to continue, and suggestions are made to help them increase their gain. Too much time must not be spent with this group, however, and the physician must pass on to those children who have not gained, usually about one-fourth of the total number. These present the physician's special problem.

Where a child has not gained there is always a cause. This cause is either social, in which case the responsibility rests with the nutrition

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worker, or it is medical, when it is the physician's business to find it, and he has not fulfilled his duty until he has done so. In these cases he must carry his analysis further, questioning both child and parent to see if directions previously given have been carried out, and going over again the five chief causes of malnutrition.

Beginning with *physical defects,* he will receive from the nutrition worker the report on the defects that have been corrected and those that remain to be done; how many children are waiting for adenoid and tonsil operations, etc., and the reason for the delay in each case. This may be fear on the part of the parents or merely postponement until a more convenient time. He must convince the parents by the record of the charts and by all other available means of the necessity of having the defects corrected. Almost invariably the child who has not gained is found to be the child who has not followed directions.

This leads at once to the question of *home control,* and perhaps the most essential part of the class work is with the mothers. If, for example, the child has not taken his rest periods we ask the mother why, and tell her she is responsible for this part of the program, and in

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fact for all directions given that are to be carried out in the home. These will cover most of the points relating to *overfatigue* and the child's *food and health habits.* The mother must be convinced of her responsibility in getting her child well, and should not be lightly excused for failure to follow directions. She must be shown that by obeying instructions she is not only preventing sickness, but possibly saving her child's life.

Where directions have not been followed, it is remarkable what effect the public opinion of the group has on the delinquent mother. She rarely has the moral courage to continue coming to the class without making the changes recommended in her child's program, knowing that this will be brought to light in case there is failure to gain.

A convincing demonstration is given when a child who has gained is asked to stand up before the group with a child who has not gained. The mothers learn to notice improvement from week to week with almost the same keenness as the doctor and when one mother sees the results secured by another whose child has carefully followed instructions, the result is apt to be very different in the case of her own child the following week.

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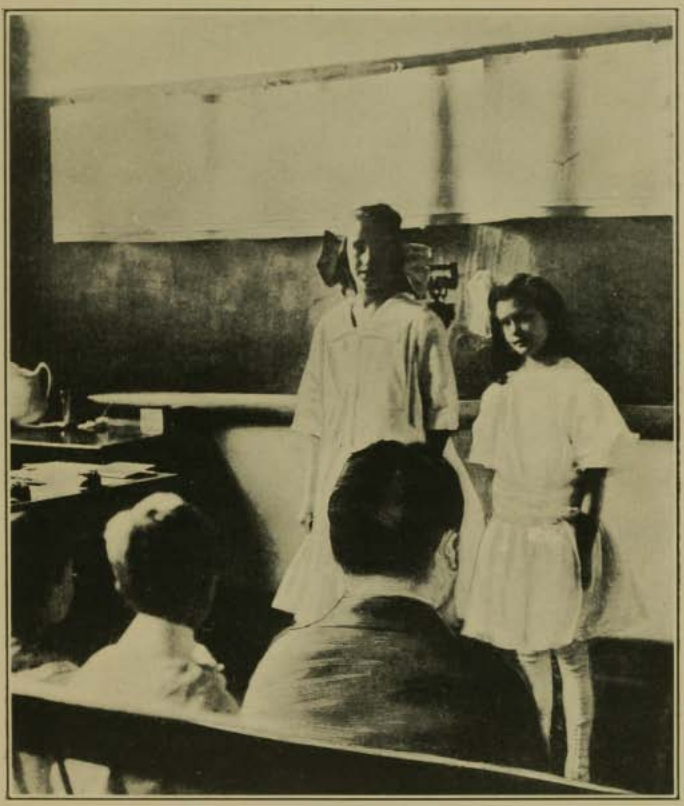

FIGURE 32. THE CHILD AS AN OBJECT LESSON

These two girls, Margaret and Irene, afford a comparison of results. Margaret had stopped drinking tea, had taken her lunches and rest periods faithfully and followed all directions, with a consequent gain of 1½ pounds, which placed her at the head of the class for the week. **Irene, who stands at the right, was at the foot of the class because** she had failed to gain. Her mother was afraid she would take cold if her windows were open at night. She was allowed to select her own food and to indulge in "banana splits" between meals. Seeing the gains made by the other children, her mother agreed to have the windows opened, and Irene corrected her bad food habits.

The following week she made a good gain.

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The physician should not take this occasion to lecture or to give general advice. Each point brought out should be demonstrated by the weight chart and by the child himself. In this way teaching is done by example and by visualization, which is perhaps the most effective method of education.

There is a fine spirit of truthfulness and honor in the nutrition class and the relation between the children and the physician becomes one of mutual trust and coöperation. The desire to gain is so keen that their attitude is, "What can I do?" and "How can you help me?"

Points are brought out in these class meetings that would never be discovered otherwise. For example, a boy who had not gained asked if reading in bed before breakfast would interfere with his gaining; a little girl said she slept with windows closed for fear a cat would get into her room at night; another child had been kept after school to help correct examination papers; and we frequently find a child attending daily rehearsals for entertainments when he is already suffering from overfatigue.

The children are always interested in one another, and the mothers become interested in every child in the class; thus all learn from the

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general experience, provided the physician brings out each point clearly.

With the indifferent mother the physician must be skillful in appealing to the influence to which she is most susceptible. In one case it may be her love for the child and her desire to have him well; in another, public opinion may be the most potent lever; another mother may be reached through a sense of shame in seeing her child at the foot of the class; others are flattered by receiving the attention of the physician and the nutrition worker, but all have a feeling of pride and satisfaction in seeing any child in the class return to health.

The questions asked should be definite and definite answers should be required. "Why have you not taken your rest periods?" Certain mothers need to be addressed in a thoroughly businesslike manner. "Do you want to play this game or not?" "If you don't intend to obey instructions, do not bring your child in again." "Does health mean more to you than education, or do you value education more than health?" "If you think your child's health the more important, then do not talk to me any more about promotions or what he is missing in school. He has all his life to study but only a few years to grow."

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The nutrition class aids the mother in establishing control over her child. When the boy or girl wants to get well, and the program recommended to accomplish this calls for plenty of sleep, regular meals, and the correction of faulty food and health habits, the occasion for parental discipline in these matters is removed and the problem of home control is greatly simplified. Therefore, when directions are clearly given to the mother in the presence of the child, and we explain to both the absolute necessity of their being followed, they return home with an equal desire to carry out the program and get results. The child will now work with the mother in the same way in which a good soldier promptly obeys an officer who has learned to give the proper orders. In each case the problem of discipline is largely eliminated.

So helpful has the class been in improving home control that we have been asked repeatedly by mothers to continue the classes during the summer for this reason alone.

On several occasions I have hesitated about holding a class meeting in especially bad weather, but on telephoning to inquire about the attendance have found it to be practically normal. When once aroused to the importance of the class, neither mother nor child will allow

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anything to interfere with their attendance. One mother brought her boy of seven to the class by carrying one child in her arms and arranging with a neighbor for the care of another. To reach the class on time she was obliged to rise at five in the morning but rarely missed a meeting during two whole winters, although on some days the thermometer was below zero.

The power for health that may be generated in such a class through the combined efforts of physician, nutrition worker, parent, and child is remarkable.

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CHAPTER XX

REPORT OF A CLASS MEETING

To illustrate what can be taught in less than a half hour's time by means of the nutrition class, the following report of a recent meeting is given. This class is connected with a nutrition clinic at a large hospital, and is selected, not because of exceptional results, but because it presents rather more than the usual number of problems, and the group is largely from a neighborhood in which strong coöperation of the schools is lacking.

The attendance on the day of this meeting was fourteen children and nine mothers. The class had been organized only a few weeks, and was being gradually increased. Four new children came in with their mothers for the first examination, and two others had been sent for examination from other departments of the hospital, only eight having previously been regularly admitted to the class and given charts. These eight were seated according to their gains in the following order:

1. *Florence Z.* (age eleven, 17 per cent un-

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derweight) occupied the seat of honor at the head of the class, having gained one and one-half pounds. She had taken her lunches and rest periods without missing a single day, and was pleased to stand up that the other children and the mothers might see her improvement, which was evident in her general appearance and better color. Her mother said, "I chase her to bed since coming here."

2. *Morton B.* (age fourteen, 10 per cent underweight) gained one and one-quarter pounds. This boy's stepmother had been unwilling to have him excused from school for his mid-morning lunch and rest period, but as this meeting was during vacation he had taken both faithfully. As his previous average gain had been only two ounces, this week's record of twenty ounces was conclusive evidence to the mother of the significance of overfatigue from school work. She therefore asked for a note to have Morton excused from school at 10:30 that he might continue his mid-morning lunch and rest period.

3. *Stephen B.* (age thirteen, 17 per cent underweight), who gained one and one-quarter pounds, was a newsboy and particularly active. He had previously thought it not worth while to go to bed early because he could not fall

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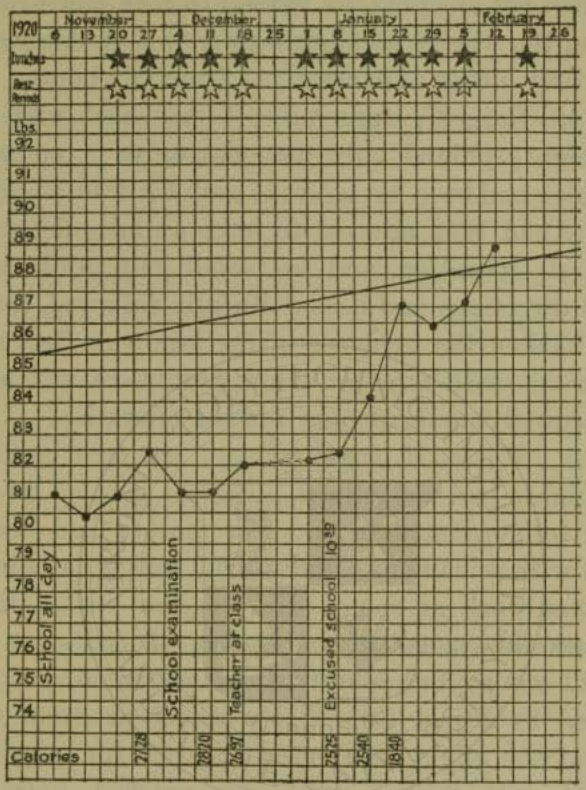

FIGURE 33. SCHOOL HOURS REDUCED

Muriel M. had been following all directions for eight weeks without making progress towards her normal weight line. Following a visit to the class, her teacher excused her at 10:30 for a mid-morning rest period. The subsequent gain confirmed the diagnosis of overfatigue from too long school hours.

asleep at once, and had therefore been staying up as late as 11 or 12 o'clock at night. When it was explained to him that he could rest even

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when not sleeping, he agreed to take more rest and the week's good gain proved that this was clearly a case of overfatigue from late hours.

4. *Rose H.* (age nine, 5 per cent underweight) gained only one-quarter of a pound, which had been her average gain for four weeks. She had been advised to have an adenoid and tonsil operation, and her small gain, although all directions had been faithfully followed, confirmed earlier evidence of the harmful effect of her diseased tonsils. An appointment was accordingly made at once for the operation.

5. *Muriel M.* (age twelve, 5 per cent underweight) had not gained, although she had tried to follow instructions. Her mother had been ill with pneumonia, and Muriel had been doing extra work at home. Her teacher visited the class this morning, and seeing Muriel's chart and having her condition demonstrated, promised to adjust the child's school program so that she might be excused at 10:30 for a lunch and rest period until she reached normal weight. (See Figure 33.)

6. *John D.* (age seven, 10 per cent underweight) also failed to gain, and the nutrition worker found the cause here was lack of home control. The mother remarked with little apparent concern that John did not mind her

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when she called him in from play. She was then asked the following questions:

"Who runs your home, you or your husband?" *Answer.* "My husband gives me the money, and I run the house."

"How much does your boy weigh?" *Answer.* "Forty pounds."

"How much do you weigh?" *Answer.* "One hundred and forty pounds."

"Do you mean to say that you, who weigh 140 pounds, cannot control your boy of seven who weighs only 40 pounds?" *Answer.* "Of course I can make him mind."

"Then, Mrs. D., why don't you make him come in for his rest periods?" No answer.

The physician continued:

"There is no use in your boy coming here week after week unless there is some one in authority over him with whom I can do business. If you can run your house, you should be able to make your boy mind. I suggest if John goes out to play and fails to come in at the proper time, that you go after him and keep him in until he promises to obey you. We depend on you to follow directions."

The mother promised "to attend to him" the following week.

7. *Alfred H.* (age eleven, 17 per cent under-

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weight) weighed just the same as at the last meeting. He had been a very difficult problem case for more than three years, with no relative gain in weight. His continued failure to gain indicated that there was some serious underlying cause. Five consultations had been held, and much laboratory work performed without success in determining the real cause of his poor condition. The preceding week a radiograph of the digestive tract had been made, and Alfred had come in to hear a report of the examination. The results showed signs of possible intestinal adhesions, and arrangements were accordingly made to send the boy to the hospital for treatment.[1] (See Figure 7.)

8. *Thomas M.* (age twelve, 15 per cent underweight) had lost one-half pound. He was 11 pounds under the average weight, but his mother thought if he were in bed 12 hours at night, he did not need extra rest during the day. She was reminded that the average well man

[1] Further tests and examinations in the ward confirmed the Roentgen-ray findings, which evidence, supported by the long failure to gain under otherwise favorable conditions, led to the decision to make an exploratory abdominal operation. This operation showed bands across the duodenum (probably congenital) that adequately explained his poor nutrition. He is now gaining steadily, and on the road to complete recovery.

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found 8 or 9 hours' work a day sufficient, and told that she should not allow her undernourished boy to expend his energy for 12 consecutive hours practically without rest. She promised to have him take a half hour's rest before both dinner and supper, and mid-morning and mid-afternoon lunches at a regular time.

Thus by bringing into play the four forces that safeguard the child's health, namely, the *home, medical care,* the *school,* and the *child's own interest,* a single meeting of the nutrition class produced results in a space of less than 30 minutes that it would have required hours of individual work to accomplish.

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CHAPTER XXI

THE NUTRITION OR DIAGNOSTIC CLINIC

In nutrition work we are constantly meeting children who have been the subject of extensive medical study without showing marked improvement. They may have been under the care of various child-helping organizations, and have passed through several hospital departments. Even after the thorough physical-growth, mental, and social examinations of the nutrition class, there will always remain a certain number of children who do not respond to treatment, and whose charts after weeks and even months show practically no gain in weight. Such cases are a drag on the class, and if they are in too large a proportion to the total number, there results discouragement and lack of interest on the part of the whole group.

The nutrition class is not only a helpful means of treatment, but also an aid in securing correct diagnosis of these difficult cases. The failure of growing children to gain when all the known causes that would interfere with their progress have been eliminated is a significant indication

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that there is some physical cause that has been previously overlooked. The child who does not gain under such conditions is most probably not "free to gain," and after a trial of four or five weeks in the nutrition class, should be sent to a nutrition, or diagnostic, clinic.

Such a clinic is most effective when connected with a hospital, where all the resources of that institution may be called into service if necessary. The clinic should work in close coöperation with the various specialists on the hospital staff, and secure special tests and expert advice according to the needs of the individual child. Observation over a number of months is sometimes necessary and Roentgen-ray, Wassermann, von Pirquet, skin proteid tests, and much laboratory work may be required before the correct diagnosis can be made. Among the obscure causes of malnutrition thus found in the diagnostic clinic may be mentioned cardiospasm, anaphylaxis, chronic appendicitis, intestinal parasites, pyelitis, hereditary syphilis, tuberculosis, and sinus infection.

The nutrition clinic should be an important department of the children's out-patient department of every hospital, with a nutrition class as part of its organization, for the purpose of observing the child under controlled conditions.

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In order that it may operate effectively, it must be a rule of the hospital that all children who apply for treatment shall be weighed and measured, and those found to be underweight sent to the nutrition clinic automatically. The nutrition clinic serves a fourfold purpose:

1. It relieves the special departments by taking care of simple cases of malnutrition in its nutrition class.

2. It gives opportunity to study problem cases sent in from nutrition classes in neighboring schools and community centers, and directs the progress of unsolved cases from one department of the hospital to the other. The completeness of its history and examination form assists the special departments by supplying data that aid in their diagnosis and treatment.

3. It offers a demonstration in first-hand health instruction to parents, teachers, students, social workers, nurses, and physicians.

4. It acts as a clearing house for children who most need the benefit of summer camps, outings, or institutional care.

The attendance of the parents is necessary at every meeting of the nutrition clinic. When both parents are present the diagnosis is frequently made clear at once. Their observation of the child in his normal environment at home

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FIGURE 34. A CASE OF CARDIOSPASM

Rose H. was 23 per cent underweight for her height. Her vital organs were normal, but the D'Espine sign was present to the seventh dorsal, which indicated a mass in the mediastinum. An X-ray examination was made, and the plate shows the findings—spasm of the esophagus. Defects: underweight 23 per cent (19 lbs); naso-pharyngeal obstruction; cerumen; lateral curvature; fatigue posture; ichthyosis; anaphylaxis; cardiospasm.

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may be more illuminating than that of specially trained observers in the unaccustomed surroundings of ward or institution.

When the attendance of the father is requested, the usual answer is that he cannot leave his work. Before such a reply is accepted, the matter should be taken up with his employer, who should welcome this as an opportunity to establish more human relations with his employee by making such adjustments as may be necessary to allow him to be absent an hour a week to help his child to get well. When the importance of such coöperation is fully explained, the case is rare where it cannot be secured.

A useful adjunct to such a diagnostic clinic is a nutrition camp or station under its control, where children may be sent to note their reaction to changed environment when it is suspected that the causes of their malnutrition are social rather than medical. Such a camp is more useful for diagnostic purposes than a bed in a hospital, provided the child is under the observation of a trained nutrition worker who can note the child's reaction to his surroundings, to other children, and to the authority of the camp. All this is valuable evidence for mental and social as well as for physical diag-

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nosis. Cases whose diagnosis has remained obscure for weeks and months in the nutrition class and the hospital often become clear in a few days under such controlled observation.[1]

When admitted to the camp, the children should be accompanied by their parents, who should also make regular visits at the time of the weekly weighing, in order that they may understand thoroughly just what is being done for their child, and so continue the treatment when he returns home.

Children frequently gain four or five pounds in a single week at such a camp, even though they are given no more, and no better, food than they were taking at home. This is a convincing demonstration to the parents that the regular routine with its rest periods, mid-morning and afternoon lunches, and freedom from disturbing influences, is the cause of the child's improvement, and that the same program carried out at home will continue the good accomplished.

It must be borne in mind that the responsibility for the child's health always rests with the parent, and therefore all efforts should be

[1] In Figure 44 we show the results accomplished in such a camp at Grand Rapids, Michigan.

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directed towards helping the parents in their work, not even temporarily taking such responsibility from their hands. Too often a child is given special privileges in an open-air school or camp with a consequent improvement in his condition, only to return to improper diet and faulty health habits that in a short time reduce him to his former poor condition. The health education that comes to the parent through observation of the steps taken in arriving at a correct diagnosis is a great factor in making the child's recovery permanent.

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CHAPTER XXII

MALNUTRITION AND THE SCHOOL

Educators have long sought a means of bringing home and school into closer association. The nutrition class accomplishes just this result. Attendance of the parents at the weekly class meetings brings them into friendly relations with one another and with school and health authorities. In the purpose of making the children well they are united in an atmosphere of mutual helpfulness, which promotes a better understanding of the spirit and administration of the school.

Parents are appreciative of what the school brings to the child in the way of culture and opportunity, but when it is also the agency through which the undernourished child becomes well and strong, this feeling is intensified into gratitude, and such a school commands the highest loyalty of its graduates and their parents.

Effect of Malnutrition.—Children who are malnourished react abnormally, and suffer greatly from pressure and nagging. This

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makes them either callous and indifferent to influences that are needed in their development, or, in the effort to keep pace with their class, leads to disheartening and destructive overfatigue. The effect of this condition, moreover, is not confined to the malnourished pupils themselves. Such children become a drag on the class, and despite all efforts of the school authorities, there is a constant tendency to lower standards. While those who are unfit for the struggle are still under strain, the children who are well able to do full work suffer from not being kept up to their normal capacity.

It is a well recognized fact among physicians that school teachers as a class break down more frequently than do members of any other profession. Many teachers are only malnourished children grown up, without ever having had knowledge of what the full tide of health means. They have no surplus energy, and would profit by the nutrition program that is provided for their pupils. Their nervous tension is constantly reflected in the health of their charges, while the malnourished children in turn react on the overstrained nerves of their teachers. The reduction of malnutrition will therefore lessen the burden of both teach-

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ers and pupils, and greatly increase the efficiency of the school.

Extent of Malnutrition.—One-half of the children in public and private schools are seriously underweight, and at least one-third are malnourished. Very seldom does a school show less than this proportion, and in some cases the malnutrition amounts to 60 per cent. An examination of the entire enrollment of one of our leading private schools, one that has influenced schools abroad as well as in this country, disclosed the fact that over one-third of the pupils were more than seven per cent underweight for their height, and had other unmistakable signs of malnutrition. This means that even in the homes of unusually intelligent and thoughtful people retarded growth has been unappreciated and uncared for.

The Nutrition Program in the School.—To combat this widespread condition the nutrition program should begin with the first day of the child's attendance. No child should be admitted without a complete physical examination in the presence of both his parents. The situation is serious enough to warrant the few minutes of concentrated attention necessary at this time in order to save the loss to the community of large numbers of backward pupils in all the

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grades, and from 30 to 40 per cent of physically unfit children among the graduates.

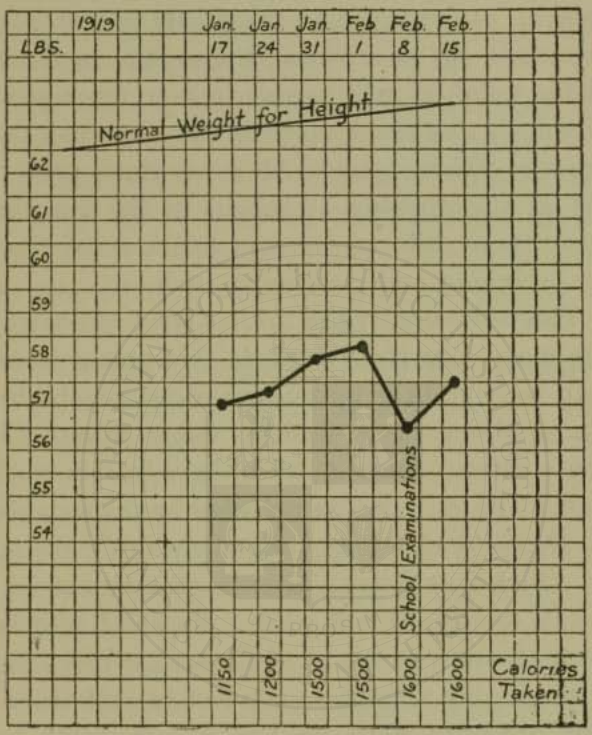

FIGURE 35. SCHOOL EXAMINATIONS

During the week of examinations school children almost invariably lose from ½ to 2 pounds in weight.

Every pupil should be weighed and measured once a year and re-weighed once a month. As there will always be a certain number of chil-

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dren absent at the time of the weighing, a system should be inaugurated by which these children will be weighed immediately upon their return. If cards for all the pupils in each room are made out in advance, the person in charge of the weighing will be able to keep track of the absentees and check up their records when they appear. There should be a set time, preferably at the opening of school in the morning, when these children are sent to the room where the weighing and measuring is done.

This follow-up work with absent children is the more important because this group is certain to contain a large percentage of children whose absence is caused by malnutrition or by acute illness which is apt to lead to this condition. The gain or loss revealed by the weighing on the child's return to school should be the test by which it is determined whether or not he is ready to resume full work. No child who has been absent on account of illness for more than a single day should be allowed to undertake a full program until he has regained his lost weight.

Nutrition classes should be formed of the worst cases, beginning with the children who are 10 per cent or more underweight. As the first members graduate, their places may be

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filled by children less than 10 per cent underweight, and in this way the program can be extended to include even the borderline cases—those less than seven per cent below the average weight for their height.

The School Physician.—The physician for this work should be trained and experienced in growth standards. At present, with one exception, the subject of malnutrition is not taught in our medical schools. For this reason the school physician requires special instruction and supervision in nutrition work.

The physician must have the final authority to decide what program is best for the malnourished child. He is responsible for the health of the child, and must have authority commensurate with his responsibility. The teacher and principal must defer to his judgment whenever questions arise as to the amount of time a child may be in school or the amount of work he is able to do.

The Nutrition Clinic.—Each nutrition class should have direct relation with a nutrition, or diagnostic, clinic where all cases that fail to respond to treatment will be sent for further investigation by specialists. An important function of the nutrition clinic is to make one or more special classes serve as a clearing house

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where obscure cases may be under observation for a sufficient length of time to ensure a thorough understanding of their condition.

In like manner, the malnourished children who require special hours and additional care may be grouped together in open-air or special classes, where they can be provided for without unduly complicating the programs of the normal classes. Children should not be placed in these special classes until they have been made "free to gain." Otherwise, there is danger that the classes will become congested with children who fail to make progress, and keep others from an opportunity for observation and treatment.

There should be rigid adherence to the rule that if children are to have the special privilege of open-air schools or classes, the parents should coöperate by having defects removed promptly and by regularly attending the class meetings until their children become well.

School Hours.—It is easy for school authorities to forget that no amount of education can compensate for loss of health, and that it is better for a child to work part of the day in prime condition than to spend double the amount of time dragging over his lessons in a state of overfatigue. On the other hand, the

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physician does not always remember how short a time many children are in school before they leave to go to work. Nor does he always appreciate the discouragement that comes to a child when he falls behind his grade and loses step with his mates. The child's day should be so planned that he may accomplish maximum results in the business of education.

Schools in several communities are already giving credit for properly conducted rest periods, and it is certainly just as reasonable to credit rest, when this is what the child needs, as it is to credit gymnastic exercise, which often overtaxes the child, and, instead of promoting, may interfere with, his growth and health.

Adjustment of the Schedule.—Malnourished children cannot work profitably upon a full school program, and the results of attempting to do so may be serious to their health. In many instances they can meet the requirements up to the time of recess, if they are then allowed to go home for a lunch and rest period. This will bring them back rested and refreshed for the shorter afternoon session. By a simple modification of the school program some minor subject of study can be scheduled for the latter part of the morning, which will relieve the pressure on all the pupils, and enable the malnour-

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ished to keep up with their grade even with a temporary absence at this time.

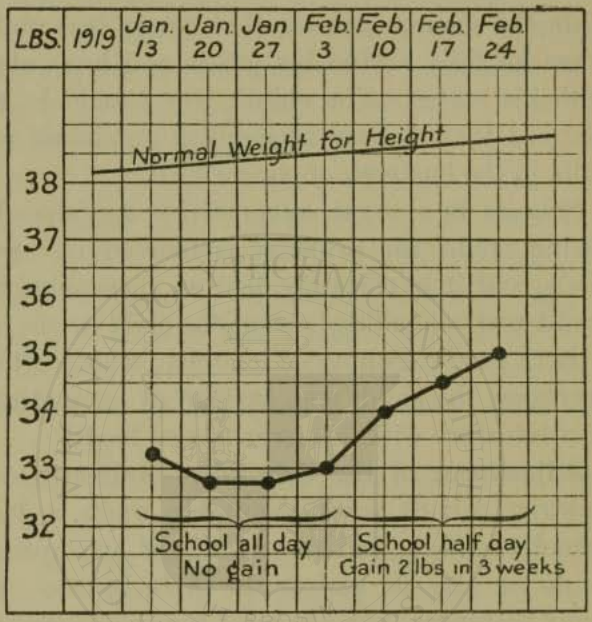

FIGURE 36. SCHOOL HALF DAY

An immediate gain was made by John B. when he was taken out of school for half a day. Even better than this is the cutting down of the long morning session by excusing the child for a lunch and rest period at 10:30. He can then return rested for the shorter afternoon session.

One-session schedules not only necessitate close application for a long period of time, but also place heavy responsibilities for home study upon the pupils. They make it harder to give

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children a reasonable program for meals and outdoor life. Nevertheless, there are many cities that keep children in school continuously from 8:30 to 1:30 or 2:30, with only 20 minutes intermission for lunch.

When children are within easy range of the school building, 8:45 is a good opening hour, and will allow plenty of time for breakfast and toilet without hurry. At 10:15 there should be a 20-minute rest, and the air should be changed throughout the building. At least an hour and a half should be allowed for the noonday meal. This is particularly important in winter in order that the children may have some time in the open air during the hours of sunlight. If the afternoon session begins at 1:15, there should be another break about 2:30 and school should close by 3:30.

This is a program for the normal well child. For the malnourished the schedule after 10:15 should be 10 minutes for lunch, 15 minutes in the open air, and half an hour for a rest period lying down. The lunch and rest periods should not interfere with the child's usual playtime. Play is necessary for the malnourished child, but should be supervised to prevent overexertion.

The recess periods should be occasions for

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real recreation, and not used as a means of punishment or a time for additional cramming. Many children need fully as much to be taught how to break away from their studies and get out in the open, as to study and recite lessons. A change in subject or classroom is chiefly a change from one form of pressure to another, and does not provide sufficient relief.

The kindergarten is mainly valuable for the opportunity it affords the child to sense a bigger world than that to which he has been accustomed. Here, too, he meets the discipline that comes from active contact with other children of his own age, and is required to make adjustments that come about less naturally in the life of the home. It is neither necessary nor desirable that he should spend many hours daily in this new environment, and the child profits by a gradual transition from short school hours at the beginning to the fairly long day required during adolescence.

Adjustment of the Program.—Children should be considered as individuals and not merely as members of a group, grade, or class. This is especially true of convalescent or malnourished boys and girls. Failure to regard this principle is responsible for many of the misfits and failures among children who, with a better un-

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derstanding of their individual needs, might be trained to lives of usefulness and satisfaction.

The taste of success is necessary to either mental or physical progress. Discouraged by their inability to meet the requirements imposed on the whole group, many children fail to develop the latent ability they possess, which would be brought out by tasks suited to their capacity. Instead of laying sound foundations for the future years of effort and strain, the school sends them forth with a lack of confidence and a consciousness of failure which they may carry through life.

Health Education.—After the child is relieved of tasks beyond his strength, and the school program is adjusted on the basis of conservation rather than exploitation, there is still much valuable work that can be done by the school through the nutrition program. We hear much about "problem" and "project" work in the schools. Where can one find problems and projects that appeal more directly to the child than those that have to do with bringing himself up to normal health, where he will be able to take his full share in the life about him, in its sports as well as its studies?

The details of the nutrition class offer training in observation and careful record making.

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Through the weekly diet record a knowledge of food values and food constituents is gained, which is as deserving of academic credit as any other subject studied, while the discussion of food and health habits has a practical educational value greater than any abstract course in physiology or hygiene.

The nutrition program provides a check upon malnutrition from the time the child enters school to the end of his connection with it. With parents informed, instructed, and brought into relations of coöperation with the school authorities from the start, the efficiency of the whole student body is raised, and great waste and loss saved to the community. It should be impossible under this program to have such conditions as now prevail even in high schools, where from one-third to one-half the pupils are unfit for their work, worried about examinations and promotion, and graduate physically unfit to begin their real work in life.

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CHAPTER XXIII

SCHOOL LUNCHES FOR MALNOURISHED CHILDREN

School feeding is no panacea for malnutrition. A common fallacy in urging the establishment of school lunches is the belief that the problem of malnutrition is mainly one of diet. As already pointed out, however, only one of its five chief causes is concerned with food, and a child who is suffering from *physical defects, lack of home control,* or *overfatigue* cannot be brought to normal condition by merely supplying him with extra food at school.

It is as futile to plan the school lunch without regard to the other meals of the child as to give an infant one feeding of carefully modified milk and allow him whatever he likes at other times. With due regard for the other needs of the child, however, school feeding can be made a useful part of a well balanced nutrition program. There should be an extension of the school-lunch movement to include at least such simple features of our nutrition program as the regular weighing and measuring of the chil-

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dren, and the checking of their diet by means of the 48-hour record each week.

For pupils who are unable to go home for the noon meal a substantial lunch of about 800 calories should be supplied. A soup or a hot drink should always be provided during the winter months.

A mid-morning lunch of about 300 calories is needed by every malnourished child, and should be made available to all at cost. Provision should be made privately for indigent children who are malnourished. Suitable foods for these lunches are thick soup and crackers, bread and milk, or sandwiches and cocoa. No sweets should be furnished at this time as they tend to spoil the appetite for the next meal.

The mid-morning lunch is particularly valuable because it breaks the strain of the long morning session, and removes the sensation of hunger, which is apt to be felt during the latter part of the morning. As breakfast is usually the poorest meal of the malnourished child, the middle of the morning is the time when extra feeding is most needed.

As has been stated, the child will assimilate more food in five light meals than in three heavy ones. In fact, various experiments with children in an institution where full control was

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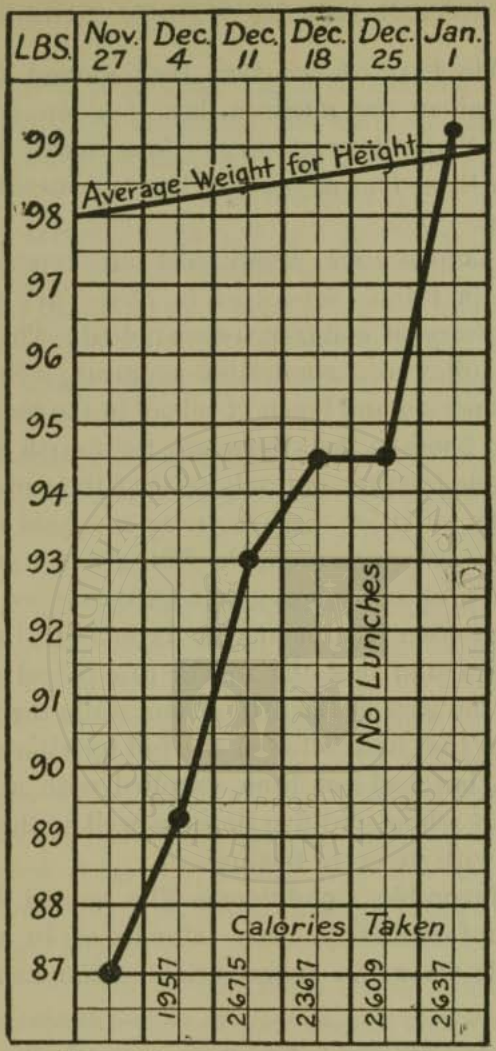

FIGURE 37. THE VALUE OF LUNCHES

This boy was making rapid progress towards his normal weight line, when his mid-morning and mid-afternoon lunches were omitted. The result was no gain for the week, although his diet list showed an increase in the total amount of food taken.

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possible have shown that they gained faster when given five meals a day of a lower total value than the customary three meals, upon which there had previously been no increase in weight.

A Comparative Study.—In an experiment made in Public School 64 in New York City[1] five groups of children were studied. Three of these followed our nutrition program, including a rest period and lunch at school in the morning and at home in the afternoon; the fourth group was able to carry out only part of the program, and the nutrition class exercise was held under adverse circumstances; the fifth group was furnished a noon lunch of about 1,200 calories daily with no other treatment. At the end of 10 weeks it was found that the fourth group had made twice the gain of the fifth group, while the three classes that had followed the full nutrition program, but had not been supplied with a noon meal at school, did five times as well as the fifth class with its extra feeding.

Unfavorable Conditions.—The school lunch has unfortunately been introduced in many schools where an appreciation of the elements

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[1] "A Nutrition Clinic in a Public School." (Pamphlet No. 1, in List of Publications, p. 332.)

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of hygiene is lacking. A dark basement room is frequently assigned; the children have no opportunity to wash and dry their hands properly; they are compelled to stand in line waiting to be served; seats are not provided; and a teacher or janitor hurries them in their eating so that the room may be cleared for other purposes. This friction and strain result in fatigue, which offsets the benefit of the food provided.

An Educational Opportunity.—On the contrary, it should be recognized that this is a favorable opportunity for teaching food values and proper food habits. The children should be seated, and allowed ample time for eating without hurry. They should have clean hands and paper napkins. There should be as little handling of the food as possible, either by those serving or by those served. This is important because of the many serious diseases that are communicated by the mouth. Sandwiches can be eaten from the papers in which they are wrapped, and milk taken through straws direct from the bottle.

The morning lunch should not be allowed to interfere with the open-air recess, because children need a complete change from the classroom conditions at every intermission. The

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lunch period should be a recognized part of the school schedule, and should be supervised by a nutrition worker or by the teacher in charge of the weekly weighing and the checking of the diet lists. Valuable observations can be made at this time as to the tastes, habits, and reactions of the child. The malnourished children should be formed into groups large enough to gain the benefit of suggestion, comparison, and competition, but small enough that attention may be given to each child's needs.

The complaint is often heard that many pupils will not eat the good food provided for them. These objections are usually based on first impressions. Children are naturally conservative, and are slow to make changes in their accustomed diet, but the association with other children who do care for the new food will soon have its influence. Reports of these lunches are carried home by the pupil, and thus bring about changes in the family diet that it would be difficult to effect through other channels.

Obstacles to Progress.—In a model school in Chicago where our nutrition program is now in force, mid-morning, noon, and mid-afternoon lunches were served under most favorable conditions, and rest periods were also provided,

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yet the children gained the least of 20 similar groups in other parts of the city. The first case investigated was that of a girl who had the habit of reading in bed with a droplight until one or two o'clock in the morning. Under such circumstances no amount of extra feeding would cause her to gain properly.

The mother of the next child was an active member of the Parent-Teacher Association which had undertaken the nutrition program. Her boy was following all the instructions given, but he had become over-enthusiastic about physical training, and by too much exercise was making worse a bad condition of overfatigue.

Many of the children in this group either ate a very scanty breakfast or omitted it entirely, knowing they would have their lunch at school in the middle of the morning. The school program in this case was ideal, but there was the essential fault that the program for the rest of the day was not controlled. By insisting that the parents come in each week, thus checking up the home conditions of the child, such facts as those mentioned are soon brought to light.

In another city a boy whose school program had been lightened, and for whom rest and lunch periods were provided, still failed to gain in weight. It was some time before we found that

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he was taking long swims in cold water. Another boy in the same class continued to drink tea, although he obeyed all other directions. Both boys knew in a general way that what they were doing was injurious, and they were careful to conceal the fact from the nutrition worker until their own interest was sufficiently aroused to cause them to sacrifice their inclinations for the sake of good health.

These cases are cited to show that until the central difficulty in each case was removed, the extra feeding failed to benefit the children. In spite of the difficulties to be overcome, however, the school lunch is nevertheless an important adjunct of the nutrition program, and when properly served has great educational possibilities.

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CHAPTER XXIV

INSTITUTIONS AND THE SUMMER CAMP

In an institution where children are under full control day and night it should be possible to eliminate malnutrition entirely, and the presence of a malnourished child among those who have been in the institution a sufficient time for study and treatment requires explanation.

The steps necessary to inaugurate the nutrition program in an institution are the same as those outlined for use in schools, namely: weighing and measuring; complete physical-growth examination upon entrance; grouping of the malnourished in nutrition classes; follow-up work to make the children "free to gain;" adjustment of the individual programs so that each schedule will be suited to the strength of the child.

In one of our leading cities the nutrition program was undertaken in two institutions for the care of orphans, which appeal for support to much the same group of public-spirited citizens. When the children were reëxamined six months later, it was found that one institution had re-

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duced its percentage of malnutrition from 22 to less than 4 per cent, while in the other there had been practically no improvement.

The explanation is that the latter institution had applied the program only in a general way, using it in so far as it did not interfere with the school schedule. In the other case the authorities believed that health is of more importance than formal education, and, consequently, that education must be built upon health. They therefore bent all their energies toward the immediate end of bringing their charges up to average weight for height.

It is interesting to note that this was accomplished on an average daily food cost of 19 cents per child, while the institution that made no progress was spending 40 cents a day!

Foster Homes.—In another institution devoted to putting children in condition for placing in foster homes an average of five physical defects per child was found after the children had been examined and reported up to the standard required for school and other activities. Twenty per cent of these boys and girls averaged seven or more defects, and a group of 14 of those in the poorest physical condition was put under care in a nutrition class. The

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defects were promptly corrected, and in 10 weeks every child in the class was up to his normal weight line.

Usually the children are placed in homes that do not receive full pay for the care taken, and they are sometimes required to share in household tasks or chores beyond the limits of their strength. Most foster parents, however, have real interest in the children and can be depended upon to make sacrifices for them when necessary.

In justice to this generous spirit on the part of foster mothers children should be made "free to gain" before they are sent out. They should be in condition to respond to good care, and not suffer from such handicaps as obstructed breathing and other physical defects. Without this foresight there is always much illness, many visits from physicians are necessary, and additional care from specialists. This is discouraging for foster parents as well as for officers of child-placing institutions.

Results that may be expected where children are first made "free to gain" are shown in the record of a nutrition camp 20 miles out of the city, where more than 100 children from our nutrition classes were cared for

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with but one medical visit during a period of 16 months, and this visit was required for a child who, by an oversight, was admitted to the home without being "free to gain."

The foster child's health is his only capital, and everything possible should be done to save it from waste and impairment. The nutrition program provides a simple system for following progress by the report of his weight at regular intervals, and for those who are underweight the other features of the program can be applied without difficulty.

Correctional Institutions.—All correctional institutions for children, such as truant and parental schools, should be so organized as to seize the first moment a child comes under their control to look into his physical condition. Much of the disciplinary difficulty with these children is due to bad physical condition, and surprising results in the way of improved behavior frequently follow the removal of defects and improved nutrition.

Summer Camps.—Another opportunity for complete control over the child's activities is afforded by the summer camp, which has the further advantage of reaching a wider range of children than those admitted to public institutions. Here, again, every child should be given

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a complete physical examination and have his defects corrected before leaving home. This is the more important because camps are usually located at a distance from the large centers in which specialists are available, and, if a child becomes ill with such an affection as appendicitis, or an acute middle ear with mastoiditis, an emergency operation may have to be performed under unfavorable conditions.

All children at the camp should be weighed each day, and the programs of those who are underweight should be regulated by their weight charts. A boy who is far below normal weight should be absolutely forbidden to take severe physical exercise; if only moderately below weight, he should have supervised exercise but no competition; and unless fully up to weight, he should not be turned free to take long hikes or enter into exhausting contests.

The temptations to overexertion are nowhere greater than in the camp, where even the new idea of the importance of health may lead a child to overtax his strength under the mistaken notion that his gain will be in proportion to the energy expended. Under such conditions overfatigue may bring out some latent condition that will cause acute illness. Far too frequently children come back from a summer of misdi-

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rected camp life covered with medals but "thin as a rail." They are overtrained and on edge, with no margin of physical or nervous energy for the winter's work.

The effect of the various forms of exercise upon the undernourished child should be carefully observed. For example, each child should be inspected after a swim. If his reaction is not good, his time in the water should be shortened, or it may be necessary to omit swimming until the weight chart, which is a sensitive indicator of the effect of all exercise, begins to show a good gain.

Practically every part of the nutrition program is applicable to camp life. The progress indicated on the weight chart makes an excellent report to be sent each week to the parents, who will find in this record the best single index of the child's physical and mental condition. A boy who is really discontented or unhappy soon shows the effect in his weight line, whether the fault is in himself or in his surroundings.

An important use of the camp has developed in the care of boys and girls who fail to come up to the physical standards required for employment certificates or working papers. These camps are open all the year, and young people who are not physically fit for industry are here

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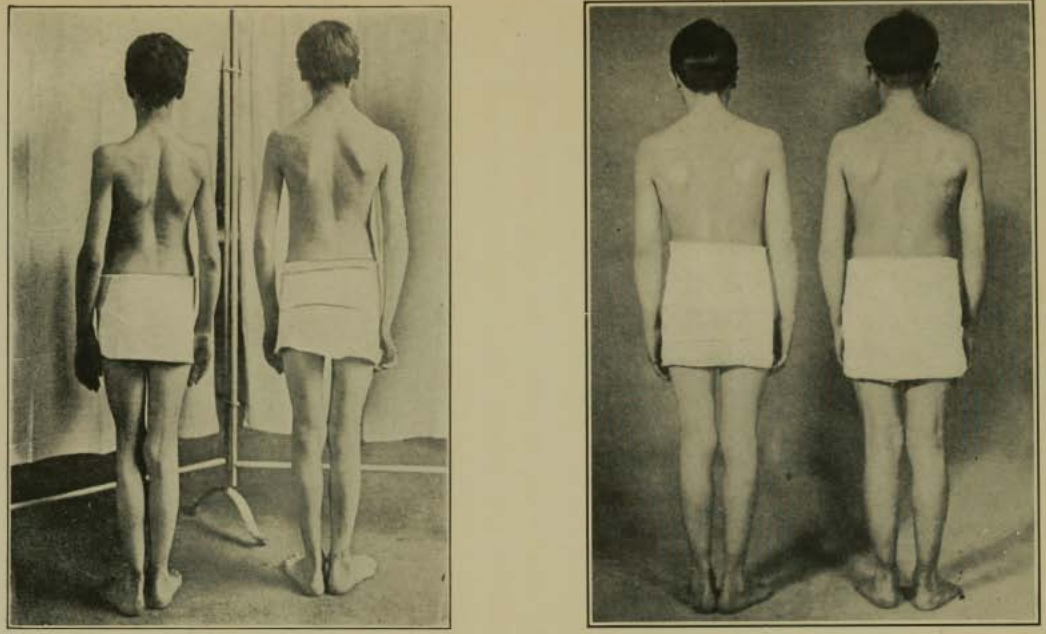

FIGURE 38. UNDERWEIGHT CHILDREN ARE UNFIT FOR WORK

The two boys at the left were refused working certificates because they were seriously underweight. Their backs present undeniable evidence of malnutrition in the projecting and uneven shoulder blades and spinal curvatures. At Camp Harlow Arden, near Chicago, the camp schedule conforms to the full nutrition program, and the boys are brought up to weight before they are certified by the Employment Bureau. Notice the sturdy posture and general appearance of vigor in both boys at the right. Having been made free to gain before admission to the camp, a few weeks' treatment brings them into good condition, and they are ready to begin work without the handicap of malnutrition. These nutrition classes are conducted by the Elizabeth McCormick Memorial Fund, Chicago, in coöperation with the municipal authorities.

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brought up to weight before they are allowed to seek employment. After going to work they are still kept under observation, and if their employers coöperate, they seldom fail to continue in good condition.

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CHAPTER XXV

MALNUTRITION AND THE COMMUNITY

UNDERDEVELOPMENT, undernourishment, and malnutrition are community problems that should be dealt with in the same spirit in which ignorance and disease are attacked. Normal physical and mental development are the best foundations for a wholesome national life. In spite of the success which may attend nutrition clinics and classes here and there, and the excellent results secured with individual children in private practice, a nutrition program cannot be considered socially effective until every child is brought within its reach through the medium of a community-wide campaign.

Training in health is one of the most natural and valuable means of education. Instead of resulting in self-consciousness, as is sometimes feared, it is the best way to avoid the dangers that come from prejudice, fear, and ignorance by teaching vital matters of health at an age when the habits formed have permanent effect on the development of the growing child.

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Nutrition Classes in the Schools.—A nutrition campaign therefore centers naturally in the public school. The school organization has existing machinery through which to operate nutrition classes, and these classes should form an integral part of its system so that every child may be reached. The person in charge of nutrition work should have the same authority in the schools that the medical inspector has in the case of tuberculosis or other illness.

In addition to classes in the schools several cities have already established nutrition camps for children who fail to pass the physical examination for employment certificates. Working papers are withheld until the children are brought up to normal weight, and when they are considered ready to enter industry, their needs are explained to the employer so that proper adjustments may be made to keep them in good condition.

The fundamental preventive work of the nutrition class underlies the problem of the associated charities, the hospital, the church, the juvenile court, and, in fact, all child-helping organizations. Each of these agencies can assist in carrying out essential features of the nutrition program, and will find its own burden lessened by close coöperation on a unified plan.

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By discovering and removing the causes of many diseases, and giving health instruction to groups in schools, the nutrition class greatly reduces the number of children who need to apply to hospitals for treatment. Most of the out-patient work with children has to be done on Saturday morning, and the busy physician now has to take time for individual advice on general matters of health that should properly be devoted to careful diagnosis. In other words, the out-patient department should be a diagnostic clinic, and not a combination of medical and welfare work with health instruction.

Nutrition Clinics for Problem Cases.—The distinction between the nutrition class and the nutrition clinic should be kept in mind. In nearly every group there will be problem cases not solved by the routine examination and class procedure. Obscure symptoms require long observation before their true character is understood. To take care of these cases there should be a nutrition, or diagnostic, clinic in every county, in each of the smaller cities, and at every hospital in the larger centers, where all the resources of these institutions can be brought into service when needed.

All of the specialized departments for cor-

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rective work should be available, but the most important is adequate provision for the removal of diseased adenoids and tonsils. Even in our best equipped cities children are scheduled months ahead for such operations, and when a nutrition class is organized it often happens that the greater part of the first year is gone before it has been possible to secure corrective treatment for all the children in need of care.

The city of Rochester, New York, has enlisted the interest of the association of allied hospitals in this work in coöperation with the schools and all other child-helping organizations. Special facilities have been provided to care for more than 100 children at a time so that all may have adequate rest in bed following the operation. The Rotary Club and other social organizations helped, and the press kept parents and friends so well informed concerning what was taking place that the common prejudice against going to a hospital was overcome, and children were eager for their turn. There were over 1,700 operations on diseased adenoids and tonsils during the first month, and 13,372 operations have been performed with no casualties.

The funds for this work came from a "community chest," which effectually prevented the usual overlapping of boundaries between asso-

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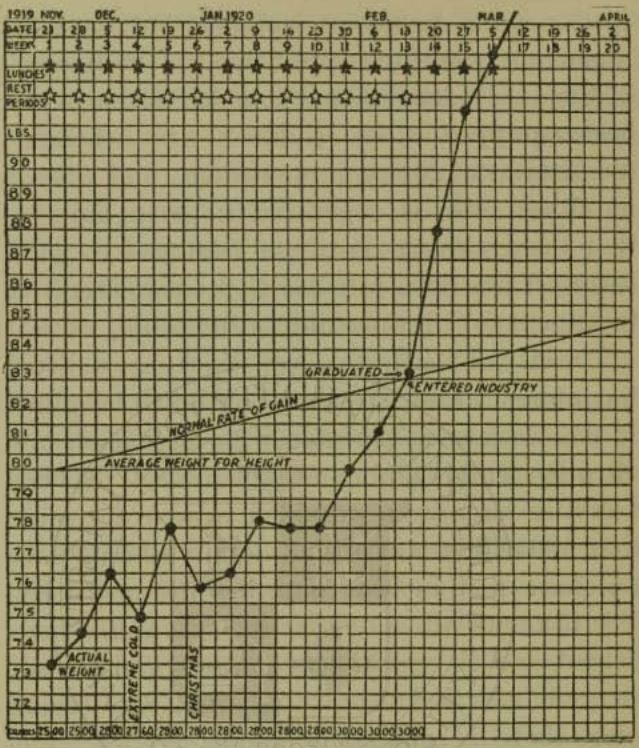

FIGURE 39. CONTINUED GAIN AFTER ENTERING INDUSTRY

Frank M. was refused a working certificate, and sent to the Arden Shore Camp of the Elizabeth McCormick Memorial Fund, Chicago. Follow-up work secured the coöperation of his employer, and he was provided with a glass of milk in the middle of the morning and the middle of the afternoon. His chart shows a gain of 11 pounds in three weeks after he went to work.

ciations, and the consequent waste of money, time, and energy.

Extension Service.—Each state or county should also have an organized extension service

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by means of which diagnostic and operating clinics may be carried to communities distant from the larger centers. By the use of trucks and tents all the essentials of clinic service can be made available for every child and the necessary operations performed without undue risk or danger. These extension facilities are also valuable for carrying health instruction into outlying communities.

Nutrition rallies afford an excellent means of getting into direct contact with the parents, and of bringing their responsibilities home to them. The speakers need not necessarily be acquainted with the technique of nutrition work. In every community there are men and women of ability who have broken down through failure to recognize *the essentials of health.* Many of these have worked their way back to good health, and the road by which they have made recovery is a matter of interest to others.

The nutrition program is not a matter of concern in regard to children alone. Parents, teachers, and other adults are finding in it the way to health for themselves. A thoroughgoing health program will include health opportunity and education for all ages. The out-of-door contacts of the Boy and Girl Scouts should be so extended in scope as to arouse the interest

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of all the members of the family. A program of this kind will also relate itself naturally to the provision of health classes for adults in evening schools, and of community outing clubs, camping grounds, golf courses, and all other means of making it easier for every one to secure the requisites for good health.

Outline of a Community Program.—In order to make a community campaign effective, adequate preparation is necessary, and the following steps are suggested for the formation of one complete nutrition unit:

First.—A local committee should be organized, representing the following interests:

1. A progressive physician who knows the existing medical agencies
2. A prominent member of a child-helping organization having access to all branches of established welfare work, who will secure unity of purpose and coöperation among social workers.
3. A school principal or teacher who appreciates that education in health should be made an integral part of the school system
4. An editor or publicity man who knows how to reach, inform, educate, and use all social groups
5. A banker or business man who can organize finances, records, etc.
6. A socially prominent person who can arouse the interest of influential members of the community.

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Second.—The services of a well-trained nutrition worker should be engaged to organize and manage the classes. A physician thoroughly interested in the work should be secured, to be responsible for the medical diagnoses, for making the physical examinations, and to aid in conducting the weekly meetings of the classes.

Third.—All supplies and equipment that will be needed should be secured, including scales, record forms, and literature.[1]

Fourth.—A place should be provided where the classes may meet regularly. There should be a room for the physical examinations, and space in which the nutrition worker may keep her records and supplies. Plans should be made for the execution of the essential features of the program, such as the place and time for rest periods and lunches; conferences with parents; visits to homes; coöperation with the school principal, teachers, nurses, and physicians.

Fifth.—The children in one school, or at least a group of 300, should be weighed and measured. Among this number there will be from 60 to 100 who are at least seven per cent underweight for their height and in need of treatment. One nutrition worker will be able to care

[1] See List of Publications, p. 331.

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for about 100 children, and five classes should be formed from this number.

Sixth.—The movement should be advertised by ample publicity. Poster competitions and other contests in the schools will interest the children. Speakers on the programs of local and state meetings of educational, social, medical, and labor organizations, and articles in all the local papers, will help to arouse the public. The committee should keep in touch with the women's clubs, parent-teacher associations, and similar organizations. The public library should be asked to supply books and periodicals on nutrition, and to feature them on its bulletin board.

Seventh.—Records should be carefully kept. The various forms and blanks printed in the appendix are the result of long experience, and should be thoroughly understood. These records are important, not only to show what is accomplished locally, but as data that may aid in extending the scope of the work and help in solving difficult problems elsewhere.

Eighth.—The main purpose should be kept in mind. The committee should keep in touch with all indications of interest in community health; secure exact knowledge about medical inspection in the schools and the examination

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of candidates for working papers; follow up plans for summer outings, aids for convalescents and for cases of special need; keep posted on the teaching of hygiene, food values, physical training, etc. Nevertheless, all these things must be considered in relation to the central purpose for which the nutrition unit has been organized, that of health education and of restoring malnourished children to normal standards of growth.

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CHAPTER XXVI

MALNUTRITION AND TUBERCULOSIS

The problem of tuberculosis is the problem of nutrition. Malnutrition in children usually illustrates either failure or neglect on the part of the physician: failure, because the condition is rarely diagnosed; neglect, because he does not take time to get at the real condition and its causes. The fact that it has not been recognized as a medical diagnosis makes the malnourished child an easy prey to tuberculosis and other diseases. An undernourished body is the best possible culture ground for *tubercle bacilli.*

Malnutrition is common among families in which tuberculosis is present, but instead of giving the malnourished child special care because of his lowered resistance, the physician's attention is frequently so fixed upon the tubercular process itself that he takes little heed of the child's actual condition in other respects. Furthermore, the nurses in charge of such families have been trained in the care of bed patients, and seldom understand what to do for

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these children until they are so ill as to be beyond help.

The five chief causes of malnutrition are strikingly evident in families suffering from tuberculosis. Uncorrected *physical defects* are more frequently found here than elsewhere. In one large group of such children in Boston, 50 per cent were in urgent need of operations to remove diseased adenoids and tonsils, after having been under treatment, in some cases for years, in a tuberculosis clinic.

The second of these causes is *lack of home control,* and in no other group have we found so many seriously disorganized homes. In long illness the mother's care is concentrated upon the sick person, and her attention is diverted from the other members of the family, which tends to break up those habits of regularity and order upon which successful home life depends. When the sick member is taken away for treatment, the family is sometimes broken up temporarily, and when the mother gets her little flock together once more the old unity is gone, and it is difficult to reëstablish the influence of family habits and customs.

It is better policy wherever possible to keep the family together and to take care of the patient at home. It should be recognized that only

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in pulmonary tuberculosis is there serious danger of communication of the disease, and the treatment prescribed for the victim of tuberculosis is also desirable for those who are well. Open air, ample nourishment and rest, as advised for the tuberculosis patient, will increase the resistance of the other members of the family. When a cure is effected in the patient's own home, new habits are established that tend to make the results permanent.

Overfatigue is a constant factor in tuberculosis. In one of our classes there was a girl of 14 who had spent some time in a tuberculosis sanitarium. She was one of 9 children, and was found by the nutrition worker to be doing most of the housework, including the washing. As an older sister required the only good room for callers in the evening, this girl and a younger sister, also an incipient case, had to sleep in a small dingy room on a court. The family had pie for breakfast, and tea or coffee at every meal. The mother seemed thoroughly indifferent; all the children suffered from pediculosis.

This girl was five grades behind her age in school, and her teacher applied all possible force to hold her up to the requirements. This involved staying after school, home work under unfavorable conditions, and when she was un-

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able to keep up even under this pressure, she was sentenced to a term at the summer session of the vacation school. As it was impossible to persuade the school authorities to give her a reduced schedule, she had to be taken out of school entirely and sent to the country to recuperate. Here she was free from overfatigue, and gained seven pounds in four weeks. During her absence the mother's pride was awakened, and the home organization changed so that it soon ranked the best among 50 families then under observation. In 30 weeks on the nutrition program this child gained 435 per cent of the expected rate of gain in weight for her age.

Another girl in the same nutrition class had more favorable home conditions, but was under constant strain because her brightness and attractiveness led to exploitation by school and social agencies. She was the leading figure in all school plays, attended club meetings at neighboring settlements four days each week, had a piano lesson on Saturday morning, and, as chief entertainer, danced frequently at weddings in the homes of friends and neighbors. When her mother was made to understand the meaning of this overfatigue, which made the child "too tired to eat," and was rendering her

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specially susceptible to tuberculosis, her whole program was changed, and she was soon up to normal weight.

Fifty per cent of this class, which was composed of children who were suspected of being tuberculous or had been directly exposed to tuberculosis—were doing extra tasks outside of school hours. There were music and language lessons, club meetings, and various forms of "gainful occupation." Sixty-four per cent kept late hours. Much of this was easily corrected, but there were too many cases like that of a girl of eleven, 15 per cent underweight and very delicate, who was studying every night until after 11 o'clock—on the waiting list of a sanitarium, yet compelled to carry out a school program too heavy for even a well child!

The next cause of malnutrition enumerated—*improper diet with faulty food habits*—is also of special importance in tuberculosis. The abnormal conditions of long illness lead to irregularity in eating and a disregard of fundamental requirements. Attention is often so completely focused upon supplying the food needs of the sick person that the other members of the family are neglected. In the group studied 28 per cent were not taking sufficient food, not because there was not enough available but because of

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faulty food habits. Thirty-six per cent were habitually fast eaters.

The fifth cause of malnutrition—*faulty health habits*—is bound up with the others already discussed. In the class above mentioned, fundamental health needs were overlooked even where children were under treatment, and the families given aid. Exercise and play in the open air and sunlight had a very small part in these children's lives, and they were allowed to sleep under conditions that destroyed the good effect of all the help given.

The care of these so-called "pre-tubercular" children should be part of a "Physically Fit" campaign in which all organizations interested in children should be brought into association. When the attempts to aid these families are centered in a specially labeled tuberculosis clinic, the children suffer from the stigma of being called "pip" cases by their companions.

Public money should no longer be spent with one hand to make well children sick and sick children worse through overfatigue at school, while the other makes appropriations for sanitaria to make them well. Every child applying for entrance to the public school should be examined in the presence of his parents and required to be up to normal weight

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before he is allowed to assume the burden of full school work. Settlements and other social organizations, while continuing the good work they are doing, should not leave undone the duty to see that the children are in condition to profit by what is offered them. Health crusades should not give highest honors to athletic achievement without knowing whether it is rest or activity that is most needed for proper development in each individual case. Boy and Girl Scouts should put the emphasis on growth and health by requiring as a first step in the progress of the "tenderfoot" that he have a body weight sufficient to sustain his height. The elimination of malnutrition from any community is its greatest safeguard against tuberculosis.

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CHAPTER XXVII

MALNUTRITION AND PREVENTIVE MEDICINE

No branch of medical science promises so much for the future as preventive medicine. Dramatic operative procedure, intravenous and intraspinal medication mark wonderful advances in saving life, but how much farther we shall have progressed when the need for such extreme measures has been prevented as far as possible.

More than one-half of the diseases of childhood, including meningitis and scarlet fever, are preventable, and the length of human life could be increased one-third were the existing knowledge of hygiene universally applied.[1] It is estimated that at least one-half of the 3,000,000 or more sick beds constantly filled in the United States would be unnecessary, and over 600,000 yearly deaths might be prevented, if such preventive measures as are entirely practicable were promptly undertaken. The annual

[1] Irving Fisher, "Economic Aspects of Lengthening Human Life."

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loss in earnings cut off by these preventable diseases and premature deaths reaches the stupendous sum of $1,500,000,000.[2]

Such estimates do not consider the lowered efficiency of countless other persons who go through life in a state of partial invalidism—those who never know what it is to be really well.

The Nutrition Program and Prevention.—The first step in prevention is to establish good nutrition and health in the infant, which is at once reflected in lowered mortality rates. Milk stations in our crowded cities have demonstrated that one nurse can safely carry 75 to 100 babies through a hot summer, not only keeping them free from serious illness but actually gaining in weight, by intelligent supervision and weekly weighings.

If the same supervision and care, with monthly weighings, were carried through the entire period of growth, it requires little imagination to see what an immense saving of time and expense would result, as well as the prevention of most of the diseases and deformities treated at the hospitals. This is what we propose in our nutrition program, utilizing the

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[2] Fisher and Fisk, "How to Live."

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school organization that all children may be reached.

One of the first indications of disease is loss of weight, and it is in the underweight group that most cases of serious illness arise. Just as the malnourished child, because of his low resistance, falls an easy prey to tuberculosis, so also he readily succumbs to other infections. It has been demonstrated in our classes repeatedly that when a child who is severely underweight contracts an illness, as during a mild epidemic of scarlet fever, he falls a victim to the disease almost without a struggle.

In one instance, the mother of a bright and precocious boy was unwilling to have him omit violin lessons, which, in addition to his school work, were clearly causing overfatigue. Two weeks later the boy succumbed to an acute illness, and the mother returned to the clinic to inquire pathetically if we thought her boy would have lived if his violin lessons had been stopped.

The mere weighing and measuring of a group of children marks an initial step in the prevention of disease. In one community the underweight children showed in 10 weeks' time 61 per cent more than the average gain of well children, following no other application of the nu-

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trition program beyond the weighing and measuring.

The fact that so many children are found to be below the average weight for their height should be a challenge to all the forces concerned in safeguarding their health. In the nutrition program the complete physical-growth examination, following immediately after the weighing and measuring, is an important step in prevention by disclosing the causes of the child's malnutrition. The early removal of these causes saves immeasurable suffering and loss of life.

How much better it is, for example, to remove infected tonsils before the inflammatory process has left permanent marks upon the child's development, or led to complications arising from the spread of the infection to vital organs of the body. The diagram on page 277 illustrates how the early discovery and removal of the causes of malnutrition may prevent results that are taxing to the utmost our hospitals and other institutions.

Effect of Wrong Ideas.—It would be interesting if we were able to measure the effect of wrong ideas upon the health of the community. A fear of disease arising from the manifestation of normal processes has an effect upon the

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COMMON DEFECTS AND RESULTS OF NEGLECT

Early Diagnosis and Preventive Work in Nutrition Classes in the School	*Late Diagnosis* and Corrective Work in Out-patient Departments and Hospital Wards
Naso-pharyngeal obstruction	Otitis media Deafness Mastoiditis Sinus infection Cardiac disease Joint infections Nephritis Pyelitis Asthma Emphysema
Postural defects	Fatigue posture Flat foot Spinal curvature Round shoulders Visceroptosis
Eye strain	Impaired vision Headache Fatigue
Teeth defects	Carious teeth Antrum infection Alveolar abscess Malocclusion Deformities of face and jaw
Poor hygiene, etc. Tea and coffee habits	Anemia Acne Eczema Pediculosis Intestinal parasites Gastritis and intestinal indigestion Disturbance of the nervous system
Early appendicitis	Fulminating appendicitis Peritonitis Intestinal adhesions
Malnutrition	Tuberculosis Syphilis Lowered resistance to infection Postural defects Early senility Impaired race

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whole after life of the individual. A mistaken impression about drafts or night air may lead to faulty health habits with serious consequences. An early prejudice against resting in the daytime is often responsible for overfatigue, which leads in time to a totally unnecessary breakdown. A wrong idea of some particular relation of cause and effect may lead one to put his trust in some nostrum, superstition, or cult.

Many erroneous notions on the part of both parents and children come out in the class meeting and in other phases of the nutrition program. For example, one mother was omitting cereal from a child's diet in the summer because she thought oatmeal was heating; another tried to build up her undernourished child on beef tea, which she thought particularly nourishing; a boy who was seriously underweight was trying to keep his weight down by underfeeding because he thought if he became fat he could never be an athlete; another boy failed to eat sufficient food for fear of appendicitis; another stayed up late at night because he thought there was no need to go to bed unless he could fall asleep immediately.

During the campaign to secure money for the suffering children in Europe, the principal of a high school in a large city proposed to the

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pupils that they go without lunches every other day and put the money into the relief fund. This unwise proposition was accepted with enthusiasm by the pupils and applauded by the newspapers throughout the country because no one seemed to appreciate the anomaly of underfeeding growing children here in order to relieve the distress resulting from the same cause abroad.

Health Education and Prevention.—Preventive medicine should include such instruction as will eradicate these false ideas before they become fixed, and bring matters pertaining to health clearly over into the regions controlled by sound experience and common sense. The surest safeguard against these unreasonable yet powerful influences is a fund of knowledge concerning the essentials of growth and health.

Discriminating consideration for one's own physical condition leads away from morbid self-analysis. It is the person lacking the essential knowledge and the trained executive ability to keep himself fit who falls a victim to hypochondriacal ideas. It is important to use every means of discovering such insidious ideas and overcoming the habits that grow out of them.

In the prevention of sickness we have an opportunity for health education of the highest

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order. A child should be as thoroughly drilled in *the essentials of health* as in the principles of arithmetic or language.

Infection is an invasion of organisms which threaten life, and must be met by leucocytes from the blood. A battle is fought between them as real as that of armies, and the stronger wins. Preparedness is more necessary in the life of the child than in that of the nation, because, while the occasion for actual warfare may not arise, there is no escape from the child's risk of infection from the destructive organisms, which are constantly present as though waiting for a favorable opportunity to attack.

Davidsohn reports [3] that in Berlin there was a marked increase of tuberculosis infection in children during the war, 48 deaths per 10,000 of the population occurring in 1919, as compared with 32 in the year before the war. The European epidemics which caused a high mortality during this period also show a distinct relationship between malnutrition and the prevalence of infection.

The best insurance that a child has against

[3] H. Davidsohn, "Die Wirkung der Aushungerung Deutschlands auf die Berliner Kinder," *Zeitschrift für Kinderkrankheiten*, 21: 349, 1919.

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sickness is not necessarily the most healthful surroundings, but a sound body to resist disease. Ideal surroundings are not always available for every child, but our nutrition classes have shown that it is possible to establish a sound body in almost any environment. Health once established in the growing period by health education will, as a rule, continue throughout life. Health and education should go hand in hand—health in education and education in health.

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CHAPTER XXVIII

THE EXTENT OF MALNUTRITION AND SOME RESULTS OF NUTRITION WORK

The most reliable evidence of the extent of malnutrition is secured by weighing and measuring groups of children in various localities representing family circumstances of wide variety. In this chapter statistics are presented in Table VII that answer the questions so often asked, "How much malnutrition is found in representative American communities?" and "Is not malnutrition largely confined to the poor?"

Since the best record of progress in regaining health appears in the weight chart, we are also giving figures in Table VIII that show the gains made in similarly varied communities where our nutrition program has been carried out.

We have collected a large amount of data which have been secured by schools, medical authorities, and others with reference to the extent of malnutrition in Europe and America, but because of the lack of a single objective

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standard on the part of the examiners, the wide range of individual differences makes the greater part of this material of little value for purposes of comparison. Thousands of children have been weighed and measured, however, during the last few years according to the methods outlined in this book, and the record thus secured may be taken as reliable evidence of the prevalence of malnutrition in this country. These figures are given in Table VII on the following pages.

It will be observed that these statistics have been gathered in a territory ranging from Atlanta to Boston, New York, and Chicago in the United States, and extending into Canada and Labrador in the British possessions. The outstanding facts in the table are the wide extent of malnutrition in all sections entered and its striking prevalence in all classes of society. Wherever comparison has been made, it has been found that the proportion among the so-called "better classes" is as great or even greater than among the poorer and immigrant groups.

In the early stages of our work with malnourished children we gave them the best possible care according to our knowledge at that time, increasing the amount of food, im-

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TABLE VII. EXTENT OF MALNUTRITION

Locality	Number of Cases *	Percentage of Malnutrition		
		Borderline Underweight less than 7 Per Cent	Underweight 7 Per Cent or More	Underweight 10 Per Cent or More
Atlanta, Georgia:				
Country High School	49	14	53	.....
Girls' High School	73	12	62	.....
Elementary grades	.....	9	54	.....
Open air school	42	.....	52	.....
Home of the Friendless	74	27	18	.....
Boston:				
Little Wanderers' Home	245	.....	.....	27
Chicago:				
10 public schools, 1919	5,045	.....	40.5	25
3 public schools, 1921	1,710	.....	35.5	.....
John Marshall High School	.....	25	20	.....
Parker High School	.....	40	24	.....
Francis W. Parker School (private)				
Boys	.....	30	25	.....
Girls	.....	23	32	.....
Both sexes	.....	27	28	.....
Kindergarten	.....	31	31	.....
Grade I	.....	20	40	.....
Grade II	.....	28	32	.....
Grade III	.....	34	38	.....
Grade IV	.....	30	17	.....
Grade V	.....	31	21	.....
Grade VI	.....	27	19	.....
Grade VII	.....	22	36	.....
Grade VIII	.....	18	27	.....
Parochial school	350	.....	25	.....
United Charities group	.....	33	36	.....
Mothers' Pension group	450	38	28	.....
Open window school	.....	31	46	.....
Open window school (colored)	.....	37	27	.....
Sicilian poor group	1,206	13	17	.....
Italian poor group	262	14	22	.....
Foreign group (miscellaneous)	256	14	20	.....
Poor district	782	21	27	.....
Poor district	726	23	22	.....
Moderate circumstances group	653	23	26	.....
Well-to-do group	212	29	29	.....
South Side well-to-do group	.....	.....	61	.....

* Whenever small groups are given, they represent the entire membership of certain classes, and in no case have the figures been influenced by special selection.

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TABLE VII. EXTENT OF MALNUTRITION—*Continued*

Locality	Number of Cases	Percentage of Malnutrition		
		Borderline Underweight less than 7 Per Cent	Underweight 7 Per Cent or More	Underweight 10 Per Cent or More
Dayton, Ohio:				
Public school	246	.....	40	.....
Illinois:				
School for Soldiers' Orphans	312	19	21	.....
School for Deaf	360	19	21	.....
School for Blind	202	24	36	.....
Manchester, N. H.:				
Total survey:	492	.....	25	.....
Three "better class" schools	251	.....	32	.....
Greek group	76	.....	21	.....
Polish group	61	.....	23	.....
French-Canadian group	104	.....	13	.....
New York City:				
Public School 64 (East Side)	894	.....	18	.....
Grade I	255	.....	17	.....
Grade V	127	.....	21	.....
Grade VI	245	.....	16	.....
Grade VII	173	.....	14	.....
Open air class	25	.....	28	.....
Specials ("exceptionally bright")	69	.....	28	.....
Rochester, N. Y.:				
Public schools	401	.....	26	.....
Immigrant poor group	.....	.....	23	.....
Well-to-do group	.....	.....	36	.....
St. Anthony, Labrador:				
Total survey:	191	.....	42	.....
Orphanage	41	.....	34	.....
Village	63	.....	60	.....
Harbour	52	.....	37	.....
Bight	35	.....	29	.....
Toronto, Canada:				
York School (Russians, Poles, Italians, Chinese, Japanese)	241	.....	28	14
Dufferin School	714	.....	58	35
Withrow School	670	.....	54	34
Brown School	882	.....	29	14

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TABLE VII. EXTENT OF MALNUTRITION—*Continued*

Locality	Number of Cases	Percentage of Malnutrition		
		Borderline Underweight less than 7 Per Cent	Underweight 7 Per Cent or More	Underweight 10 Per Cent or More
Walpole, Mass.: †				
Public schools	1,305	19	36	
Kindergarten		15	30	
Grade I		22	37	
Grade II		21	35	
Grade III		22	40	
Grade IV		19	37	
Grade V		22	44	
Grade VI		20	43	
Grade VII		22	35	
Grade VIII		18	43	
Grade IX		11	25	
Grade X		10	29	
Grade XI		20	15	
Grade XII		6	29	
Elementary grades				
Boys		22	34	
Girls		20	43	
Both sexes		20	39	
High School:				
Boys		10	25	
Girls		14	23	
Both sexes		12	24	
All grades:				
Boys		20	33	
Girls		18	39	
Both sexes		19	36	

† DISTRIBUTION OF MALNUTRITION IN WALPOLE ACCORDING TO PERCENTAGE UNDERWEIGHT

Underweight Per Cent	Cases Per Cent	Underweight Per Cent	Cases Per Cent
1	.8	12	2.6
2	1.3	13	2.2
3	3.4	14	1.4
4	4	15	1.5
5	4.5	16	.6
6	5	17	1.2
7	5.3	18	.6
8	5.5	19	.6
9	4	20	.8
10	6.1	21	0
11	3.3	22	.3

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TABLE VII. EXTENT OF MALNUTRITION—*Continued*

Locality	Number of Cases	Percentage of Malnutrition		
		Underweight Borderline less than 7 Per Cent	Underweight 7 Per Cent or More	Underweight 10 Per Cent or More
Washington, D. C.:				
Total survey	3,913	.....	.....	29.5
White	.....	.....	.....	36
Colored	.....	.....	.....	26.3
Kindergarten	.....	.....	.....	22.7
Grade I	.....	.....	.....	28.8
Grade II	.....	.....	.....	24.8
Grade III	.....	.....	.....	27.9
Grade IV	.....	.....	.....	25.8
Grade V	.....	.....	.....	30.7
Grade VI	.....	.....	.....	33.9
Grade VII	.....	.....	.....	33.7
Grade VIII	.....	.....	.....	34.3
Williamstown, Mass.:				
Total survey	443	.....	.....	30.6
Boys 5 to 14 years	240	.....	.....	26.6
Girls 5 to 15	203	.....	.....	35

proving the sleeping conditions, and correcting other matters of general hygiene. The result was that the few children who needed only these simple adjustments came up to normal weight promptly, but the majority persisted in making either very slight gains or none at all. The chart given in Figure 40 reports a typical case of this period.

Despite such convincing records, efforts are still made to do away with malnutrition by giving attention principally to a single factor such as diet. Figure 41 gives the recently published

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results [1] of classes conducted under the most modern principles of dietary efficiency as com-

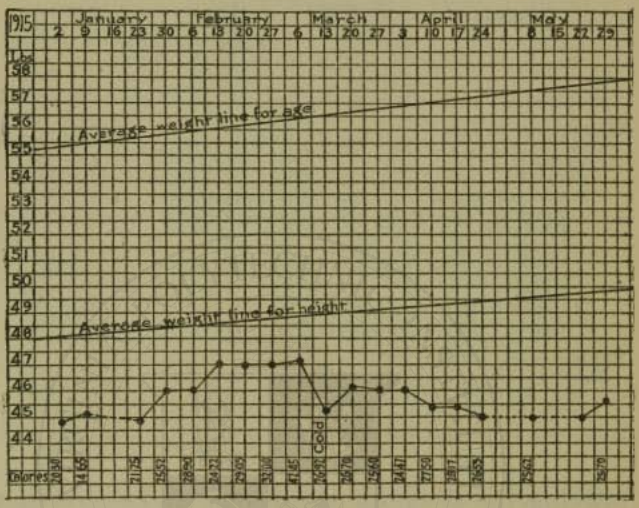

FIGURE 40. AN EARLY CHART; NO GAIN

This is one of our early charts showing an entire lack of progress during a period of 20 weeks. While this boy was under observation, all possible causes for his underweight that were known at that time were removed. Treatment was continued for 20 weeks more with no relative gain. The cause was overfatigue, the significance of which was not then recognized. Average weight for age was the standard in use at that time, and as this boy belonged naturally to the group under the average size, it was practically impossible for him to attain the average weight for his age.

pared with the record of one of our nutrition classes.

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[1] See footnote, p. 191.

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Contrast the outcome of these limited programs with the results that have followed a careful use of the procedure outlined in this book. Figure 42 shows what may be expected

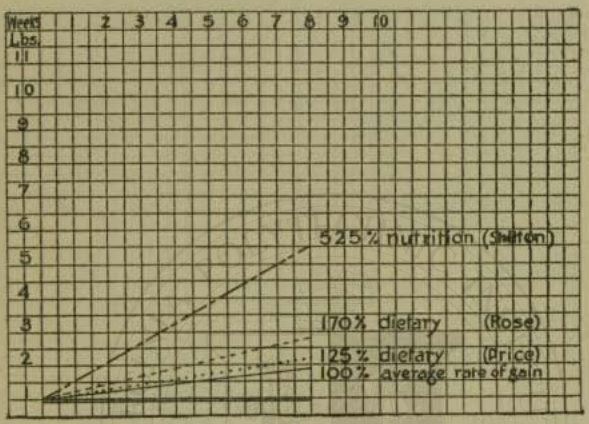

FIGURE 41. NUTRITION CLASS AND DIET CLASSES COMPARED

This chart illustrates the gains made in two classes conducted with special emphasis on dietary standards, compared with the results accomplished in a nutrition class under similar social conditions, where attention was given to all *the essentials of health.*

in a nutrition class carried on under ordinary circumstances with good coöperation of the parents. Figure 43 reveals the still higher results obtained in a private school which adds to the usual good conditions the potent and significant factor of a sane school program where health is considered as a matter of fundamental impor-

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tance, essential to education and in no way antagonistic to it. Figure 44 registers results recently secured in a class of "contact" cases (children who had been exposed to tubercu-

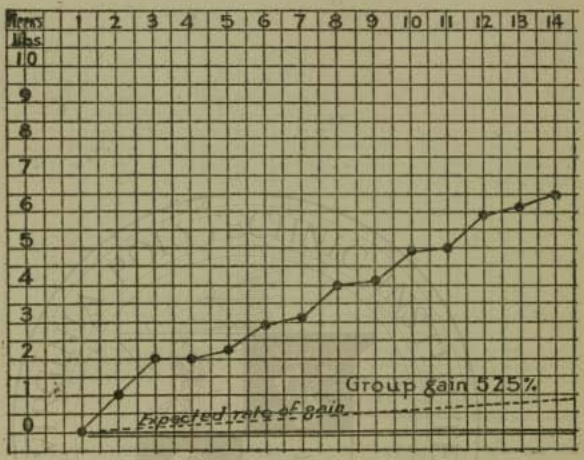

FIGURE 42. A 1918 CLASS AT THE BERKELEY INFIRMARY, BOSTON

Half a dozen nationalities were represented in this group, as well as a wide variety of family circumstances. The causes of their malnutrition were equally varied, but all came up to normal weight, making more than five times the average rate of gain. (Mabel Skilton, nutrition worker.)

losis), in a nutrition camp which was under full control of the nutrition worker 24 hours a day.

Table VIII shows what has been accomplished in representative classes working on our nutrition program. This plan has proved ef-

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ficacious in removing malnutrition in a wide range of situations, including children in the

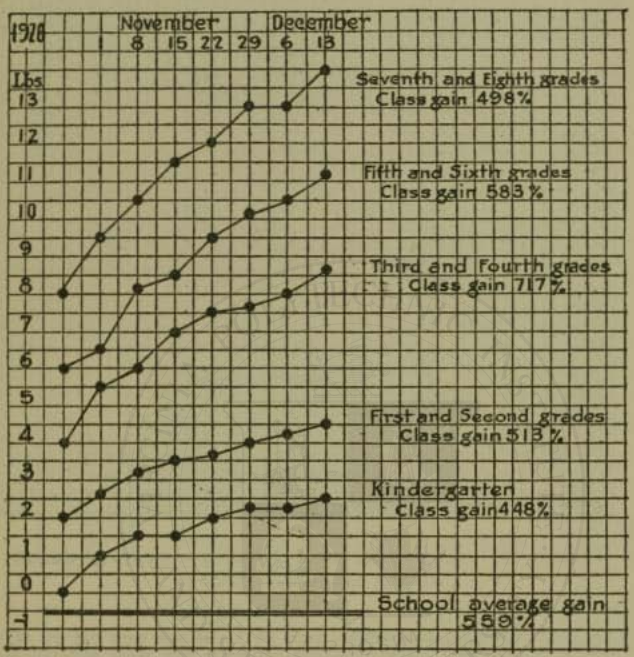

FIGURE 43. CLASSES IN THE FRANCIS W. PARKER SCHOOL, CHICAGO, 1920

In this school nutrition work has the hearty coöperation of principal and teachers, with the result that five nutrition classes, containing 70 of the most seriously underweight children, made an average gain of 559 per cent during the first seven weeks of class treatment. (Elizabeth McCormick Memorial Fund, Marion Moseley, nutrition worker.)

homes of wealthy and poor alike, in public, parochial, and private schools, orphan asylums,

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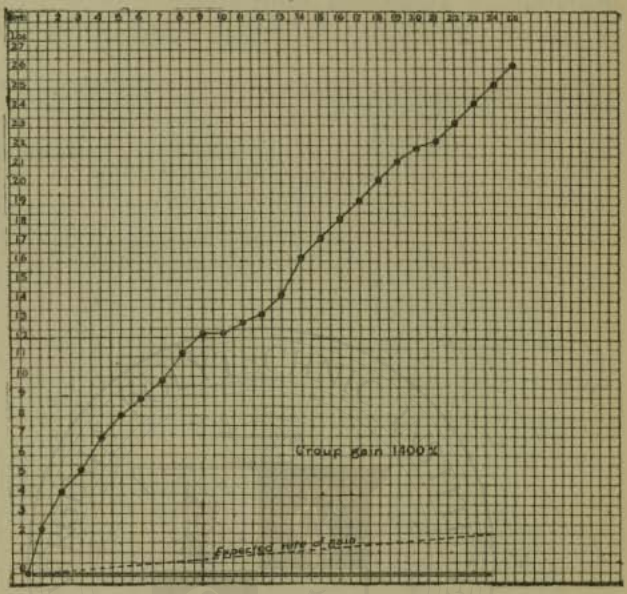

FIGURE 44. GROUP GAIN AT A NUTRITION CAMP IN GRAND RAPIDS, MICHIGAN, 1920-21

This chart shows a remarkable gain of 1,400 per cent for 28 children of school age. Our nutrition program has been strictly followed, with special reference to the prevention of overfatigue, although a considerable number of the children attended school all day. The camp was maintained for the first two months of 1921 at a food cost of 35 cents per day per child, and the total cost has not exceeded $7.12 per capita per week. This is not a chronological chart, but a composite of the gains of the actual first, second, third, and fourth weeks, etc., of the various members of the group, showing the more rapid rate of gain during the early weeks, tapering off as the children approached normal weight. (Tuberculosis Association, Enid Bailey, nutrition worker.)

summer camps, hospital out-patient departments, social settlements, and in child-helping organizations of all kinds.

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TABLE VIII. RESULTS OF NUTRITION WORK

Locality	Cases	Time in Weeks	Percentage Actual Gain of Expected Gain *		
			Range	Median	Average
Boston:					
Berkeley Infirmary:					
Boys	8		240-1,618	470	615
Girls	4		213- 565	316	353
Both sexes	12	3-13	213-1,618	385	525
All-the-year nutrition camp:					
Boys			860-2,400		990
Girls			203-2,800		1,300
Both sexes		2	203-2,800		1,115
Tuberculosis classes 1919:					
"Free to gain" cases:					
Boys	7				220
Girls	11				330
Both sexes	18				272
Adenoid and tonsil cases:					
Boys	6				104
Girls	13				144
Both sexes	19				130
All cases:					
Boys	13				165
Girls	24				222
Both sexes	37	4-33			205

* Several formulas are in use for determining the ratio between actual and expected group gains. While the results do not vary greatly, it has seemed best to submit the question to statisticians who have approved the following rule: "To determine this percentage for a group, take the average of the individual percentages of the members of the group." It will be found that the percentage secured by this formula approximates the percentage of the median case in the group.

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TABLE VIII. RESULTS OF NUTRITION WORK—*Continued*

Locality	Cases	Time in Weeks	Percentage Actual Gain of Expected Gain		
			Range	Median	Average
Boston (*continued*):					
Tuberculosis classes 1920:					
Cases having 4 or more nasopharyngeal defects each	14				194
Other cases	26				245
Cases having 7 to 13 defects each	19				172
Cases having 2 to 6 defects each	21				206
Chicago:					
Marshall High School:					
Boys	29	19			195
Girls	25	18			262
Carter Practice School:					
Boys	25	18			280
Girls	23	24			185
Francis W. Parker School:					
Kindergarten					448
Grade I					471
Grade II					550
Grade III					738
Grade IV					658
Grade V					525
Grade VI					665
Grade VII					531
Grade VIII					453
All grades	70	7	41-1,260	518	559

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TABLE VIII. RESULTS OF NUTRITION WORK—*Continued*

Locality	Cases	Time in Weeks	Percentage Actual Gain of Expected Gain		
			Range	Median	Average
Chicago (*continued*):					
Orphanages:					
Nathan Marks Home:					
Boys	20	23	.....	.....	200
Girls	30	23	.....	.....	215
Jewish Home	.....	25	.....	.....	225
South Chicago	.....	33	.....	.....	230
Northwestern University Settlement—Mothers' Pension group	26	27	.....	.....	200
North Shore Country Day School:					
Group I	16	22	.....	.....	170
Group II	20	22	.....	.....	220
Astor Street:					
Boys	.....	.....	134-1,300	463	527
Girls	.....	.....	260-2,000	633	830
Both sexes	.....	.....	134-2,000	585	653
Camp Algonquin:					
Boys	239	2	.....	.....	548
Girls	284	2	.....	.....	409
Individual cases selected:					

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TABLE VIII. RESULTS OF NUTRITION WORK—*Continued*

Locality	Cases	Time in Weeks	Percentage Actual Gain of Expected Gain		
			Range	Median	Average
Chicago (*continued*):					
Age / Per Cent Underweight					
5 / 11					2.276
7 / 33.4					5,194
9 / 18					2,366
9 / 7.2					3,351
11 / 11					1,989
12 / 22					2,094
13 / 11.2					1,152
Camp Harlow Arden (for children refused working papers):					
Boys		6			425
Girls		8			592
Cleveland:					
Working permit class:					
Boys		16			630
Girls		16			256
Grand Rapids:					
Nutrition camp:					

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TABLE VIII. RESULTS OF NUTRITION WORK—*Continued*

Locality	Age	Per Cent Underweight		Cases	Time in Weeks		Percentage Actual Gain of Expected Gain		
		Average	Range		Average	Range	Range	Median	Average
Grand Rapids (*continued*):									
Boys	11	16	8-29	12	10	1-19	825-5,610	.....	1,500
Girls	10	14	2-30	15	9	2-19	550-3,610	.....	1,300
Both sexes	10	15	2-30	27	9	1-19	550-5,610	.....	1,400

Distribution of Individual Gains According to Percentage

Per Cent	Boys	Girls	Both
500- 600	0	2	2
700- 800	1	1	2
800- 900	3	0	3
900-1,000	1	3	4
1,000-1,100	0	2	2
1,100-1,200	1	1	2
1,200-1,300	4	2	6
1,400-1,500	0	1	1

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TABLE VIII. RESULTS OF NUTRITION WORK—*Continued*

Locality				Cases	Time in Weeks	Percentage Actual Gain of Expected Gain		
						Range	Median	Average
Grand Rapids (*continued*):								
1,500-1,600..	0	1	1					
2,000-2,100..	1	0	1					
2,200-2,300..	0	1	1					
3,600-3,700..	0	1	1					
5,600-5,700..	1	0	1					
	12	15	27					
Labrador:								
St. Anthony Village:								
Boys				8				265
Girls				15				205
Both sexes				23				226
St. Anthony Harbour:								
Boys				6				350
Girls				13				492
Both sexes				19				447
St. Anthony Orphanage:								
Boys				11				250
Girls				4				218
Both sexes				15				241
St. Anthony total:				57				304

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TABLE VIII. RESULTS OF NUTRITION WORK.—*Continued*

Locality	Cases	Time in Weeks	Percentage Actual Gain of Expected Gain		
			Range	Median	Average
New York City:					
Public School 64:					
Grade I	20				240
Grade VI	20				140
Grade VII	21				150
Specials	14				179
Total	75				189
Walpole, Mass.:					
100 consecutive cases unselected:					
Boys	54				281
Girls	46				228
Both sexes	100		69-560		256

(Among 1,087 elementary school children in Walpole the percentage of cases seven or more per cent underweight was reduced during the period from September, 1920, to February, 1921, from 37 to 25 per cent, and the borderline cases from 20 to 11 per cent.)

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Two groups listed under Boston well illustrate the difference in the results secured when there is reasonable coöperation and when this coöperation is lacking. These are the Berkeley Infirmary and the Tuberculosis groups, where the classes were conducted under similar conditions in buildings a few blocks apart.

The children in the Tuberculosis classes came largely from a district that is known as one of the most congested areas in the world. In spite of the evident need to safeguard their health in every possible way, whenever the demands of health and school appeared to conflict, the school authorities decided to enforce the latter. They objected to absence on account of dental work or adenoid and tonsil operations, and were unwilling to modify the school program sufficiently to allow the children time for the rest periods which they required.

The Infirmary class, on the other hand, was made up of children who came from outside districts in which the schools were ready to cooperate, with the result that where the one group made only 205 per cent of the expected rate of gain, the other progressed at the rate of 525 per cent.

The remarkable gains appearing in groups under institutional management are explained

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by the regularity of their daily program and freedom from the interruptions, excitement, and nervous stimulation of the average household. When the importance of *home control* is fully recognized, these results can be achieved in the home, where, under proper organization, even more favorable conditions for growth and development should be attainable.

The highest individual rates of gain recorded were found to be closely associated with a previous condition of serious underweight.

While these boys and girls have been getting well, they have also been receiving health education which tends to make their recovery permanent. These results have been brought about for the most part without taking children out of their own environment or making extraordinary changes in their daily programs, and without adding to the expense for food. In cases wherein extra milk was required, it has usually been possible to offset this by a saving in some other item of the household budget.

A study of the results accomplished in scores of classes makes it clear that any group working on our nutrition program should make a gain of at least 200 per cent of the normal expectation. The work has not been carried on where conditions were specially favorable for

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securing high rates of gain, but, on the contrary, in what would be considered the most unfavorable localities, such as the West and South Ends of Boston, the East Side of New York, and the stockyard district of Chicago. It is therefore a demonstration that with proper care and intelligent planning malnutrition can be eliminated from any community.

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APPENDICES

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APPENDIX I

TABLES OF WEIGHTS

TABLE I.—AVERAGE WEIGHTS OF CHILDREN AT VARIOUS HEIGHTS

BOYS				GIRLS			
Height, inches	Average Weight for Height, pounds	7 per cent Under-weight, pounds	10 per cent Under-weight, pounds	Average Weight for Height, pounds	7 per cent Under-weight, pounds	10 per cent Under-weight, pounds	Height, inches
*21	8.2	7.6	7.4	7.9	7.3	7.1	21*
*22	9.7	9.0	8.7	9.4	8.7	8.5	22*
*23	11.1	10.3	10.0	11.0	10.2	9.9	23*
*24	12.5	11.6	11.3	12.5	11.6	11.3	24*
*25	13.9	12.9	12.5	14.0	13.0	12.6	25*
*26	15.3	14.2	13.8	15.5	14.4	14.0	26*
*27	16.9	15.7	15.2	17.2	16.0	15.5	27*
*28	18.5	17.2	16.7	18.8	17.5	16.9	28*
*29	20.2	18.8	18.2	20.5	19.1	18.5	29*
*30	21.7	20.2	19.6	22.0	20.5	19.8	30*
*31	23.2	21.6	20.9	23.4	21.8	21.1	31*
*32	24.5	22.8	22.1	24.8	23.1	22.3	32*
*33	25.9	24.1	23.3	26.0	24.2	23.4	33*
*34	27.3	25.4	24.6	27.3	25.4	24.6	34*
*35	28.7	26.7	25.8	28.6	26.6	25.7	35*
*36	30.0	27.9	27.0	30.0	27.9	27.0	36*
*37	31.6	29.4	28.4	31.5	29.3	28.4	37*
*38	33.2	30.9	29.9	32.7	30.4	29.4	38*
39	36.3	33.8	32.7	35.7	33.2	32.1	39
40	38.1	35.4	34.3	37.4	34.8	33.7	40
41	39.8	37.0	35.8	39.2	36.5	35.3	41
42	41.7	38.8	37.5	41.2	38.3	37.1	42
43	43.5	40.5	39.2	43.1	40.1	38.8	43
44	45.4	42.2	40.9	44.8	41.7	40.3	44
45	47.1	43.8	42.4	46.3	43.1	41.7	45
46	49.5	46.0	44.6	48.5	45.1	43.7	46
47	51.4	47.8	46.3	50.9	47.3	45.8	47
48	53.0	49.3	47.7	53.3	49.6	48.0	48
49	55.4	51.5	49.9	55.8	51.9	50.2	49
50	59.6	55.4	53.6	58.3	54.2	52.5	50
51	62.5	58.1	56.3	61.1	56.8	55.0	51
52	65.8	61.1	59.2	63.8	59.3	57.4	52
53	68.9	64.1	62.0	66.8	62.1	60.1	53
54	72.0	67.0	64.8	70.3	65.4	63.3	54
55	75.4	70.1	67.9	74.5	69.3	67.1	55
56	79.2	73.7	71.3	78.4	72.9	70.6	56
57	82.8	77.0	74.5	82.5	76.7	74.3	57
58	87.0	80.9	78.3	86.6	80.5	77.9	58
59	91.1	84.7	82.0	91.1	84.7	82.0	59
60	95.2	88.5	85.7	96.7	89.9	87.0	60
61	99.3	92.3	89.4	102.5	95.3	92.2	61
62	103.8	96.5	93.4	110.4	102.7	99.4	62
63	108.0	100.4	97.2	118.0	109.7	106.2	63
64	114.7	106.7	103.2	123.0	114.4	110.7	64
65	121.8	113.3	109.6	130.0	120.9	117.0	65
66	127.8	118.9	115.0	137.0	127.4	123.3	66
67	132.6	123.3	119.3	143.0	133.0	128.7	67
68	138.9	129.2	125.0	146.9	136.6	132.2	68

* Without clothing.

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TABLE II.—AVERAGE WEIGHT AND HEIGHT MEASUREMENTS OF BOYS AT VARIOUS AGES

Age		Height in Inches	Weight in Pounds	Age		Height in Inches	Weight in Pounds
Years	Months			Years	Months		
Birth	0	*20.6	* 7.55	9	0	50.0	59.6
	2	*22.5	*10.4	9	2	50.3	60.6
	4	*24.5	*13.2	9	4	50.6	61.5
	6	*26.5	*16.0	9	6	51.0	62.5
	8	*27.5	*17.7	9	8	51.3	63.5
	10	*28.5	*19.3	9	10	51.6	64.4
1	0	*29.5	*21.0	10	0	51.9	65.4
1	2	*30.3	*22.1	10	2	52.2	66.3
1	4	*31.1	*23.3	10	4	52.5	67.2
1	6	*32.0	*24.5	10	6	52.7	68.0
1	8	*32.7	*25.5	10	8	53.0	68.9
1	10	*33.4	*26.4	10	10	53.3	69.8
2	0	*34.0	*27.3	11	0	53.6	70.7
2	2	*34.7	*28.2	11	2	53.9	71.7
2	4	*35.4	*29.1	11	4	54.2	72.7
2	6	*36.0	*30.0	11	6	54.5	73.8
2	8	*36.5	*30.8	11	8	54.8	74.8
2	10	*37.0	*31.6	11	10	55.1	75.9
3	0	*37.5	*32.5	12	0	55.4	76.9
3	2	*38.0	*33.2	12	2	55.8	78.2
3	4	*38.5	*34.0	12	4	56.1	79.5
3	6	*39.0	*34.7	12	6	56.5	80.8
3	8	*39.5	*35.4	12	8	56.8	82.1
3	10	*40.0	*36.1	12	10	57.2	83.5
4	0	*40.5	*36.8	13	0	57.5	84.8
4	0	39.5	37.2	13	2	57.9	86.5
4	2	39.9	37.9	13	4	58.3	88.3
4	4	40.2	38.5	13	6	58.7	90.0
4	6	40.6	39.2	13	8	59.2	91.8
4	8	41.0	39.8	13	10	59.6	93.5
4	10	41.4	40.5	14	0	60.0	95.2
5	0	41.7	41.2	14	2	60.5	97.2
5	2	42.1	41.8	14	4	61.0	99.3
5	4	42.4	42.4	14	6	61.5	101.3
5	6	42.8	43.1	14	8	61.9	103.3
5	8	43.2	43.8	14	10	62.4	105.3
5	10	43.5	44.5	15	0	62.9	107.4
6	0	43.9	45.2	15	2	63.2	109.7
6	2	44.3	45.9	15	4	63.6	111.9
6	4	44.7	46.6	15	6	63.9	114.2
6	6	45.1	47.3	15	8	64.2	116.5
6	8	45.4	48.1	15	10	64.6	118.8
6	10	45.7	48.8	16	0	64.9	121.0
7	0	46.0	49.5	16	2	65.1	122.5
7	2	46.5	50.3	16	4	65.5	124.0
7	4	46.9	51.2	16	6	65.7	125.5
7	6	47.4	52.0	16	8	65.9	127.0
7	8	47.9	52.8	16	10	66.1	128.5
7	10	48.3	53.6	17	0	66.5	130.0
8	0	48.8	54.5	17	2	66.7	130.9
8	2	49.0	55.4	17	4	66.8	131.7
8	4	49.2	56.2	17	6	67.0	132.6
8	6	49.4	57.1	17	8	67.2	133.4
8	8	49.6	57.9	17	10	67.3	134.3
8	10	49.8	58.8	18	0	67.4	135.1

* Without clothing.

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TABLE III.—AVERAGE WEIGHT AND HEIGHT MEASUREMENTS OF GIRLS AT VARIOUS AGES

Age		Height in Inches	Weight in Pounds	Age		Height in Inches	Weight in Pounds
Years	Months			Years	Months		
Birth	0	*20.5	* 7.16	9	0	49.7	57.4
	2	*22.3	* 9.9	9	2	50.0	58.3
	4	*24.2	*12.7	9	4	50.4	59.2
	6	*26.0	*15.5	9	6	50.7	60.2
	8	*27.0	*17.2	9	8	51.0	61.1
	10	*28.0	*18.8	9	10	51.4	62.0
1	0	*29.0	*20.5	10	0	51.7	62.9
1	2	*29.8	*21.7	10	2	52.1	64.0
1	4	*30.6	*22.8	10	4	52.4	65.1
1	6	*31.4	*24.0	10	6	52.8	66.2
1	8	*32.0	*24.8	10	8	53.2	67.3
1	10	*32.7	*25.6	10	10	53.5	68.4
2	0	*33.4	*26.5	11	0	53.8	69.5
2	2	*34.0	*27.3	11	2	54.1	71.0
2	4	*34.6	*28.1	11	4	54.5	72.6
2	6	*35.3	*29.0	11	6	54.9	74.1
2	8	*35.9	*29.8	11	8	55.3	75.7
2	10	*36.5	*30.6	11	10	55.7	77.2
3	0	*37.0	*31.5	12	0	56.1	78.7
3	2	*37.5	*32.1	12	2	56.5	80.4
3	4	*38.0	*32.7	12	4	56.9	82.0
3	6	*38.5	*33.3	12	6	57.3	83.7
3	8	*39.0	*34.0	12	8	57.7	85.4
3	10	*39.5	*34.6	12	10	58.1	87.0
4	0	*40.0	*35.3	13	0	58.5	88.7
4	0	39.3	36.2	13	2	58.9	90.3
4	2	39.7	36.8	13	4	59.2	91.9
4	4	40.0	37.4	13	6	59.5	93.5
4	6	40.4	38.0	13	8	59.8	95.1
4	8	40.7	38.6	13	10	60.1	96.7
4	10	41.0	39.2	14	0	60.4	98.3
5	0	41.3	39.8	14	2	60.6	99.7
5	2	41.6	40.4	14	4	60.8	101.1
5	4	41.9	41.0	14	6	61.0	102.5
5	6	42.3	41.6	14	8	61.2	103.9
5	8	42.6	42.2	14	10	61.4	105.3
5	10	42.9	42.8	15	0	61.6	106.7
6	0	43.3	43.4	15	2	61.7	107.6
6	2	43.7	44.1	15	4	61.8	108.6
6	4	44.1	44.8	15	6	61.9	109.5
6	6	44.5	45.5	15	8	62.0	110.4
6	8	44.9	46.2	15	10	62.1	111.3
6	10	45.3	46.9	16	0	62.2	112.3
7	0	45.7	47.7	16	2	62.3	112.8
7	2	46.0	48.5	16	4	62.4	113.3
7	4	46.4	49.3	16	6	62.5	113.8
7	6	46.7	50.1	16	8	62.5	114.4
7	8	47.0	50.9	16	10	62.6	114.9
7	10	47.4	51.7	17	0	62.7	115.4
8	0	47.7	52.5				
8	2	48.0	53.3				
8	4	48.4	54.1				
8	6	48.7	55.0				
8	8	49.0	55.8				
8	10	49.4	56.6				

* Without clothing.

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TABLE IV.—TABLE SHOWING INCREASES IN WEIGHT AT VARIOUS AGES BY YEARS, QUARTERS, AND WEEKS

BOYS

Age	Year—52 Weeks		Quarter—13 Weeks		Week	
	Pounds	Ounces	Pounds	Ounces	Pounds	Ounces
Birth to 1 year	13.45	215.2	3.3625	53.8	.259	4.14
1 to 2 years	6.3	100.8	1.575	25.2	.121	1.94
2 to 3 years	5.2	83.2	1.3	20.8	.100	1.60
3 to 4 years	4.3	68.8	1.075	17.2	.083	1.32
4 to 5 years	4.0	64.0	1.0	16.0	.077	1.23
5 to 6 years	4.0	64.0	1.0	16.0	.077	1.23
6 to 7 years	4.3	68.8	1.075	17.2	.083	1.32
7 to 8 years	5.0	80.0	1.25	20.0	.096	1.54
8 to 9 years	5.1	81.6	1.275	20.4	.098	1.57
9 to 10 years	5.8	92.8	1.45	23.2	.112	1.79
10 to 11 years	5.3	84.8	1.325	21.2	.102	1.63
11 to 12 years	6.2	99.2	1.55	24.8	.119	1.91
12 to 13 years	7.9	126.4	1.975	31.6	.152	2.43
13 to 14 years	10.4	166.4	2.6	41.6	.200	3.20
14 to 15 years	12.2	195.2	3.05	48.8	.235	3.75
15 to 16 years	13.6	217.6	3.40	54.4	.262	4.18

GIRLS

Age	Year—52 Weeks		Quarter—13 Weeks		Week	
	Pounds	Ounces	Pounds	Ounces	Pounds	Ounces
Birth to 1 year	13.34	213.44	3.335	53.36	.257	4.11
1 to 2 years	6.0	96.0	1.50	24.0	.115	1.85
2 to 3 years	5.0	80.0	1.25	20.0	.096	1.54
3 to 4 years	3.8	60.8	.95	15.2	.073	1.17
4 to 5 years	3.6	57.6	.9	14.4	.069	1.11
5 to 6 years	3.6	57.6	.9	14.4	.069	1.11
6 to 7 years	4.3	68.8	1.075	17.2	.083	1.32
7 to 8 years	4.8	76.8	1.2	19.2	.092	1.47
8 to 9 years	4.9	78.4	1.225	19.6	.094	1.51
9 to 10 years	5.5	88.0	1.375	22.0	.106	1.69
10 to 11 years	6.6	105.6	1.65	26.4	.127	2.03
11 to 12 years	9.2	147.2	2.3	36.8	.177	2.83
12 to 13 years	10.0	160.0	2.5	40.0	.192	3.08
13 to 14 years	9.6	153.6	2.4	38.4	.185	2.95
14 to 15 years	8.4	134.4	2.1	33.6	.175	2.59
15 to 16 years	5.6	89.6	1.4	22.4	.108	1.72

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TABLES OF WEIGHTS

The tables on pages 305 and 308 are based upon those on pages 306 and 307. The material of the latter for the first four years is taken from Holt's *Diseases of Infancy and Childhood* (1920); that for the succeeding years is derived principally from the work of Boas, Burk, Bowditch, and Smedley. The weights and heights in Holt's table are without clothing, while those of the later years are with indoor clothing but without shoes.

It will be noted that the figures for the later years differ from the Boas-Burk tables by six months. Our reason for setting the figures forward half a year is that in their original form they represent *averages* that include the very large number of children whom our clinical experience and studies of entire school groups find to be seriously malnourished. The tables in their present form run lower at the various ages than those made in studies concerned mainly with normal children. As they are here printed they afford the best *working standard* for use until such a time as sufficient data are secured from weighing and measuring a large number of children who are normal.

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TABLE V.—TABLE SHOWING WEIGHT OF CHILDREN'S CLOTHING AT VARIOUS AGES

BOYS

Age	Indoor Clothing, Pounds	Shoes, Pounds	Outdoor Clothing, Pounds	Total Pounds
3	.75	.25	1.0	2.0
6	1.5	1.0	1.0	3.5
7- 9	2.0	1.25	1.0	4.25
10-12	2.0	1.5	1.5	5.0
13-15	2.5	1.9	1.6	6.0

GIRLS

Age	Indoor Clothing, Pounds	Shoes, Pounds	Outdoor Clothing, Pounds	Total Pounds
3	.75	.25	1.0	2.0
6	1.25	1.0	1.0	3.25
7- 9	1.5	1.0	1.25	3.75
10-12	1.75	1.0	1.5	4.25
13-15	2.0	1.25	1.75	5.0

These figures were secured by weighing children's outfits in a number of representative stores and checking the results by the weight of clothing actually worn. They indicate conditions in the month of May, midway between the extremes of winter and summer. Investigation shows that the difference in the weight of indoor clothing due to temperature or season seldom amounts to more than three-quarters of a pound at these ages.

By "Indoor" clothing is meant the clothing usually worn in the house or at school, excluding coat and shoes, which should be removed before weighing. "Outdoor" clothing includes cap or hat and the coat previously referred to. The "Total" in the table is the sum of the three previous columns, thus representing the child's entire outfit when he is out of doors.

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APPENDIX II

FORMS FOR NUTRITION RECORDS

Name		Age	Yrs. Mos.
Address	Birthday		
School	Grade		
Teacher			
Parent			
Height	Average Height		
Weight	Average Weight		
Underweight—Normal—Overweight			%
	Date		

FORM I. INDEX RECORD CARD, SIZE, 3 BY 5 INCHES

This form is used for the first record at the time of the weighing and measuring, before the nutrition class is formed. The cards may be grouped to show the number of children of average weight, the borderline cases less than seven per cent underweight, the malnourished who are seven per cent or more underweight, and the overweight who are twenty per cent or more overweight for height.

A system of classification with colored cards has been worked out by Dr. Burger, of the Physical Education Department of the Kansas City Schools, where

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CARD WHITE
ALL RIGHT

Name.....

Address.....

Age.....Years.....Months. Date of first weighing.....

Height.....inches. Weight.....pounds

Average weight for height.....pounds

Weigh yourself each month and record below:

192	Date	Lbs.	192	Date	Lbs.	192	Date	Lbs.
September			January			May		
October			February			June		
November			March			July		
December			April			August		

"ALL RIGHT" means

that you are up to the average weight for your height.

Try to come up to your "best weight" which is about.....pounds above the average.

At your age you should gain about.....pounds each month.

If you fail to gain properly or fall below the average find the cause and remove it.

The chief causes for failure to gain are:

Diseased adenoids and tonsils; lack of fresh air; over fatigue; late hours; not enough food of the right kind; fast eating; sweets between meals; the use of tea and coffee.

FORM II. FRONT AND BACK OF WHITE CLASSIFICATION CARD. SIZE, 3 BY 4½ INCHES

each child is given a red, white, or blue card according to his condition. The cards bear the verse,

Card of white, all right.
Card of blue, won't do.
Card of red, danger ahead.

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CARD BLUE
WON'T DO

Name.....

Address .....

Age.....Years.....Months. Date of first weighing.....

Height.....inches. Weight.....pounds

Average weight for height.....pounds.

Weigh yourself each month and record below:

192	Date	Lbs.	192	Date	Lbs.	192	Date	Lbs.
September			January			May		
October			February			June		
November			March			July		
December			April			August		

"WON'T DO" means

that while you are not greatly underweight for your height you are in danger of becoming more so unless you discover the cause and remove it.

At your age you should gain about.....pounds each month.

Already you are.....pounds underweight for your height.

Take at least a pint of milk each day in one form or another.

Gain in weight and change your blue card for one that is white.

The chief causes for failure to gain are:

Diseased adenoids and tonsils; lack of fresh air; over fatigue; late hours; not enough food of the right kind; fast eating; sweets between meals; the use of tea and coffee.

FORM III. FRONT AND BACK OF BLUE CLASSIFICATION CARD. SIZE, 3 BY 4½ INCHES

We have made use of this system of classification, adding a fourth color to the series, "Card slate, overweight," with a statement on the reverse of each card giving instructions how to correct the abnormal con-

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CARD RED
DANGER AHEAD

Name.....

Address .....

Age.....Years.....Months. Date of first weighing.....

Height.....inches. Weight.....pounds

Average weight for height.....pounds

Weigh yourself each month and record below:

192	Date	Lbs.	192	Date	Lbs.	192	Date	Lbs.
September			January			May		
October			February			June		
November			March			July		
December			April			August		

"DANGER AHEAD" means

(1.) Less endurance in games, sports and work.
(2.) Less resistance to sickness.
(3.) Probably always remaining underweight and underheight—stunted.

At your age you ought to gain.....pounds each month.

You are already.....pounds underweight for your height. Find the cause and remove it! Gain in weight, change your red card for one that is blue. Then get one that is white as soon as you can.

The chief causes for failure to gain are:

Diseased adenoids and tonsils; lack of fresh air; over-fatigue; late hours; not enough food of the right kind; fast eating; sweets between meals; the use of tea and coffee.

Things you can do:

Take a quart of milk a day in one form or another.
Take rest periods of at least half an hour before mid-day and evening meals.
Take mid-morning and mid-afternoon lunches without sweets, not enough lunch to spoil appetite for the next meal.

FORM IV. FRONT AND BACK OF RED CLASSIFICATION CARD. SIZE, 3 BY 4½ INCHES

dition. These colored cards arouse the interest of the children and stimulate all to work for white cards, the sign of normal condition.

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CARD SLATE
OVERWEIGHT

Name.....

Address .....

Age.....Years.....Months. Date of first weighing.....

Height.....inches. Weight.....pounds

Average weight for height.....pounds

Weigh yourself each month and record below:

192	Date	Lbs.	192	Date	Lbs.	192	Date	Lbs.
September			January			May		
October			February			June		
November			March			July		
December			April			August		

"OVERWEIGHT" means

less endurance and efficiency in both play and work as well as lessened attractiveness in appearance.

You should reduce your weight.....pounds and get a white card. It would be better to lose a few more pounds.

Begin at once to reduce your weight to the normal.

Take less of high value foods such as candy, pastry, cream and butter; also avoid eating between meals.

Eat fruit and vegetables.

Do not reduce more than a pound a week.

Work for a White Card!

FORM V. FRONT AND BACK OF SLATE CLASSIFICATION CARD. SIZE, 3 BY 4½ INCHES

A buff card has also been adopted, Form VI, to hold the child's complete weight record, with the dates on which he receives the various colored cards.

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NUTRITION RECORD CARD

Name..... Age.....Years.....Months

Address..... Birth date.....

Date of first weighing..... Weight.....pounds. Height.....inches.

Average weight for height.....pounds. Per cent $\begin{matrix}\text{overweight}\\\text{underweight}\end{matrix}$.....

Register below results of successive weighings:

192	Date	Lbs.	192	Date	Lbs.	192	Date	Lbs.
September			January			May		
October			February			June		
November			March			July		
December			April			August		

Dates pupil received various colored cards:.....

FILE THIS CARD IN OFFICE AND FILL IN RECORDS REQUIRED
USE REVERSE SIDE FOR NOTES

FORM VI. NUTRITION RECORD CARD (BUFF), SIZE, 3 BY 5 INCHES

When filed according to the color classification, these buff cards will then show constantly the proportion of overweight, underweight, borderline, and normal children in any group.

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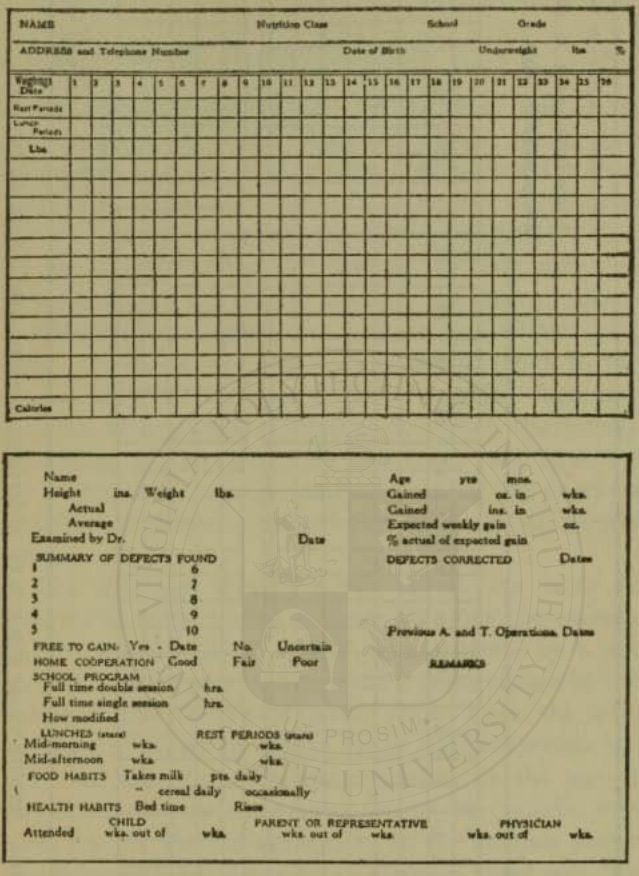

NAME | Nutrition Class | School | Grade

ADDRESS and Telephone Number | Date of Birth | Underweight lbs. | %

Weighed Date | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26

Rest Periods

Lunch Periods

Lbs.

Calories

Name | Age yrs mos.

Height ins. Weight lbs. | Gained oz. in wks.

Actual | Gained ins. in wks.

Average | Expected weekly gain oz.

Examined by Dr. Date | % actual of expected gain

SUMMARY OF DEFECTS FOUND | DEFECTS CORRECTED Dates

1 6

2 7

3 8

4 9

5 10

Previous A. and T. Operations. Dates

FREE TO GAIN: Yes - Date No. Uncertain

HOME COOPERATION Good Fair Poor | REMARKS

SCHOOL PROGRAM

Full time double session hrs.

Full time single session hrs.

How modified

LUNCHES (state) | REST PERIODS (state)

Mid-morning wks. wks.

Mid-afternoon wks. wks.

FOOD HABITS Takes milk pts. daily

" cereal daily occasionally

HEALTH HABITS Bed time Rises

CHILD | PARENT OR REPRESENTATIVE | PHYSICIAN

Attended wks. out of wks. | wks. out of wks. | wks. out of wks.

FORM VII. FRONT AND BACK OF INDIVIDUAL WEIGHT CHART. SIZE, 4 BY 6 INCHES

The record on the face of this individual weight chart is copied from the large weight chart used in the nutrition class. The summary on the back is made at the end of the quarter or half year. This form can also be used for recording the average weekly gains of a class or group, being rendered more effective by a red line showing the average expected gain of the members of the group.

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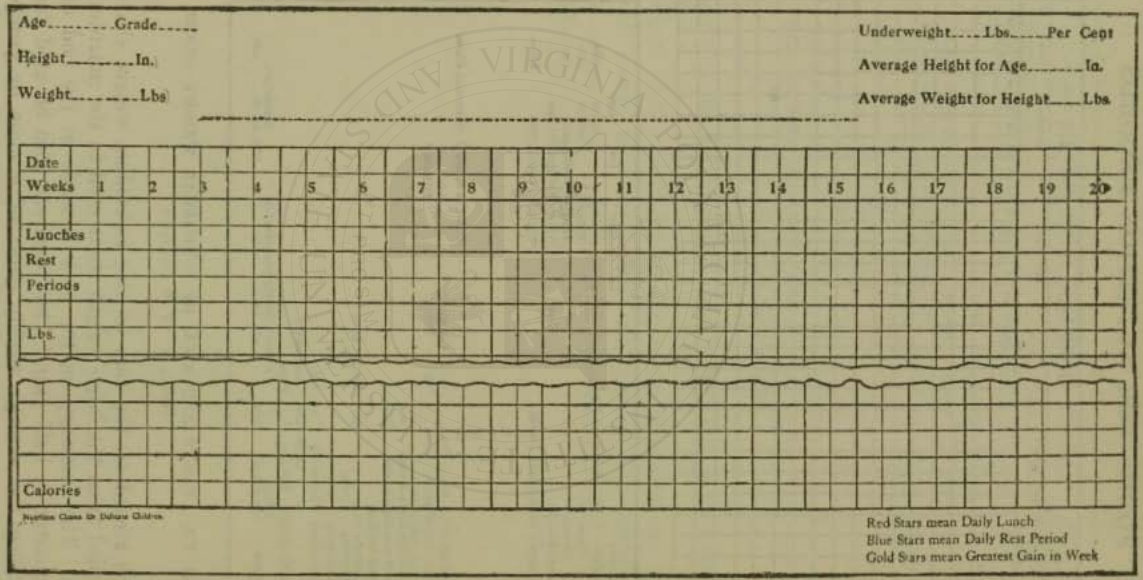

FORM VIII. WEIGHT CHART FOR USE IN NUTRITION CLASSES. SIZE, 18 BY 24 INCHES

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Directions for Making Out the Weight Chart

The Actual Weight Line. On the lower line of the square above the word "Calories" write the number of pounds that the child weighs. On each of the lines above this increase the figure by one. Fill in the dates of the weekly weighings on the top horizontal line. In the column under the date of the first weighing place a dot in the square opposite the figure indicating the child's weight—even pounds on the lower line, half pounds on the middle line, and quarters in the spaces between. Disregard all fractions less than one-quarter of a pound. Continue to record the weekly weighings in the same way. Connect each new dot by a straight line with the dot recording the previous weighing and thus construct the child's *actual weight line.*

The Average Weight Line. From the table of weights at various heights (page 305) find the average weight for the child's height, and indicate by a dot opposite that figure on the middle vertical line in the column under the first weighing date. From the table showing increases in weight (page 308) determine the expected gain for 13 weeks according to the age of the child, and indicate by a dot on the middle vertical line of the proper square in the column under the thirteenth weighing date. Connect these two dots by a straight line extending across the remainder of the chart at the same angle. This is the *average weight line.*

When the actual weight line reaches the average weight line, the child should be measured again, and

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if he has grown in height during the interval, a new average weight line based on his new height should be computed. He should be graduated only when he has attained the weight required by his new height.

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FORM FOR HISTORY AND PHYSICAL EXAMINATION

NUTRITION CLINICS FOR DELICATE CHILDREN

HISTORY

INFORMATION REGARDING MEMBERS OF FAMILY

Name	Age if Living	Health	Defects	Remarks—In Case of Death Give Date, Age and Cause
Father				
Mother				
Children 1				
4				
5				

Use lower spaces for brothers and sisters. Include still-born and miscarriages in order.

INFORMATION REGARDING BIRTH AND INFANCY

Born at full term Labor Condition at birth

1st Tooth at mos. Walked at mos. Spoke at mos.

Breast-fed Bottle Mixed Weight at birth

PREVIOUS DISEASES (WITH DATES)

Measles	Otitis (Earache)	Tonsillitis
Mumps	Rheumatism	Convulsions
Scarlet-fever	Meningitis	Chorea
Diphtheria	Pneumonia	Operations
Whooping-cough	Bronchitis	

GENERAL HEALTH AND HABITS

General Health: Good—fair—poor Frequent colds: Yes—No

How long underweight Date when well and strong

Repeated attacks indigestion without apparent cause Yes—No

Habits as to Tea Coffee Ice water

Candy or sweets between meals Washing down food

Does child take cereals? Milk?

Sleep: Mouth open—quiet—restless—snoring

Bowels regular daily Yes—No How often laxatives used

Average number minutes at meals: Breakfast lunch dinner

Average number hours in 24 spent in bed at play in open air at work or study

PRESENT SYMPTOMS

PHYSICAL EXAMINATION

Underline each word describing condition

INSPECTION. Bright—dull—nervous—phlegmatic—apathetic

GENERAL CONDITION. Good—fair—poor Lines under eyes

MUSCLES. Biceps firm—flabby Posture. Erect—fatigue

HEAD. Normal Bosses prominent Pediculi

EYES. Pupils equal—unequal React to light—distance Motions. normal—abnormal

Vision. Right /20 Left /20 (Snellen's test)

NARES. Clear—crusted—mucous discharge—spur—deviated septum

MOUTH. Normal—open Cough Herpes Mucous membrane. Normal—pale

TONGUE. Normal—moist—dry—brownish coat

THROAT. Normal—congested—granular—mucous

TONSILS. Normal—large—buried—cryptic—inflamed—absent

GLANDS. Normal—enlarged: ant-cervical—post-cervical—epitrochlear

TEETH. Good—Number carious Approximation: Good—poor

EARS. Right drum: Normal—dull—retracted—bulging Cerumen—right

Left drum: Normal—dull—retracted—bulging Cerumen—left

HEART. Area dullness cm. left mid-sternal line

cm. right mid-sternal line

Apex 4th—5th—6th—space in mid-clavicular line

cm. outside mid-clavicular line

cm. inside mid-clavicular line

Action: Regular—irregular Sounds. Clear—impure

Murmurs: None 2d pulm. accentuated

soft systolic	apex		ant. axillary line
loud systolic at	pulmonic	tr. to	mid. axillary line
diastolic	aortic		angle of scapula

LUNGS: Resonance good throughout Respiration good throughout D'Espine

ABDOMEN: Normal—large—distended—tympanitic—tender—hernia

LIVER. Dullness space—rib to costal border mid-clavicular line

SPLEEN: Felt—not felt

GENITALS: Normal Prepuce. Long—adherent—circumcised

EXTREMITIES: K J: Present and equal—absent Edema: Present—absent

SKIN: Smooth—rough—clear—scars Vaccination: Present—absent

SPINE: Normal—rigid—curvature—round shoulders

CHEST: Normal—barrel—flat—funnel—pigeon

FEET: Arches: Good—flat

URINE: Color Specific gravity Reaction Albumen Sugar

TEMPERATURE: WEIGHT: Pounds HEIGHT: Inches

DIAGNOSIS

SUMMARY OF DEFECTS FOUND

Underweight For Height Pounds Percent

Other Defects

Signs of Naso-pharyngeal Obstruction	Mouth breather
	Nasal voice
	Granular pharynx
	Cryptic tonsils
	Enlarged ant.—cervical glands
	Eardrums dull

RECOMMENDATIONS

EXAMINED BY RECORDED BY DATE

FURTHER EXAMINATION (in case of failure to gain)

X-Ray of Chest, Digestive Tract, etc.

Special Nose, Throat and Sinus

lood, especially Red Cells and Hemoglobin

Wasserman Reaction

Temperature Chart Record

Skin Tests for Proteins

Stools for Parasites, etc.

ADDITIONAL NOTES ON PHYSICAL EXAMINATION

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FORM IX FRONT OF HISTORY AND PHYSICAL EXAMINATION FORM. SIZE, 14½ BY 8 INCHES. SPECIAL DIRECTIONS FOR THE USE OF THIS FORM WILL BE FOUND IN CHAPTER IV.

Child's Name | Address | Date of Birth

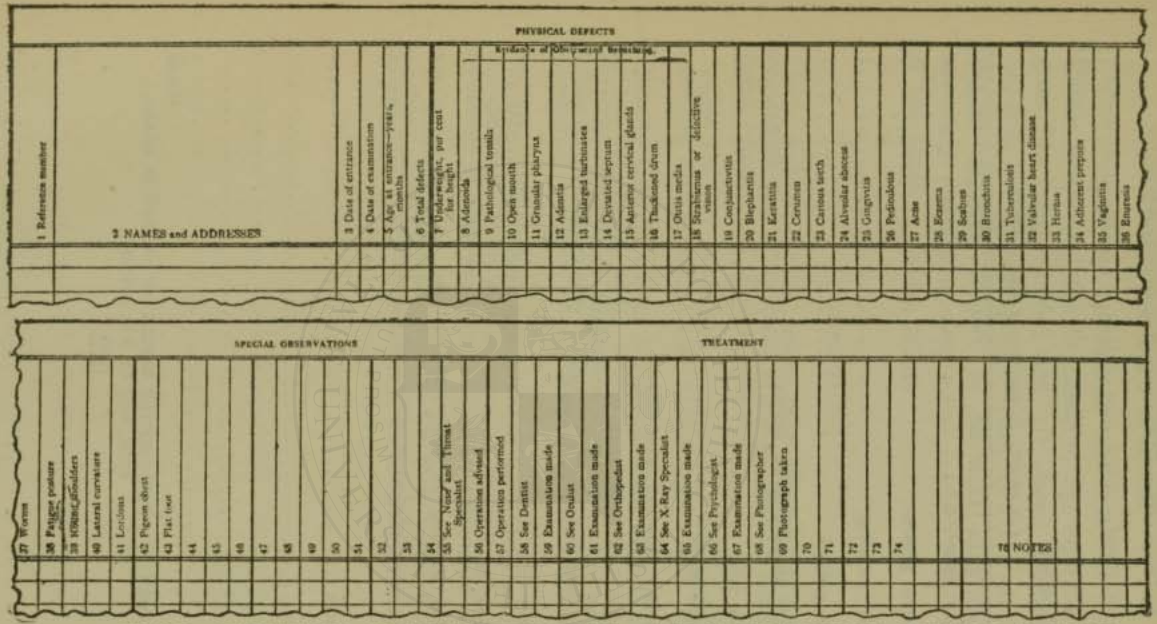
Date of 1st Examination | Height Inches | Weight Pounds | Average Weight for Height Pounds | Underweight for Height Pounds Per cent

Date of Graduation | Height Inches | Weight Pounds | Gain in Weight Actual Pounds Expected Pounds

Dates of Weighing	Weight	Gain	Loss	Rest Periods	Lunches	No. Hrs Sleep	Food 2 days a wk. Calories	Rapid Eating	Over Fatigue	Other Facts	Treatment	
											Recommended	Carried Out
Fold here												Fold here

FORM IX. BACK OF HISTORY AND PHYSICAL EXAMINATION FORM

Supplementary Notes:



FORM X. REGISTRATION AND VISIBLE RECORD FORM. SIZE, 24 BY 19 INCHES; SPACE FOR 65 NAMES.
This form enables the nutrition worker and the physician to see at a glance the condition of the class with respect to defects found, corrected, and still requiring attention. The defects corrected may be indicated by a check mark in red ink.

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NUTRITION CLINICS FOR DELICATE CHILDREN

REPORT OF NUTRITION CLASS

Name of Class .....

Date—from .....*to* *1921*

Reporter .....

(A report is due every two weeks)

	Week I	Week II
Members enrolled	.....	.....
Members present	.....	.....
Number gaining	.....	.....
Ounces gained	.....	.....
Number unchanged or losing	.....	.....
Ounces lost	.....	.....
Average gain	.....	.....
Physician present: Yes—No	.....	.....
Number parents present	.....	.....
Number diet records brought	.....	.....
Number red stars	.....	.....
Number blue stars	.....	.....
Number waiting physical examination..	.....	.....
Number requiring A and T operation....	.....	.....
Visitors	.....	.....

Notes .....

.....

.....

.....

(Over)

FORM XI. FORTNIGHTLY REPORT OF NUTRITION CLASS.
SIZE, 4¼ BY 9½ INCHES

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FORMS FOR NUTRITION RECORDS

The form shown opposite is useful in checking up a class to see that the essentials of the nutrition program are being carried out. It shows whether the children are following directions, and the status of the group with respect to physical examinations, necessary operations, and gains made. The reverse of the blank is shown below.

DIRECTIONS

Date first fortnightly report from the day of the first weighing to that of the third weighing. Week I closes with second weighing and Week II with third.

Count for first enrollment all present at second weighing whom you have decided to admit to the class.

Remove from the official roll names of all children absent for two consecutive weeks. (This does not mean that the nutrition worker is to discontinue visits or in any way lose connection with the family.) Reënroll them when they return to class.

In determining ounces gained or lost by children who have been absent divide the gain or loss since the last weighing by the number of weeks and enter the result in the proper column.

In determining average gain for the week, subtract ounces lost from ounces gained and divide the remainder by the number present.

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NUTRITION CLINICS FOR DELICATE CHILDREN, Incorporated

44 DWIGHT STREET, BOSTON

QUARTERLY REPORT TO GENERAL SECRETARY

Name of class _____ Report for 13 weeks from _____ 192 to 192

Address _____ School _____ Grade _____

Nutrition worker _____ Physician _____ Principal _____

RESULTS OF WEIGHING AND MEASURING GROUP FROM WHICH CLASS WAS FORMED

	BOYS		GIRLS		BOTH SEXES	
Children weighed and measured	No.	100%	No.	100%	No.	100%
Normal weight (average to 20% over inclusive)	No.	%	No.	%	No.	%
Borderline (less than 7% under)	No.	%	No.	%	No.	%
Underweight (7% and more)	No.	%	No.	%	No.	%
Overweight (more than 20%)	No.	%	No.	%	No.	%

Average number of physical defects (divide total number of defects by number of cases examined) _____

Physician present _____ out of 13 meetings _____ Total number visits made by parents _____

Explanation of all cases dropped _____

Notes: (Predominant nationality of group, economic condition (whether well-to-do or poor, etc.)

FORM XII. FRONT PAGE OF QUARTERLY REPORT OF NUTRITION CLASS. SIZE OF BLANK FOLDED, 8½ BY 11 INCHES

This report furnishes a class summary in such form that the results may be compared with similar data from other groups. The second page of the blank is shown opposite.

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
NAMES	AGE Years Months	Per cent Underweight	Number Physical Defects	Number Meetings Attended	Number Weeks Enrolled	Expected Gain (lbs.)	Actual Gain (lbs.)	Per cent Actual of Expected Gain	REMARKS

Date report made 192 (Signed)

(1) List boys and girls separately. Include all enrolled.
(6), (7), (8) The number of pounds indicated in (7) and (8) should be for the number of weeks registered in (6).
(10) Indicate physical defects requiring operation and special care, dates of operations, dates of graduation, etc.

FORM XII. THIRD PAGE OF QUARTERLY REPORT FORM SHOWN OPPOSITE

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APPENDIX III

GLOSSARY

Acne. An inflammatory disease of the sebaceous glands, occurring mostly about the face, chest, and back.

Adenoid. A mass of tissue situated at the posterior wall of the upper end of the pharynx; known as the pharyngeal tonsil.

Adherent prepuce. Abnormal tightness of the foreskin.

Alveolar abscess. A collection of pus in a tooth socket or cavity.

Anaphylaxis. Increased susceptibility to the action of a foreign proteid introduced into the body, induced by a first injection of the same substance.

Anemia. A condition in which the blood is reduced in amount or is deficient in red blood cells.

Antineuritic. Effective in the treatment and prevention of neuritis.

Antirachitic. Effective in the treatment and prevention of rickets.

Antiscorbutic. Effective in the treatment and prevention of scurvy.

Antrum. A nearly closed cavity in the superior maxillary bone, communicating with the middle passages of the nose.

Calory. The heat unit employed in the study of metabolism; the amount of heat required to raise

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the temperature of one kilogram of water one degree centigrade.

Carbohydrate. A substance containing carbon, hydrogen, and oxygen, the two latter in the proportion to form water. The sugars, starches, and cellulose belong to the class of carbohydrates.

Cardiac. 1. Relating to the heart. 2. Relating to the esophageal orifice of the stomach.

Cardiospasm. Spasmodic contraction of the cardiac end of the stomach or of the adjoining portion of the esophagus.

Carious. Decayed or decaying.

Cerumen. Ear wax; the soft, brownish yellow secretion of the glands of the external auditory canal.

Cervical. Relating to the neck.

Chorea. St. Vitus' dance; a nervous disorder, usually occurring in childhood, characterized by irregular, spasmodic, involuntary movements of the limbs or facial muscles.

Duodenum. The first division of the small intestine, in adults about 11 inches or 12 fingerbreadths (hence the name) in length.

Eczema. An inflammation of the skin often accompanied by itching or burning.

Emphysema. A swelling due to the presence of air in the interstices of the connective tissue of a part.

Endocarditis. Inflammation of the endocardium, or lining membrane of the heart.

Endocrine glands. Glands which furnish an internal secretion to the body.

Enuresis. Involuntary passage of urine.

Eosinophilia. An increase beyond the normal in the number of blood cells that stain readily with eosin.

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Esophagus. The gullet; a musculo-membranous canal extending from the pharynx to the stomach.

Exacerbations. The periodical aggravation of the febrile condition in remittent and continued fevers.

Focal infection. An infection confined ordinarily to a distinct location, such as the tonsils or tooth sockets, from which at times microörganisms or their toxins escape to infect other regions or the general system.

Fulminating appendicitis. Appendicitis marked by a sudden onset with rapid and fatal development.

Gastritis. Inflammation of the stomach.

Gingivitis. Inflammation of the gums.

Hypertrophic. Marked by overgrowth or general increase in bulk of a part or organ.

Infantilism. Retardation of mental and physical development; the persistence into later years of the characteristics of childhood.

Intraspinal. Within the spinal canal or spinal cord.

Intravenous. Within a vein or veins.

Leucocyte. A colorless cell-mass, such as a white blood corpuscle, or one of the irregular cells found in the blood, the lymph, in pus, or as wandering connective cells in the tissues of the body.

Malocclusion. Abnormal closing of the teeth; a misfit of the masticatory surfaces.

Mastoiditis. Inflammation of the bony structure of the temple situated below and behind the orifice of the ear.

Naso-pharyngeal. Pertaining to that part of the pharynx above and behind the soft palate, directly continuous with the nasal passages.

Nephritis. Inflammation of the kidneys.

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Otitis. Inflammation of the ear.

Otoscope. An instrument for examining the ear.

Pediculosis. Lousiness; a skin disease produced by lice.

Peritonitis. Inflammation of the peritoneum or sac lining of the abdominal cavity.

Pharyngitis. Inflammation of the mucous membrane and underlying parts of the throat.

Phlyctenular keratitis. Inflammation of the cornea, or outer coat of the eyeball, accompanied by the formation of pustules or blisters.

Proteid. One of a group of substances constituting the greater part of the animal and vegetable tissues, all containing carbon, hydrogen, nitrogen, and oxygen, and some containing in addition iron, phosphorus, or sulphur.

Ptosis. A falling or sinking down of any organ.

Pyelitis. Inflammation of the pelvis of the kidney.

Pyloric stenosis. A narrowing of the aperture between the stomach and the small intestine (duodenum).

Radiograph. The record made on a photographic plate by the Roentgen rays or rays proceeding from radium or other radioactive bodies.

Rickets. A disease occurring in infants and young children, characterized by softening of the bones.

Sinus. A hollow cavity or channel in the cranial bones communicating with the nose.

Syphilis, hereditary. An infectious venereal disease existing in a child at birth.

Thyroid. A ductless gland lying in front of the trachea which furnishes an internal secretion of influence upon metabolism and important in the economy of the body.

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Tonsil. A small mass of tissue situated on either side of the passage between the mouth and the pharynx.

Toxemia. Blood poisoning caused by the poisonous products of the body cells or the influence of micro-organisms.

Trachea. The principal air passage of the body; the windpipe extending from the larynx to the bronchial tubes, connecting through these with the lungs.

Vaginitis, gonorrheal. Inflammation of the vagina or genital canal in the female, due to a specific infection of the mucous membrane.

Visceroptosis. Abdominal ptosis; an abnormal sinking down of the abdominal organs.

Description of Tests

Cutaneous proteid test. The application to the skin of the extract of various proteids to determine the reaction of the individual, which is indicated by a skin eruption.

Roentgen-ray test. A shadow picture made by placing the part to be examined between the Roentgen rays and a sensitized film or plate. The rays penetrate many substances, as the flesh, that are impervious to ordinary light rays, but bone and other substances which are impervious to the Roentgen rays cast a shadow on the plate and form a picture.

von Pirquet test. The inoculation with tuberculosis toxin, which causes more marked inflammatory reaction on the skin of tuberculosis subjects than of normal persons.

Wassermann test. A diagnostic test for syphilis, based upon the theory of complement fixation, carried out upon blood samples.

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APPENDIX IV

LIST OF PUBLICATIONS OF NUTRITION CLINICS FOR DELICATE CHILDREN, INCORPORATED, 44 DWIGHT STREET, BOSTON

Forms

NO.

I. Index record card, 3 by 5 inches.
II. White classification card, 3 by 4½ inches.
III. Blue classification card, 3 by 4½ inches.
IV. Red classification card, 3 by 4½ inches.
V. Slate classification card, 3 by 4½ inches.
VI. Nutrition record card (buff), 3 by 5 inches.
VII. Individual weight chart, 4 by 6 inches.
VIII. Weight chart for use in nutrition classes, 18 by 24 inches.
IX. History and physical examination form, 14½ by 8 inches.
X. Registration and visible record form, 19 by 24 inches.
XI. Fortnightly report of nutrition class, 4¼ by 9½ inches
XII. Quarterly report of nutrition class, 8½ by 11 inches, folded.
XIII. Tables of weight in relation to height and age, 4½ by 6 inches, folded.
XIV. Nutrition class diploma, 5¾ by 7¾ inches.

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PAMPHLETS

1. "A Nutrition Clinic in a Public School," by William R. P. Emerson, M.D.
2. "Nutrition Clinics and Classes: Their Organization and Conduct," by William R. P. Emerson, M.D.
3. Record Book for Measured Feeding, by William R. P. Emerson, M.D.

7.* "Defective Nutrition and Growth: A Selected Bibliography," by Frank A. Manny.

8. "Physical Defects in Children: Report of Six Hundred and Two Cases," by William R. P. Emerson, M.D.
14. "Practical Mental Examinations for Growing Children," by A. Warren Stearns, M.D.
17. "Malnutrition in Children: Report of a Clinic," by William R. P. Emerson, M.D.
20. "How to Organize a Local Nutrition Center."

24.† "The Essentials in Diet for Good Nutrition," by Prof. E. V. McCollum.

26. "Weight and Height in Relation to Malnutrition," by William R. P. Emerson, M.D., and Frank A. Manny.

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* Out of print.

† In preparation.

The serial numbers omitted have either been superseded by other pamphlets, or the material covered has been incorporated in the chapters of this book.

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INDEX

An asterisk attached to a number denotes that an illustration of the subject will be found on or facing the page indicated.

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BOOKS FOR MOTHERS

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By L. EMMETT HOLT, M.D.

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