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NUTRITION OF
MOTHER AND CHILD

C. ULYSSES MOORE, M.D.

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A normal breast-fed baby.

NUTRITION OF MOTHER AND CHILD

BY

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INCLUDING MENUS AND RECIPES

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WITH 33 ILLUSTRATIONS

SECOND EDITION, REVISED



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TO MY WIFE,
WHOSE INTEREST AND ASSISTANCE
HAVE RENDERED ITS COMPLETION POSSIBLE,
THIS BOOK IS DEDICATED.

PREFACE

DURING the past decade, and especially during the past five years, important discoveries in nutrition have been made which have revolutionized our ideas of dietetics. Constant requests from mothers, librarians, social workers and nurses for books containing these newer facts of nutrition presented in a form suitable for the laity, has led the author to feel the necessity for this volume.

The ideas here presented are not such as are advanced by faddists who, without occasion, advocate some erratic and unbalanced ration, but are facts of nutrition accepted by schools of accredited standing everywhere.

The author has personally superintended various experiments corroborating or supplementing the work of others along these lines, and the results thus obtained have been successfully applied in clinical practice. Emphasis has been placed upon breast feeding, vitamins, and the mineral content of the diet. In the chapters on breast feeding, nothing is included which has not been tested and proven of practical value in personal experience.

The sick child has been only casually considered, as this volume is not intended to replace the physician in the home. In all illnesses, acute or chronic, medical advice should be sought. The purpose of the book is to teach mothers how to render their families less subject to disease.

As prevention is better than cure, our ideal should be the avoidance of unnecessary ills by proper diet from infancy. The author sends forth this little book with the hope that it may be of assistance to anxious mothers who are seeking to feed their families intelligently and scientifically.

As the subject matter has been designed primarily for persons without medical training, the language employed has been made as untechnical as is feasible in the presentation of scientific facts. The book has been so arranged that it may be employed by nurses and social workers for instruction of mothers in the homes, and in conducting short courses in nutrition.

For his initial interest in breast feeding and much of his knowledge of the subject, the author wishes to express his indebtedness and gratitude to his friend and teacher, Dr. Julius Parker Sedgwick of the University of Minnesota. For many of the scientific facts here presented, use has been made of recent publications by Dr. Alfred F. Hess and Dr. E. V. McCollum of this country, and by Dr. J. C. Drummond, Dr. Edward Mellamby, and Dr. E. T. King of England; also of current publications in scientific and medical journals of both countries. For suggestions on the subject matter regarding teeth, the author is indebted to Dr. Percy R. Howe of Boston and Dr. Guy A. Woods of Portland, Oregon.

DECEMBER 29, 1922.

FOREWORD

THIS text book for young mothers, and for social workers and nurses who have to advise them, is rich in the three vitamins: Scientific temper, common sense, and that sense of reality which comes naturally from a large specialized medical practice. Like the three known vitamins of the author's third chapter these essential elements are not to be weighed or measured. They are not mechanically separable. If they are present in our mental diet we thrive on it. We digest and assimilate it. We relish and enjoy it.

The scientific temper, which is not to be confounded with indigestible accumulations of facts, protects the author and the reader against gullibility and also against the sterility of the closed mind. It insures holding fast to the older knowledge, such as is summarized in the first chapter. It inoculates against the errors of vegetarian enthusiasm and at the same time rejects the old errors, such as that drinking water is dangerous in measles, typhoid and other fevers. The special contribution of this first vitamin however, this scientific Soluble A, as we might call it, is to put the newer knowledge of nutrition in its right relation to other knowledge and the practical needs of mothers and

infants. Here in a few pages we have the established and applicable results of modern research into the accessory food factors. It is fascinating; and it is not fantastic but directly useful. The past ten years have given an opportunity to see the sad effects of inadequate war diets on children. Dr. Moore had an unusual opportunity in Italy and in France to study and to counteract these deficiencies. He has had further opportunity in his private and hospital practice and in "well-baby clinics" of the Co-operative Infant Welfare Society of Oregon, to push such studies and to coördinate his observations with the results of the researches of Funk, McCollum and others. A conservative but open minded scientific temper has made these opportunities fruitful to the advantage of the mothers who may read and study or hear at second hand what he has to tell them.

The second vitamin, what we may call Common Sense Soluble B, comes by nature. Neither university study nor experience by themselves will conjure it into those who do not have it. The absence of it is fatal and its presence is not difficult to detect. It guards against fads and exaggerations. It is an ally of the scientific temper and is very useful in the laboratory, but unfortunately it is sometimes left out of the academic diet. If it had not been present here, Dr. Moore would hardly have devoted a whole

chapter and innumerable incidental references to the subject of *breast feeding*. This is indeed his central and indispensable message. Others have advised it and some have emphasized it. Dr. Moore insists upon it, and what is more to the point, he shows that it is possible for every mother. He has a technique for it. The chapter on this subject, while amply fortified by science, morals and the experience of cooperating patients, whether prosperous or of restricted means, will be recognized as the very embodiment of common sense.

The third imponderable factor in this treatment of the nutrition of mother and child is in some respects the most reassuring and indispensable of all. We may call it the sense of reality Soluble C. We do not read far without seeing that this is not merely a scientific report for specialists. Dr. Moore has indeed experimented for himself. He is thinking however not of his rats and puppies, but of the mothers and children whom he has known in their homes, in his consultation office and clinics. We see, too, that he has not relied on his common sense unduly. His mind is turned outward on realities, not inward on possibilities. Nothing is here merely because it is in books or has been projected by some academician. What appears here has to do with the life and health of mothers and babies. What is offered to us is

a diet, appetizing, digestible, balanced in essential information, old and new, not over seasoned, free from faults and fallacies; in other words, one that can be whole-heartedly recommended to all who are or ought to be interested in the welfare of mothers and children.

EDWARD T. DEVINE.

New York.

INTRODUCTION

For a generation past physiology and hygiene have been taught in our schools. As a result the average mother has a general understanding of the physical needs of her child. She knows that he must have fresh air; that if he is confined in close, stuffy rooms he soon pales and sickens. So much has been said and published as to the benefits of fresh air that the screened sleeping porch is a common sight. Exercise, too, has come in for its share of emphasis. Even the infant is usually taken out for an airing and is given some sort of play time each day. The hours in the school room have been shortened that the children may have more time for play and relaxation. The normal child scarcely needs to be urged to exercise; rather the reverse is true. A mother usually must curb her child in this respect, or he will exercise to exhaustion. Proper cleanliness of person and clothing has received much attention of recent years. With modern facilities for bathing, there are few children in the average home who are neglected in this respect. Both dress reforms and improved housing conditions have had an influence in bettering the physical health of our children.

Not denying the urgency of the foregoing,

factors, nutrition surpasses in importance all other health considerations, and is the one in which failure is most common. One-fifth of all deaths occur during the first year of life, and more than half of these are directly due to nutritional disturbances. Not only is this true, but death in later life is so often traceable to improper feeding in childhood that we cannot afford to ignore the value of proper nutrition.

Many mothers who realize the necessity of a well-balanced and properly regulated diet, do not comprehend what constitutes such a diet. This is not surprising when we consider the rapid progress recently made in nutritional knowledge. A study of food factors and the metabolic requirements of the human body is here presented, beginning with the old, long established facts of nutrition, and coördinating with these the newer discoveries of recent years.

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NUTRITION OF MOTHER AND CHILD

CHAPTER I

FORMER KNOWLEDGE OF NUTRITION

IN a brief review of the history of nutrition it is hardly necessary to discuss the physiology of digestion or assimilation of food. The process of converting food into body materials is called metabolism. All foods contain one or more of the five main elements, protein, fats, carbohydrates, salts, and water, each of which has its distinctive part in the work of metabolism.

The Food Elements. FUEL FACTORS.—Carbohydrates, in the form of sugars and starches, form a large part of our diet and have two uses in the body: they produce heat and are stored up as a reserve food. The preponderance of carbohydrates in the diet is justified by the ease with which they are digested and assimilated by most individuals. The function of fats and oils in nutrition is very similar to that of carbohydrates—both serve as fuel for heat and energy and both are a source of body fat. Though the consumption of carbohydrates is larger, the heat

value of a unit weight of fat is much greater. One of the chief differences is that fat may be deposited in the animal without material change, whereas carbohydrates must undergo complex transformations before appearing as fat. However, fats and carbohydrates are essentially the same in their chemical processes and uses in the body.

PROTEIN.—Protein is the food element that furnishes the material with which to build new body tissue and repair old tissue. The muscles, connective tissues, skin, and the tissues of the various organs, are largely formed from the protein of our foods. Hence, we see how important a part of our normal diet is this element and how erroneous is the idea presented by some vegetarian enthusiasts that animal food is unnecessary. Many plants, such as peas and beans, contain small quantities of protein in some of its forms, but our best sources of this necessary food are in milk, meat, and eggs. Gelatin and zein are proteins which are not capable of yielding structural material because they are incomplete, that is, they lack some of the constituents that are necessary to form complete proteins suitable for the formation of body structures. Like fats and carbohydrates, protein also has a heat-producing function. Persons living in an Arctic climate subsist largely upon meats and fats, and succeed in being very

comfortable even in the coldest weather, whereas, on a vegetable diet, they could never withstand the rigors of their native land. On the other hand, those living in a torrid climate, where an excess of body heat is undesirable, and where great energy of body muscles is not required to procure a livelihood, subsist almost exclusively on a plant diet. We of the temperate zones find that a combination of animal and vegetable foods is best suited to our needs with more meat in winter and less in summer.

MINERALS.—A fourth and very necessary food element is that of minerals or salts. The tissues, blood, digestive fluids, and especially the bony framework of the body, contain large amounts of various minerals. For instance, phosphorus and lime are requisites for the formation of bone; iron is necessary to form the hæmoglobin of the blood. Children fail to develop if given no mineral food and adults become weak, nervous, and inactive. Minerals are especially important to the pregnant and nursing mother, that her child may develop healthy tissues, strong bones, and a stable nervous system. Those on a mixed diet rarely suffer from mineral deficiency, as there are various mineral salts in milk, meats, and cereals, while the ever necessary iron is abundant in the yolks of eggs and green vegetables.

WATER.—One of the most important elements

in nutrition is water. A person will die of thirst long before hunger becomes fatal. A large part of the tissues, as well as the fluids of the body, are composed of water; in fact, it comprises from one-half to two-thirds of the body weight. Water acts as a solvent for the building materials, as a carrier of food from one organ to another, and as a remover of waste products. The last is accomplished through the skin, lungs, bowels and kidneys.

Water in Disease.—However great the need of water in health, the demand is vastly increased during disease. There are then more waste materials to be removed; the temperature is higher, causing an increased evaporation from the skin; and the loss of water through the bowels is frequently increased. These additional demands make it imperative to increase, rather than to decrease, the amount of water taken. At least fifty per cent. of the usual amount should be added to the normal daily intake in case of severe diarrhœa; in high fevers the amount should be twice that given in times of health. In former times it was believed to be almost fatal to give water in measles, typhoid, and other fevers. Now we know that these old-time beliefs and fears were without scientific foundation, and that many diseases are best combated with an abundant supply of water. Among these are included pneumonia, acute

digestive disturbances, various fevers, and even common "colds." Frequently headaches, especially those due to indigestion, biliousness, or insufficient exercise, may be speedily relieved by drinking one or two pints of lukewarm water. This results in no injury to the body, such as is often occasioned by the use of drugs, but is a positive benefit to the system in general. Water may and should be given, even when other foods must be withheld.

Calories.—Every food contains one or more of the elements enumerated above. All of them are necessary, and no diet should consist of excessive amounts of any one element to the exclusion of others. Chemists have experimented elaborately and painstakingly with various foods until they have evolved lists representing the value of each article of diet to the human body in the language of calories. A calory is the unit of measurement used to indicate the amount of heat or energy derived from a certain quantity of food. Calories thus serve to represent the value of foods from the energy standpoint. An article of diet high in caloric value, such as butter, is capable of maintaining life much longer than an equal amount of a food which is of low caloric value, such as tomatoes. About 1840, the famous chemist, Liebig, advanced the theory that the essential constituents of an adequate diet were proteins, fats,

carbohydrates, certain mineral salts, and water. Others have taught that calory values, protein content, and digestibility are the three nutritional factors which should determine our choice of food stuffs.

VALUE OF CALORIES.—Calories have been considered of such importance that, until recently, a large part of the attention given to diets in household science courses was centered upon the caloric value of food. To the ordinary mother, busy with her manifold duties, these caloric calculations seem so cumbersome and ultra-scientific that they have never been popularly used. The human appetite, as a rule, is a sufficient index to the needed amount of food for the energy requirements of the body. It is only in the case of some unusual condition, such as an undernourished child or an overweight adult that particular attention need be given to caloric valuations. Carefully computed problems in diets have evolved estimates of the caloric requirements for adults and for children at various ages. In estimating the food allowances of children, both the size and age must be considered; for instance, an eight year old boy who is very large for his age may require as much food as a twelve year old of normal size. A detailed list of the caloric values of common foods is given on page 203.

Daily Food Allowance for Healthy Children.

Age Years	Boys		Girls	
	Weight Pounds	Calories	Weight Pounds	Calories
2	27	1000	26.4	1000
3	32	1200	30.5	1100
4	36	1300	34	1200
5	41	1400	40	1300
6	45	1500	43	1400
7	49	1600	47.5	1500
8	54	1700	52	1600
9	59	1800	57	1700
10	65	1900	62	1800
11	70	2100	69	1900
12	77	2300	78	2000
13	85	2500	89	2100
14	95	2700	98	2200
15	107	2900	106	2300
16	121	3100	112	2400
<hr/>				
Mother				
35			135	2600
Father				
40	154	3500		

CHAPTER II

NEWER NUTRITIONAL KNOWLEDGE

THE preceding chapter gives, in brief, the substance of our knowledge of nutrition prior to a decade ago. Useful as this knowledge is, we have discovered that there are other factors in nutrition just as important as calories. One may partake of protein, fats, carbohydrates, minerals, and water in adequate amounts and proper proportions and yet die of starvation. We wonder why the scientific world was so slow in discovering that protein values, calories, and digestibility are not the complete story of nutrition. The reason probably lies in the fact that that part of the world in which scientific research flourishes has usually consumed such a widely varied diet. The existence and the importance of certain factors normally present in such a diet, long failed to be appreciated.

Vitamins.—For years, ardent students of the subject had felt that the chemists were at fault in believing that they could fully determine the value of foods by chemical analysis. In 1911, Funk crystallized these ideas and shattered our former beliefs of nutrition by announcing his theory of vitamins. He held that in our food there are certain minute substances of unknown

composition which have not, as yet, been chemically separated or analyzed, but which exercise a very marked influence upon nutrition. To these he gave the name "vitamin." About the time Funk announced his belief in the existence of vitamins, McCollum and his coworkers, at the University of Wisconsin, brought forth further scientific proof of the accuracy of this theory.

THE TALE OF THE CALVES.—Have you heard the story of McCollum's calves? It reads like a fairy tale. In the year 1906, three groups of heifer calves were selected and placed on diets chemically equal; the fat, protein, and carbohydrate contents of the three were identical as were, consequently, the caloric values. One group was fed on corn, another on oats, and the third on wheat—the complete plant, stalk, leaves, and kernel being used in each case. The calves grew and thrived and only minor differences were noted until they were grown and produced young. The cows that had been fed on a wheat diet from babyhood produced calves that were born dead and weighed only 40 to 50 pounds, while a normal calf at birth weighs from 75 to 80 pounds. The oat-fed cows brought forth calves practically normal in weight, but these were also born dead. The corn-fed cows produced calves that were normal in weight and that were on their feet within a few hours. Considered from a casual point of

view, these results would seem to indicate the superiority of corn above other cereals. The real point of advantage lay in the larger amount of green leaves and stalk in the corn diet, rather than in the grain itself. This point will be enlarged upon later.

A NEW ERA.—When the results of these experiments were published, the eyes of the world were opened to amazingly wonderful facts in the science of nutrition and a new epoch in dietetics was entered upon. We came to realize that a diet may be chemically complete and yet be woefully inadequate for proper growth, development, and reproduction. Since this elaborate undertaking was completed, many scientists have conducted other dietetic experiments, using smaller animals such as mice, rats, dogs, guinea-pigs, and pigeons. The smaller animals are preferred, both because of the lesser expense involved and because the cycle of growth, maturity, and reproduction is completed in a much shorter time. Practically every medical, chemical, and nutritional institution in the country is now conducting experimental studies in vitamins.

Each year new facts are being established, and we cannot but feel that our knowledge of these accessory food factors is still in its infancy. During the past few years the sad experiences resulting from inadequate war diets have also been a means of changing many beliefs and

theories. This has led to an intensive study of infant morbidity and mortality from the standpoint of nutrition. So surprising have been the results of all these recent experiments that our former mathematical calculations of food values have been proven altogether inadequate.

Vitamin Knowledge.—There are so many points about which we are, as yet, uncertain that we sometimes feel our knowledge of vitamins is very meagre; however, we do know some of the essentials. One of the peculiar facts about vitamins is the disproportion between their great importance and the very insignificant amounts in which they are consumed. They are present in amounts far too small to add to the energy supply of the body. Scurvy, that dread disease known for centuries among seafaring men, can be wholly prevented by the daily addition to a sailor's diet of three or four tablespoonfuls of orange or lemon juice. These fruits owe their efficacy to the vitamin they contain. Whether these minute amounts of vitamins are necessary foods themselves, or whether their presence merely helps other food to become effective we do not as yet know, nor is it positively necessary that we should know this. We know that the body is extremely sensitive to certain substances existing in natural food-stuffs in minute quantities; and that if these substances are destroyed or removed, such foods fail to support nutrition, and actual grave dis-

ease may result. Our modern desire to have all food perfectly sterilized, and our present day methods of preservation of various foods, are, in many instances, responsible for the destruction of these necessary substances. Vitamins in some form are always present in natural foods, and any individual will have a sufficient supply of these essential factors as long as his diet is sufficiently varied and has had no destructive influences applied to it.

The reader may say, "Since my family has a varied diet, do they not receive these vitamins in different foods?" They may and they may not. Many persons have idiosyncrasies of taste that lead to a very unbalanced ration; sometimes limited means is an influencing factor; and very often children consume a scanty variety of foods, even where an abundance is provided upon the family table. Also, while an individual may receive enough of a given vitamin to prevent actual disease, it may be in amounts far too small to promote proper nutrition and to insure good health and longevity. This is particularly true in the case of young children, as their vitamin requirements are far greater than those of adults. Even a partial deficiency of one or more of these necessary food substances, occurring in early childhood, may lead to extremely serious results; and these ill effects cannot be repaired, even by excessive amounts taken in adult life.

CHAPTER III

THE THREE KNOWN VITAMINS

At present there are three vitamins recognized as necessary for health, proper growth and normal development. For want of knowledge as to their chemical nature, they have been designated by the first three letters of the alphabet. One of these accessory food factors, found in animal fats and in green leaves, is called the *A vitamin* or *fat-soluble A*. Another, called the *B vitamin* or *water-soluble B*, is found in the seeds of plants, in egg yolks, and in many fruits and vegetables; a third one, termed *water-soluble C*, is also found in most juicy fruits and vegetables.

Fat-soluble A.—This vitamin has its original and natural source in the vegetable kingdom—the green leaves of plants. Its presence in animal foods is due to the fact that the animals which produce this vitamin have first obtained it from plants that furnish their diet. The fat-soluble factor was first detected in butter, cod-liver oil and egg-yolk, and these are still considered the richest sources of this vitamin. It may vary in amount in animal foods at different seasons according to the amount of green food the animal has been consuming. A cow that has been fed for some time entirely on hay

and grain produces butter-fat of a lesser vitamin content than when green grass or other fresh food has formed a part of her diet. In children, many of the symptoms arising from deficiency diets appear in late winter or early spring, when both animal and vegetable foods are lowest in this necessary factor. The well-known craving for green foods in the early spring is the call of the body for its necessary quota of vitamins.

ANIMAL AND VEGETABLE SOURCES.—The fat-soluble vitamin is present in a variety of foods of daily use, and no individual in ordinary circumstances need be without it. Since butter is one of its richest sources, every child should have an adequate amount each day. This should be fresh and unheated. If there is a limited amount of butter available in the family, it should be given to the children, even though the adults have to refrain from its use. Children are much more sensitive to a deficiency diet than their elders, who have completed their growth. Fish oils, from cod, cod liver, salmon, and whale, are also satisfactory sources of this substance. Oleomargarine made from animal fats contains the A-vitamin in lesser amounts than butter, but nut margarines made from vegetable oils are lacking in this substance. The glandular organs of animals such as liver, kidneys, heart and sweetbreads, represent a much richer source of fat-soluble A than do the mus-

cular portions of the animal which we more generally consume. Pork fat seems to be almost wholly deficient in this factor. In the vegetable kingdom, spinach, carrots, peas, and green leaves contain varying amounts. Yellow corn contains some, but white corn is considered valueless as a source of the A vitamin. Corn, olive, and cotton-seed oils have been shown to be deficient in this respect.

Water-soluble B.—Experiments have demonstrated that egg-yolk, cereals, spinach, cabbage, carrots, onions, beets, tomatoes, and certain other vegetables contain the B vitamin. The germ of the grain, rather than the bran, as was formerly supposed, is one of the most potent sources of this factor. The germ is usually removed with the bran as “shorts” and is used as stock food. Thus, we feed the growth-promoting portions of our grains to our animals and give the lifeless starch to our children. Commercial bran, sold by grocers to be added to refined cereals, is not of much vitamin value as, usually, the germ has been removed. Whole grain products should constitute a large part of our cereal consumption, and would do much to correct the faulty diets of our children. The water-soluble B is more often lacking in our dietaries than the fat-soluble A. This is especially true among children, who frequently dislike vegetables and prefer white bread and refined or prepared cereals to the whole grain products. One of the rich-

est known sources of the B vitamin is ordinary yeast. This is often prescribed in the diet of weak or nervous children, frequently with marvelous results. However, promiscuous consumption of yeast has become a fad, and is to be discouraged, except under a physician's direction. Next to yeast rank whole grain cereals and egg-yolk. These latter should be included in all well-balanced diets.

Milk is not an abundant source of water-soluble B and, hence, milk and white bread, upon which many children largely subsist, is far from a complete or satisfactory diet.

Water-soluble C.—The C vitamin is an essential of every individual's diet, but is frequently lacking in the food of young children under two years of age. Its presence has been determined in most fruits and green vegetables, less in root vegetables. It is found in small amounts in meat and milk, but has not been detected in yeast, fats, or cereals. Orange, lemon, tomato, and raw cabbage juices are the richest sources of this vitamin.

Cabbage Juice.—Dr. Harriette Chick of London has recently demonstrated the very interesting and practical fact that raw cabbage juice is fully as effective as orange juice. Since the relative cost of cabbage is very small compared with that of oranges, hers is a most important discovery. A half cup of cabbage, put through the food grinder and then compressed in a cheese

cloth, will yield from one to two ounces of juice. Naturally, only for infants is it necessary to express the juice; older children may eat the raw cabbage, whole or finely chopped, according to age. The juices of raw turnips, beets, and carrots are likewise good sources of the C vitamin. Mothers should see that their families receive this substance every day in some form.

Destructive Influences.—Cooking or drying of foods has a distinct influence on the vitamin content. Butter that has been heated for four hours at 100 degrees largely loses its growth promoting qualities, and even after one hour these are distinctly lessened. Prolonged heating is more harmful than a higher degree of heat for a shorter time. Reheating foods after they have once been cooked produces a further diminution of the vitamin efficiency. Dried foods are very poor in vitamins, especially those which have been subjected to a slow process of drying. Storage also has a markedly destructive influence. The B factor is the most stable one and is least affected by drying. The C vitamin is the least stable, and hence suffers most from these processes of preservation. Cooking or drying largely destroys this important factor. Exceptions to this rule are in the case of potatoes, if large quantities are used, and tomatoes, which are so rich in this factor that they retain goodly amounts of the water-soluble C, even after being canned and

reheated. A general rule is that more cooked food is required to supply a sufficiency of vitamins than is necessary when the same food is eaten raw. Arctic explorers have found that in the absence of fresh fruits and vegetables, scurvy can be prevented by the eating of raw meats, whereas, if all the meat is cooked, scurvy almost invariably develops. This eating of raw meats, permissible in Arctic lands, would not be advisable in warmer countries, because of the danger of bacteria. Foods should be as fresh as possible and not previously heated. All prepared cereals and many uncooked varieties have been subjected to heat in the processes of milling and sterilization. This, followed by storage and aging, markedly diminishes the vitamin content. Whole grain cereals, unheated in milling, are in every way preferable. The very fact that the latter do not keep as well insures their greater freshness.

All fruits and vegetables should be cooked as short a time as possible. No fresh vegetable, except green beans, needs to be cooked more than forty-five minutes, and for cabbage, fresh peas, new potatoes, spinach, asparagus Brussels sprouts, cauliflower, and new carrots, twenty to twenty-five minutes are entirely ample. Carrots, beets, and turnips should be sliced and finely chopped to shorten the time of cooking. Vegetables should be cooked in as small an amount of water as possible, none of

which should be drained off. The cooking should be done just at the boiling point, not at a "gallop," as the English term it. In making soups, the vegetables should be added only in time to insure their being tender, and cabbage or tomatoes should be added last. When root vegetables are old and tough they may be finely chopped, the juices pressed out, the pulp then cooked alone, and the juices readded just before serving. In this way the vitamin is less affected.

DEFICIENCY DISEASES

It has been very clearly demonstrated that there are distinct diseases associated with a lack of any of the vitamins. These can be induced in no other way and hence are termed "deficiency diseases." The affection may be so slight as to escape notice in cases of only a partial deficiency, or, in the case of a total deprivation, the disease may be so severe as to cause death.

Eye Affections.—One of the most easily recognizable and clearly defined conditions caused by a lack of the fat-soluble A is an affection of the eyes known as *xerophthalmia*. In Roumania, during the war, Red Cross workers found the children living on a limited diet of corn meal and thin bran soup. No milk, butter, or green vegetables were obtainable. Many were suffering with a severe eye affection—a congested condition of the lids with inflammation of the eyeball. This often led to formation of pus, hem-

orrhages, and in severe cases to total blindness and death. A cargo of cod-liver oil was obtained through the American Red Cross, and with this food, rich in fat-soluble A, the disease was checked and many little lives saved. In fact, after only a few days on this vitamin-rich diet a vast improvement was noticeable in the severest cases of xerophthalmia.

ANIMAL EXPERIMENTS.—Rats fed on a diet deficient in fat-soluble A first show the deficiency by a cessation of growth, then by a marked susceptibility to infectious diseases. Xerophthalmia soon results and can be cured only by the administration of a food rich in the A vitamin. Within a few days, and sometimes even within a few hours, after butter or cod-liver oil is added to the diet, the eye condition clears up. In a few days more growth recommences.

Rickets.—A more common disease than xerophthalmia is that of rickets. This has been shown to be associated with a deficiency of vitamins. Rickets is of such importance and of such prevalence that it is considered in a separate chapter.

THE AGE FACTOR.—The need of fat-soluble A is more imperative in children than in adults, though, the latter are by no means independent of this need. The younger the animal is when placed on a deficiency diet, the sooner he shows the effects of it, sometimes within a few days. It has been shown that mature young

rats can live without fat-soluble A in fairly good health for a certain time, no doubt due to the fact that there are reserve stores in the tissues. Eventually, however, the deficiency is manifested by a loss of weight, eye affections, and a susceptibility to disease. Attention has been called to an eye condition in the men of the northern lumber camps known as "night blindness." This is believed to be due to a diet in which the only fat is cured bacon, which is practically free of any vitamin.

Need of Water-soluble B.—The B vitamin is fully as important as fat-soluble A, and is more frequently omitted from the dietary. This vitamin has a distinct value in promoting growth. Without this factor in their diets, young animals cease to grow and do not live long. This cessation of growth takes place almost immediately following the removal of the water-soluble vitamin as, apparently, the body holds little in reserve. Not only do the young cease to grow without water-soluble B, but both young and old rapidly lose weight and, unless the shortage is made good, the experiment terminates in death. Following a cessation of growth, the next symptom to be noticed is a lack of control over the nervous system. Chickens and pigeons, so fed, acquire a paralysis of the legs, and stagger about painfully as they try to walk. This affection is termed *polyneuritis*.

BERI-BERI.—The disease in man correspond-

ing to polyneuritis in fowls is called beri-beri. It is a severe nervous disorder occurring chiefly among the rice-eating peoples of the Orient. There is a great wasting of the body with paralysis of the extremities, or there may be extreme swellings of the trunk and limbs. The heart is usually involved, and in severe cases death may result suddenly from heart failure. The disease has been found to be due entirely to a lack of the water-soluble vitamin, which occurs when polished rice is used. Those Orientals who subsist almost exclusively upon rice, have no other source of the B vitamin than the germ of this cereal. When the germ is removed in the process of milling, the disease characteristic of this deficiency results. Peoples who eat rice milled by hand, in which process the germ is not removed, do not contract beri-beri. Both in human beings and pigeons the disease may be checked, if it has not proceeded too far, by the administration of rice polishings or whole unpolished rice. Pigeons have been cured of polyneuritis within twenty-four hours after a return to a diet containing water-soluble B.

WHITE BREAD.—A similar disease may be induced by a diet consisting largely of white bread. Mice fed on a diet of white flour and water do not live more than a week; those fed on whole wheat flour and water live a normal length of time. Dr. Harvey Wiley, former gov-

ernment food chemist, is fully sustained by recent experimental knowledge in his wholesale denunciation of refined flours and cereals. Our only salvation lies in the fact that we have such a varied diet in America that other foods tend to make up the deficiency of our highly milled, beautifully white flour. However, a mother is wiser, both from the standpoint of vitamins and digestibility, if she feeds her family on the more nutritious whole wheat bread and cereals.

General Effects.—In animal experiments it has also been found that on a diet lacking the B vitamin the body temperature falls, indicating a diminution in the activity of the tissue cells. Digestion is weakened and the various organs of the body decrease in weight. Among these the organs of reproduction suffer in a marked degree, the loss in weight of the testicles of the males reaching 93 per cent. in some cases. The ovaries of the females decrease in weight to as much as 69 per cent. Drummond, in England, found that after fourteen days on a diet lacking the B vitamin, rats lost their power of reproduction.

Personal Experiments.—To test the effect of an absence of water-soluble B in the diet of animals, we conducted the following experiments on rats. In each case the defective diet contained an abundance of fat, protein, carbohydrates, salts, and water.

NURSING PERIOD.—We found that when a

mother rat, immediately after birth of her young, was placed on a diet lacking the B vitamin, her offspring grew normally for a short time only. They then began to lose in weight and died in less than four weeks. This was true in each litter tested.

AFTER WEANING.—To test the effect of the B vitamin on animals after weaning, litters of young rats eight weeks old were used. Each litter was divided into two groups. The diets of all were exactly the same, except that one group had no water-soluble B, while the other group received yeast which is rich in this vitamin. Those having the B vitamin grew normally, and in due time reproduced healthy young. Those on the deficient diet grew for a time, then declined in weight and the majority died within three months. The photograph in Figure 1 illustrates the comparative size of rats from the two groups.

These two rats were from a litter of eight young, divided as indicated. The small one was the only surviving member of his group of four which received the deficient diet. He weighed but two and one-half ounces. His full brother, fed on the vitamin-containing diet, weighed over five ounces at the time the pictures were taken, twelve weeks after the beginning of the experiment.

Reproduction.—Corroborative of the work of others were the results of our experiments when we mated normally fed males with the



FIG. 1.—Showing the effect of a diet lacking the B Vitamin. After three months on a deficient diet, the rat above weighed only two and one-half ounces, while his full brother, below, which had received the B Vitamin, weighed five ounces.

female rats who had lost their young because of vitamin deficiency. No pregnancies resulted; even after the females had been returned to a normal diet for a period of ten days, sterility continued.

Human Experiences.—Human observations have demonstrated similar results. One authority found among the women in the Philippines suffering from beri-beri, that eighty per cent. of pregnancies resulted either in abortion or in death of the child during the first year of life. Many cases of sterility developed among the poorly nourished peoples of Belgium, Austria, and Germany during the war. This may have been attributable more to a generally deficient diet, than to a specific lack of the B vitamin. A few years ago, however, the idea that diet could in any way influence reproduction would have been considered absurd. We now feel that there is scientific foundation for the belief that many of our childless American homes may be such because of incomplete diets, either in childhood or adult life, on the part of the would-be parents.

Scurvy.—The water-soluble C vitamin is of greatest importance in preventing scurvy. For centuries, this disease has been recognized, and its cure known to be orange juice. Recent experiments have demonstrated that it is a vitamin problem, and the number of curatives has been enlarged. Both children and adults are subject to scurvy. In the former, it is usually due to the use of condensed, dried, or over-

heated milk. In adults it appears among men subsisting for long periods on dried or preserved foods, such as those in the army or navy or upon Polar expeditions. Likewise it appears in institutions where the diet is largely lacking in fresh fruits and vegetables.

SYMPTOMS.—The acute form of scurvy is characterized by hemorrhages of the gums, looseness or falling out of the teeth, swelling of the joints at wrists, knees, and elbows, great weakness, and a general soreness of the muscles. In infants, one of the first symptoms is fretfulness and an indisposition to be handled or even touched: the child will cry at the approach of its mother, evidently fearing it is to be taken up. Usually associated with these symptoms, or preceding them, is an enlargement at the base of the heart, accompanied by rapid pulse and respiration. Mild cases of adult scurvy may manifest themselves only as languor and depression, with vague pains suggestive of rheumatism. The mild or latent form of the disease may be suspected in an infant who is fretful, has a pale, muddy complexion, stationary weight, and loss of appetite. Such cases often fail of recognition. Though they may never develop into acute forms, they cannot fail to have seriously deteriorating effects on normal development. It is to prevent the development of such conditions as this that regular examinations of infants and children are advisable.

CURE OF SCURVY.—As with all other deficiency diseases, so with scurvy, the cure lies in supplying the food factor, the lack of which has been the cause of the condition. In infantile scurvy, orange juice, tomato, or raw cabbage juice are easily given and work speedy cures. To demonstrate the almost miraculous results effected by this treatment it may be of interest to cite an individual case: The babe was eight months of age and weighed only ten pounds. For four months she had been fed on proprietary foods. At the first examination, her feet were found to be painful to touch, and she screamed with fright if anyone approached her. The respiration was short and quick, the pulse rate was 174. Four teaspoonfuls of raw cabbage juice daily were prescribed. After two days she showed remarkable improvement, followed by rapid and complete recovery. Naturally, the mother marvelled at the seemingly magic effect of cabbage juice.

Summary.—Fat-soluble A is necessary to insure in children proper growth, strong bones, and healthy tissues; in both children and adults, to maintain proper nutrition and render the body less susceptible to disease.

Water-soluble B is necessary to furnish proper nutrition for the nerve tissues, to insure growth and normal development, and to maintain the functions of the body organs, including those of reproduction.

Water-soluble C insures the body against the weakness and lassitude of latent scurvy as well as the graver results of the more serious forms.

A mother should see that there is enough variety in her children's dietary to insure a sufficiency of those foods containing these three necessary vitamins each day. Emphasis needs to be placed on the danger of overcooking foods, especially vegetables, and upon the advisability of taking daily some raw fruit or vegetable.

The following table, giving the comparative vitamin values of certain foods, was compiled, with slight modifications, from one prepared by the English Government's Medical Research Committee.

<i>Classes of Foodstuff</i>	<i>Fat-soluble A or "Anti- rachitic" Factor</i>	<i>Water-soluble B or Antineuritic (Anti beri-beri) Factor</i>	<i>Antiscorbutic Factor</i>
Butter	+ + +		
Cream	+ +		
Cod-liver oil	+ + +		
Mutton fat	+ +		
Beef fat or suet...	+ +		
Fish oil, whale oil, etc.	+ +		
Lean meat (beef, mutton, etc.)	+	+	+
Liver	+ +	+ +	+
Kidneys	+ +	+	
Heart	+ +	+	
Fish, fat (salmon, herring, etc.)..	+ +	very slight, if any	
Canned meats	?	very slight	

Milk, cow's, whole,				
raw	+ +		+	+
Milk, skim, raw...			+	+
Milk, condensed,				
sweetened	+ +		+	less than +
Cheese, whole milk	+ +			
Eggs (fresh)	+ +		+ + +	?
Wheat, maize, rice,				
whole grain ..	+ +		+	
Wheat germ	+ +		+ + +	
Germinated pulses				
or cereals	+ +		+ +	+ +
Cabbage, fresh				
(raw)	+ +		+	+ + +
Cabbage, fresh				
(cooked)			+	+
Swede (turnips)				
raw expressed				
juice				+ + +
Lettuce	+ +		+	
Spinach	+ +		+ +	+
Carrots, fresh				
(raw)	+ +		+	+
Potatoes, cooked				+
Potatoes, raw	+ +		+	+
Onions, cooked				+ at least
Lemon juice, fresh.				+ + +
Orange juice, fresh.				+ + +
Raspberries				+ +
Apples				+
Bananas	+ +		+	very slight
Tomatoes (canned)				+ +
Nuts	+ +		+ +	
Yeast (dried)			+ + +	

None of the three factors were found in: Lard; olive, cottonseed, cocoanut, or linseed oils; cocoa butter; hardened fats, animal or vegetable in origin; margarine, from vegetable fats or lard; cheese, from skim milk; polished rice, white wheaten flour, pure corn-flour, etc.; custard powders, or egg substitutes prepared from cereal products, and meat extracts.

CHAPTER IV

rickets

rickets, or rachitis as it is termed in medical parlance, is a disease of infancy or early childhood which materially affects growth and development. Some authorities state that eighty per cent. of present day infants are affected by it. Rickets appears usually between the second and twenty-fourth months of life. After this age, the child who has thus far escaped rarely develops the disease, though the evidences of its previous existence often persist throughout life.

Symptoms. NERVOUS.—The first evidences of developing rachitis are of a nervous type, such as restlessness, peevishness, fitful sleep, and a hypersensitiveness to touch. This is accompanied by a marked increase in perspiration; the pillow of a rachitic infant may be drenched during sleep, even in winter.

MUSCULAR.—Following the nervous evidences of rickets we find that the smooth muscle fibres stretch and become flabby, a condition first apparent in the abdomen. As the muscles of the intestinal walls dilate they force the abdominal wall outward, giving the round protruding abdomen, known as the “young robin belly.” Constipation ensues, followed in later



FIG. 2.—The “young robin belly” in a rachitic, bottle-fed child. The square, bulging forehead is also noticeable. (Courtesy, Dr. L. Howard Smith.)

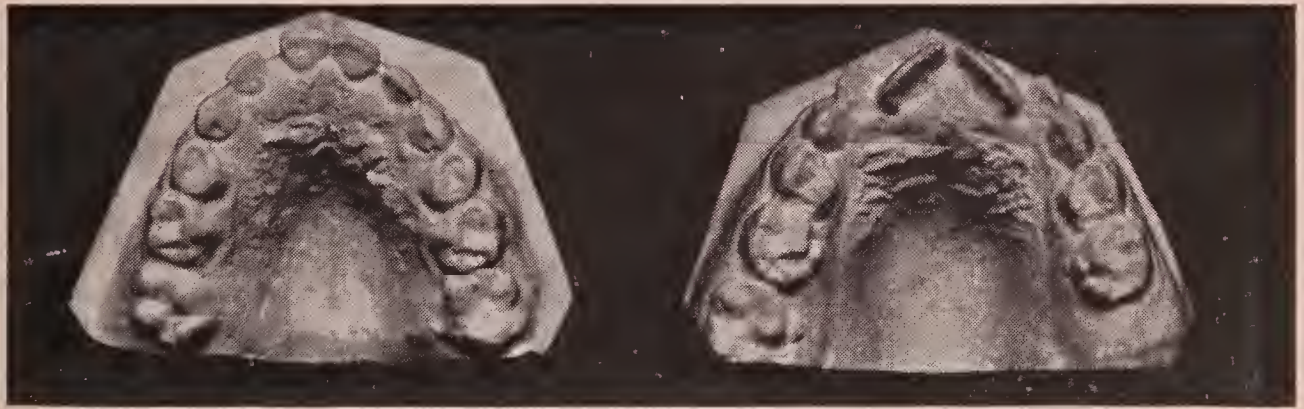


FIG. 3.—At left, impression of the mouth of a child of six years; deciduous teeth show inadequate separation. Arch is not widening and spreading sufficiently to make room for the much larger permanent teeth. At right, impression of the mouth of a child seven years, showing permanent incisors standing at an angle as a result of underdevelopment of the arch and jaws.

life by chronic indigestion and dyspepsia, with all their accompanying ills. In many cases of adult colon trouble demanding surgical attention, an inquiry into the early history of the patient reveals feeding difficulties and infantile rachitis. The heart muscle is also affected by rickets, becoming enlarged, with diminished power of accommodation to various forms of exercise.

BONY.—A third manifestation of rickets, and the one most strikingly evident, is the effect on the bone formation, resulting from a diminution in the amount of calcium deposited. Practically all the framework of the body is affected. In the young infant the bones of the skull fail to harden as they should; the edges of the fontanelle soften, and the opening does not close until late in the second year; the frontal bones become decidedly thickened, causing the child to have a large and often misshapen head, with the forehead bulging and back of the head flat; or he may have a square or quadratic head with the edges more or less well defined. Of even more importance, as regards both physical beauty and sound health, is the effect on the jaw bones. The jaws become narrowed forcing the arch of the mouth upward, thus lessening the nasal space, and leading to adenoids with their pernicious consequences. The teeth are delayed and irregular in eruption, crooked and crowded in position, and in composition soft and

non-resistant to decay. Not only are the temporary teeth thus affected, but the permanent ones are even more noticeably impaired. If the jaws fail to expand as the child approaches the age of six, even though the first teeth be fairly straight and strong, the permanent teeth are crowded into a space perhaps three-fourths as large as they should occupy. The misery caused, both directly and indirectly, by unsound teeth or malocclusion* is coming to be fully appreciated by the medical and dental professions. Many a child must of necessity undergo months of discomfort at the hands of the orthodontist and his parents pay large sums for the correction of these deformities caused by early rickets.

TRUNK DEFORMITIES.—The disease leads to three types of deformed chests: flat, triangular, and square. In the first type of chest the front is flattened while the sides are rounded. Across the lower part of the chest a groove is usually present. In infants the ribs feel abnormally soft in front. The triangular chest is flat on each side and flares outward in front at the breast bone forming what is known as the “pigeon-breast.” The square chest is flat at the sides and in front with rather sharp corners. With any of these deformities we usually find the well-known “rosary,” a row of hard bead-like formations on the ribs extending downward at the sides of the chest. The complica-

* Failure of the teeth to meet properly for mastication.



FIG. 4.—Badly bowed legs in a rachitic child two years of age.



FIG. 5.—X-ray of rachitic bow-legs showing marked curvature just above ankles, and diminished calcium content above the knees, indicated by the semi-transparency of the bone, and by the indefinite margins of the bone-ends.

tions that may develop from these malformations are naturally those connected with the lungs, which are crowded downward in their position and hindered in their development. The child, thus affected, is often afflicted with nasal catarrh, bronchial inflammation, or respiratory infections. Dr. Abraham Jacobi, the first child specialist in America, noticed many years ago that pneumonia and whooping cough are far more often fatal to the rachitic child.

The *pelvic bones* share in the general deformity, being flattened and otherwise abnormal in shape. In the female child this may result in serious complications in adult life.

Extremities.—The most commonly noticed malformations of the bones are those of the arms and legs. The joints at the wrists and ankles become thickened and enlarged. The long bones of the legs bend either inward forming knock-knees, or outward forming bow-legs. It is an interesting study at the bathing beach to note the characteristic horny knees and misshapen legs of the individual who bears about in his person the evidences of early rickets. The fingers, also, are thickened at the joints and lose their natural tapering appearance.

A child may not exhibit all of these signs or symptoms and yet have a pronounced case of rickets; sometimes the limbs alone are affected, again the head or chest may show the leading defects. Whatever the visible evidences,

the health and well-being of the child are, in some degree, permanently affected by the disease.

Cause of Rickets.—During recent years differences of opinion have existed as to the cause of rickets, different authorities advocating varying and diverse beliefs. Some have maintained that confinement and lack of exercise are causative; while these may be contributing factors in so much as they lower the general vitality, they are not a primary cause as has been proven in experimental tests made on animals. Another evidence that this is not a tenable theory is that rickets often develops at so early an age that exercise is not possible. It is usually during the first six months of life that the disease makes its appearance, too early for any child to have had enough exercise to act as a preventive. At the present time practically all close students of this prevalent disease are agreed that it is a result of faulty nutrition during the early months of life. Some have held that a deficiency of lime salts causes the trouble, but it cannot be induced by a diet deficient in lime salts alone, or cured by large doses of these; and it has even developed in cases with a dietary excess of these minerals. For example, children fed on cow's milk develop rickets much more frequently than those who are breast-fed, though cow's milk contains three times as much calcium as human milk. It has been proven

that the disease is due, not necessarily to a lack of calcium in the food, but to a deficiency of some factor, the absence of which prevents the proper assimilation of calcium and its deposition in the tissues and bony structures.

One seeming contradiction of rickets is in the fact that a thin, undernourished child is less susceptible to the disease than is the overfed one. It is the fat, pale, pudgy infant who is most apt to be a prey to this disease. This convinces one that the fault is not in the amount of food but rather in the kind. It is in the fast growing child that this deficiency is most apparent, as it is during the months of most rapid growth that the disease first appears.

In England, animal experiments have been conducted in the study of rickets which have led the experimenters to conclude that the cause of the disease lies in a deficiency of the fat-soluble vitamin. In America more recent experiments have indicated that the lack of sunlight has an important bearing upon the development of rickets. Whether the anti-rachitic factor is the A vitamin itself, or whether it is an associated factor found in foods rich in this vitamin which affects the retention and deposition of minerals, is still an open question, but not one to concern us especially here.

Experimental Studies.—In the desire of corroborating the results obtained by others, and in the hope of establishing some new facts in the

study of nutrition, the following individual experiments were conducted.

TEST ON PUPPIES.—In our first experiment we divided a litter of eight puppies into two groups of four each. The diets of the two groups were chemically equal and identically the same, except that one group had its fat in the form of butter, while the other was given a well-known and highly advertised white vegetable fat. Both groups had an abundance of food rich in absorbable mineral salts. The striking results are shown in the accompanying X-ray plates of the forelegs of two puppies, one from each group.

In Figure 6 we notice that the ends of the bones are strong and well defined, while in Figure 7 we find they are spongy and enlarged. In Figure 6 the joints are firmly and closely connected and have only the necessary small spaces between, while in Figure 7 the spaces are much greater, resulting in a looseness of the joint. The latter easily assume an irregular position when weight is put upon them, the bones pressing closer together at one side of the joint than at the other. This is equally true in the joints of the toes. In Figure 6, the shaft of the bone is thick and opaque, while in Figure 7 it appears as a thin semi-transparent line. That such joints and bones bend easily into bowed-legs or knock-knees is not surprising; neither is



FIG. 6.—X-ray of forelegs of a puppy that received butter, a full brother of the one (shown in Fig. 7) that received a commercial vegetable fat. It is noticeable that at "e." (Fig. 7) the head of the bone is semi-transparent showing marked calcium deficiency. The outer shell of bone at "D" is several times as thick as at "d" in Fig. 7.



FIG. 7.—X-ray of forelegs of puppy receiving a commercial, vegetable fat. Compare with Fig. 6 noting especially points marked "e" and "d". Also note the looseness of the joints as compared with the close-knit joints in Fig. 6.

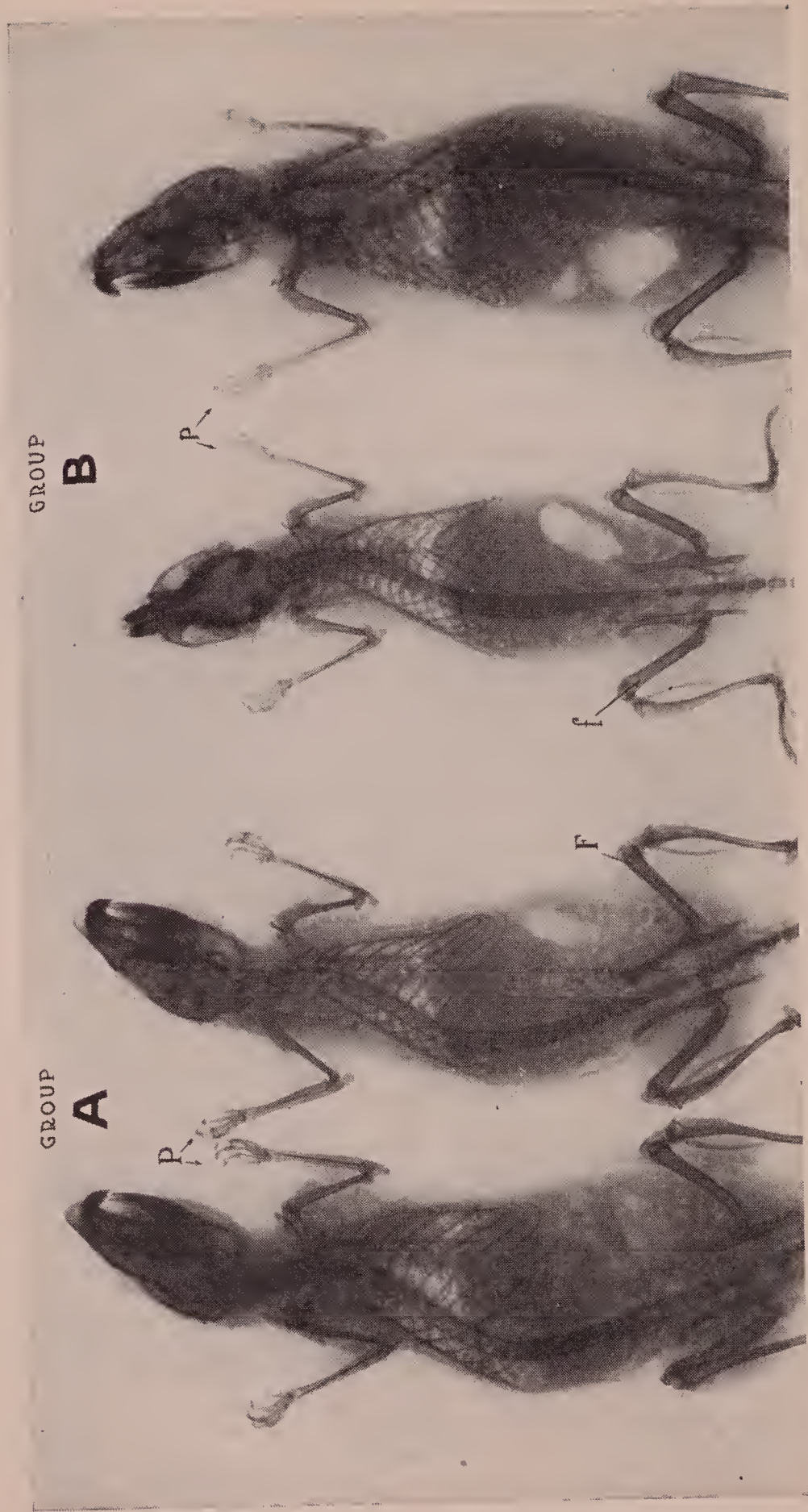


FIG. 8. A.—Butter group. B.—Commercial vegetable fat group. X-ray of rats, illustrating the superiority of butter over a commercial vegetable fat as a factor in bone development. The greater degree of calcification is shown in the paws at "p" compared with "p", and in the femur at "F" compared with "f".

the fact that they break more easily than normal bones.

TESTS.—Similar results were obtained with our rats. Figure 8 represents the skeletons of four rats, as revealed by the X-ray. These were from the same litter, but were placed in different groups. As with the puppies the diets of the two groups were identical, except as regards the fat, group A having butter and group B, lard. The rats of group A have bones which are darker in appearance, indicating the presence of larger amounts of calcium. This is especially noticeable in the paws, and in the large bones of the hind legs.

The conclusions to be drawn from experimental results to date are, that the cause of rickets is largely dietetic, and that at least one important factor in combating its development is an abundance of those foods rich in the fat-soluble vitamin.

Cure.—For many years cod-liver oil has been known to be effective in the treatment of rickets, and this is now recognized as one of the richest sources of the fat-soluble vitamin, which characteristic probably accounts for its efficacy in curing the disease. Exercise, massage and especially sunlight have beneficial effects. There are also special appliances for the correction of some of the bone deformities, a discussion of which is not in place in this volume. It is a curi-

ous fact that, as a child grows older, the disease tends to rectify itself without special treatment, and extremely bad cases of rickets may improve as the child advances in years, though the malformations of bone and muscle persist in some degree throughout life. Season has a marked influence on the development and improvement of rickets, the disease attaining more severe forms throughout the winter months and subsiding materially during the summer. Fresh air and sunlight, no doubt, have a part in this improvement. It may further be accounted for by the fact that both animal and vegetable foods contain more of the vitamins during the summer season.

Prevention.—Although, as has been indicated above, the active disease may be arrested and the curved leg-bones straighten out in some degree, many effects of early rickets continue throughout life and tend to cause various ills of heart, brain, and digestive system. The child who has suffered from rickets in infancy is often a nervous, irritable, easily excitable type when he reaches school age, and though he may do well in his school work, it is usually at the expense of his physical well-being. It should be a mother's concern to see that her child is spared an encounter with this disease monster. It is so much more frequent among artificially fed infants than among those who are maternally fed that *breast feeding* is the best means a

mother can adopt to prevent the early development of rickets in her child. A more complete discussion of this phase of the subject is to be found in a subsequent chapter.

After breast feeding, a mother should see that her child's diet contains a goodly amount of absorbable minerals and of the antirachitic factor, which is closely associated with fat-soluble A. For all practical purposes we may consider it as embodied in the A vitamin, which is found in animal fats and green vegetables, such as spinach, carrots, cauliflower, string beans, beets, and asparagus tips. Since the amount of fat that a child can or should take is limited, it is necessary that this amount should be in proper form, preferably the fat of milk. A good proportion of this should be in the form of butter for children over one year of age. Vegetable fats and oils should not be given to young children both because they are not effective in preventing rickets and because they may overbalance the diet in respect to fats, causing indigestion which favors the development of disease. In addition, skin hygiene is of great importance. Sunlight and fresh air in direct contact with the skin greatly increase the effectiveness of a good diet.

After the age has passed with which active rickets is associated, the child has need of the anti-rachitic diet for the further formation of strong bones and good teeth. Though com-

pleted as far as their crowns are concerned long before this, some of the teeth require until the eighteenth year to calcify their roots; any falling off in the mineral or vitamin content of the food up to that time may result in defective teeth or early decay. Throughout infancy, childhood, and adolescence, a mother should take precautions to safeguard her children against the disfiguring and disease-producing agency of rachitis.

CHAPTER V

DIET DURING PREGNANCY AND LACTATION

PROPER nourishment for the developing young life is the only means by which physical health can be assured to the adult of the species. As this development commences with the embryo, so must our consideration of nutrition begin here. Since the little unborn life is entirely dependent upon the maternal organism for sustenance, the question of the mother's diet during this time is one of great importance.

PREGNANCY

General Rules.—Many of the popular beliefs and theories regarding a pregnant woman's dietary are as amusing as they are erroneous and unfounded. There need not be any great divergence from the usual varied diet, but only a closer attention to the completeness of it. Sufficient food should be taken by the mother to meet the requirements of her own body and, at the same time, to furnish materials for nourishing the developing embryo. If her consumption of food falls below this minimum the reserve energy of the mother's body must make up the deficiency, with an inevitable loss of weight in

the mother and a lack of sturdiness in the child. However many pregnant women overeat, thus causing a rapid increase in weight and a consequent indisposition to exercise. The mother's weight increase should correspond only to the growth of the child and the accompanying membranes.

Amount of Food Required.—The gain in weight of the fetus during the first weeks of pregnancy is scarcely more than one gram per day (one-thirtieth of an ounce), while the daily ration of the average woman consists approximately of 500 grams per day. Therefore the additional food necessary is hardly appreciable. As the weeks pass, a more rapid growth gradually occurs, and after the sixth month, the amount of food required becomes correspondingly greater—about ten grams a day additional. There are, however, certain body activities that demand an increase in food. Often the pulse rate is accelerated and, toward the end of pregnancy, the respiration is noticeably more rapid. These changes require an additional amount of energy which must be supplied by food. The appetite is the best gauge as to this caloric need, for it is less capricious during the last weeks of pregnancy.

PRECAUTIONS.—There are a few dietary precautions to be voiced to the pregnant mother, as often she is the victim of a very erratic appetite, being inclined to overeat or to indulge

in an unbalanced ration. She should avoid irregular meals and highly seasoned or very rich foods, which are likely to cause digestive disturbances. Likewise she should curtail the amount of sweets, as these not only cause indigestion, but lead to an undesirable increase in weight. Thank heaven! the day of the indolently-reclining, novel-reading, and chocolate-consuming, expectant mother is largely past. A third and very important precaution is in regard to animal protein. Meat or eggs, used in excess, overwork the kidneys, causing albumin in the urine with attendant dangerous complications.

Minerals.—The importance of minerals is often overlooked. If a diet is lacking in calcium, for instance, the reserve store in the body is called upon to meet the need. A diet may be deficient in iron, as is a milk diet, and a person so nourished necessarily becomes pale and anemic. Green vegetables are our best source of minerals, and contain them in adequate amounts in a form easily assimilated. Fresh vegetables, therefore, constitute an important requirement in a pregnant woman's dietary.

Water.—The expectant mother should drink freely of water; in fact, about three pints of liquid daily are advisable. This insures the passing of a goodly amount of urine, which is essential to the proper elimination of waste from the body. The bowels likewise are kept in better condition by a liberal supply of water.

Vitamins.—Aside from the various food elements and their caloric values an expectant mother requires the vitamin foods in generous amounts. A pregnant woman's resistance to disease is usually somewhat lowered at best; she cannot afford to risk any deficiency in diet which would tend to further this condition. In epidemics of beri-beri, pregnant women are especially subject to the disease, usually with resultant abortion. We have all noted in our recent "flu" epidemics how readily the expectant mother became a victim and how frequently she succumbed. It has been shown that lack of vitamins may render conception impossible. The deficiency, on the other hand, may not be so complete as to produce sterility, but extensive enough to prevent the development of a healthy child with a reserve force in its system to combat disease. Not even in infancy are the vitamin requirements as imperative as during the prenatal stage. The demands upon the system of the pregnant woman, both for her own sake and her child's, are too great to risk a deficiency in the vitamin content of her food.

Various Needs.—Whole-grain cereals are necessary to promote proper growth and insure resistance to disease. The tendency to scurvy in the young infant can be reduced considerably if during the prenatal period the mother has consumed food adequately supplied with the antiscorbutic substance, such as raw fruits and

vegetables. Perhaps the most necessary vitamin to the pregnant woman is fat-soluble A. An abundance of butter fat and green vegetables in her diet will insure strong bones and healthy tissues to her offspring. From the green foods also are derived the child's supply of minerals. These are especially necessary during the latter months of pregnancy, which are the bone- and brain-forming period. One-third of the weight of a new born infant is acquired during the last six weeks of uterine life. Premature infants almost invariably develop rickets, because they have been denied a part of this bone-building period. All of the higher brain cells originate before birth, and all the teeth a child will ever possess are under construction long before he is born. The process of enameling of the first teeth is largely dependent upon materials he receives before birth. When a mother realizes that the quality of this workmanship is entirely dependent upon the condition of her own blood, she has a strong incentive to keep her body in the best of repair during this prenatal period.

EFFECT OF SEASON.—Even the season of the year has its effect upon the bones of the new born babe, the ideal time for a child's birth being early summer. The mother can then have, during the last weeks of pregnancy, an ample supply of green vegetables and milk fats, rich in vitamins. It has long been a matter of com-

mon consent among farmers that spring or summer pigs and calves grow far more successfully than fall or winter ones. Now we know the secret lies not only in temperature, but also in diet.

The following case is illustrative of this point: The mother had always subsisted upon a diet consisting largely of pork and corn meal, with green vegetables and fruits in season only. Both of her children were born in south-eastern Missouri in the month of March. The older one began cutting teeth at three months, and when seen at four years of age, had erupted the upper, central incisors of the permanent set which normally appear at seven years. These were normal in form, but were covered with a very thin, transparent enamel; while of her temporary teeth, six were decayed. The younger child's teeth began erupting at two months, and at one year of age she had eight teeth, two of which were discolored and badly decayed. With such early eruption of teeth we realize how wholly dependent the child is upon its mother for building material. These cases of early decay can undeniably be traced to an insufficiency of vitamins and minerals in the mother's diet during the latter months of pregnancy.

EFFECT OF POVERTY.—The expectant mother should have at least one cupful of green vegetables daily, measured after cooking; this means leafy vegetables or green beans or peas. In

addition she needs plenty of butter fat. While there is not generally so great a chance of a serious lack of the B and C vitamins in her diet due to cost, the A vitamin is much more likely to be present in wholly insufficient amounts. This is due to the fact that the foods richest in this factor, milk, butter, eggs, and fresh, green vegetables are almost prohibitive in price for the poorer classes in our urban districts. Thus many of the children of such families are deprived of the fat-soluble factor, and it is not surprising that we find rickets so rife among the offspring of the poorer and more inadequately fed mothers.

Selection of Diet.—With these facts in mind the pregnant woman should maintain a simple diet of meat, milk and eggs in moderate amounts, combined with whole-grain cereals, and an abundance of green vegetables and fresh fruits. If a woman reasonably satisfies a normal appetite from foods selected as indicated above, all requirements of her own body and those of her offspring will be adequately supplied.

LACTATION

The fundamental importance of breast feeding cannot be over-emphasized for it is impossible to supply an adequate substitute for this natural form of infant nutrition. Since every mother should nurse her child, let us consider some of the food requirements that render this

possible and make it of greatest benefit to the babe.

Amount.—Again, as during pregnancy, the amount of food taken must be sufficient to cover the needs of both mother and child. This means that a woman must increase her food to furnish the average thirty ounces of milk per day for her infant, as otherwise her reserve store of food and energy are called upon to meet this demand. Many a mother loses in weight during the lactating period, because her intake of food is insufficient for the needs of two. On the other hand, a mother may gorge herself with food, hoping to increase the quantity of her milk, but succeeds only in increasing her own weight. This is especially true where she consumes large quantities of milk, cocoa, and thick soups. In fact, milk does not make milk. In this are concerned other factors than diet alone, which will be considered in the following chapter.

Origin of Breast Milk.—Milk is a secretion of the mammary gland, evolved from materials supplied by the mother's food or by her tissues. Therefore, a normal, balanced diet is necessary during lactation to furnish the elements requisite for the secretion of milk, and to insure in this milk an appropriate supply of the necessary food factors. To this must be added at least a quart of fluid daily to compensate the mother's

body for the loss of this amount of liquid. This may be given as water, tea, broth, or thin soups.

Kind of Food.—As to the nature of her food it must first of all be digestible. Both for her own sake and her child's, a nursing mother cannot afford indigestion. The quantity of milk secreted is always affected by illness of the mother, though the quality may remain the same. In general, she need not fear that any food she takes will disagree with the child, provided it does not disagree with herself. What she craves and desires and is able to digest, she should have, unless it is clearly demonstrated that the child is susceptible to some certain food. Proteins in the mother's diet sometimes react unfavorably upon the child. This is especially true of egg white. Some stubborn cases of eczema in infants that will not yield to other treatment, do clear up very quickly when eggs are entirely omitted from the mother's diet. In cases of indigestion or skin eruptions in a breast-fed infant, it is wise for the mother to forego eggs for a time to satisfy herself if this is the cause of her child's trouble. The old fallacy that a nursing mother should not eat acid fruits has worked many an unnecessary hardship, and has often decreased the supply of milk by affecting her appetite. To a woman accustomed to fruits, a diet without them is extremely monotonous and unappetizing; the result is an insufficient intake of food.

Fruits are also necessary for the prevention of constipation.

Necessity of Vitamins. TEETH.—Important as are the vitamins during the prenatal period, the necessity for them continues imperatively during lactation. This is the period of the most rapid growth of any time of life. A child should double his birth weight during the first six months, and treble it in a year. Any deficiency in the mineral and vitamin content of the mother's milk will result in the impaired development of the child such as can never be rectified even by an excess of these factors in later years. The teeth share prominently in this early demand for good building materials. As has been stated the temporary teeth are completely formed and the work of enamelling them largely accomplished at birth; soon after birth the enamelling of the permanent teeth is begun. This is well advanced during the period of lactation. At six months of age the crowns of the six-year molars, which are the first permanent teeth to erupt, are fairly well formed and no food taken after this time can in any way benefit that portion of their enamelling completed at this early date. Just as the character of the temporary teeth is determined by the materials supplied by the mother's blood before birth, so the soundness of the permanent teeth is determined by the food the child obtains during the early years of life. The crowns of the teeth when once formed and enamelled,

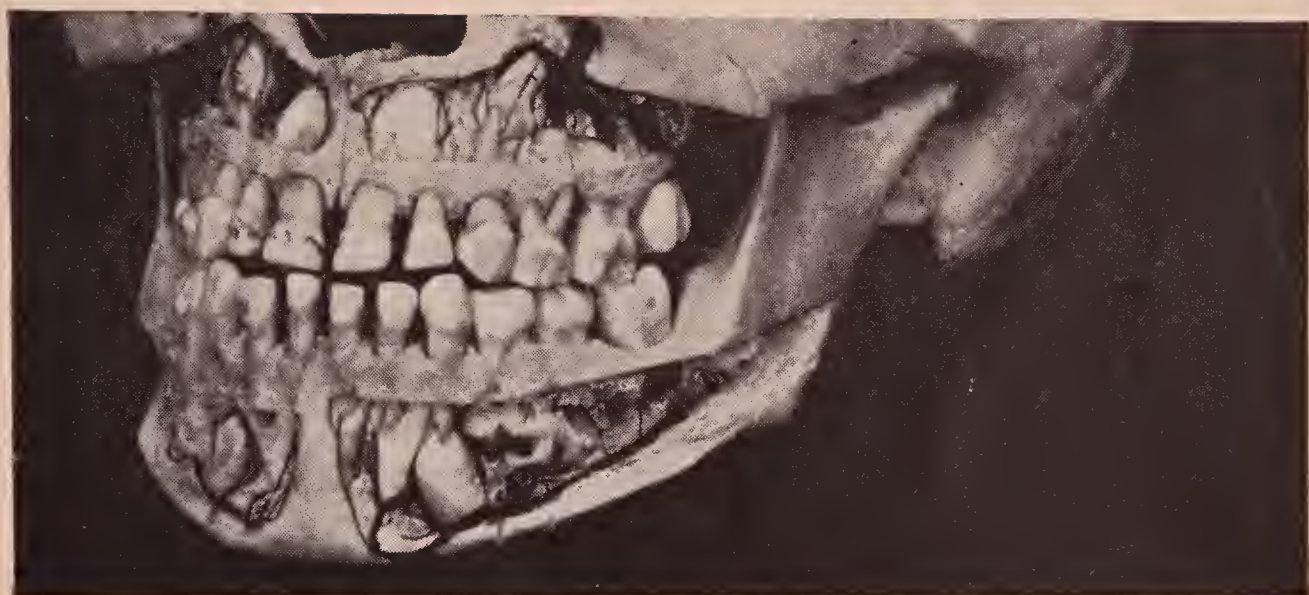


FIG. 9.—Picture made from the Skull of a Mexican child about seven years of age, showing all the deciduous teeth perfect and in place, with the permanent six-year molars behind them. Note the wide spaces between, insuring ample room for the large permanent teeth, seen imbedded in the jaw bones at the roots of the temporary teeth.

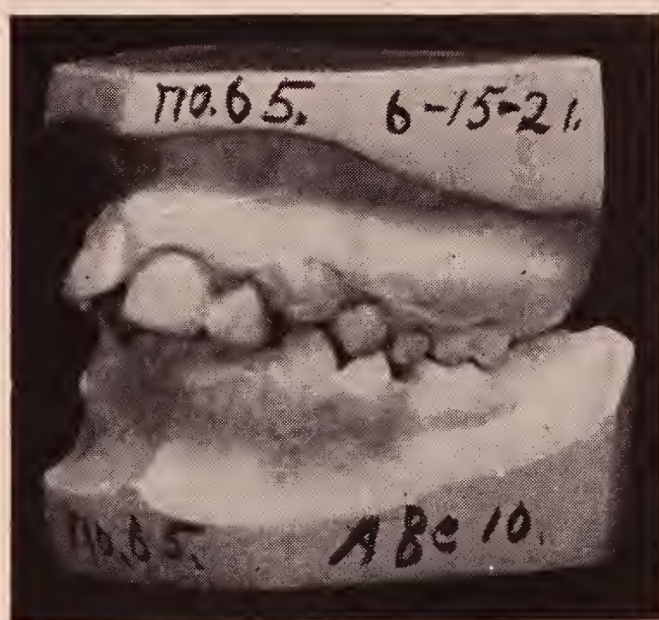


FIG. 10.—Overlapping, irregular teeth, with malocclusion, resulting from mouth breathing, a diet of "predigested" soft foods, and early loss of deciduous teeth. (A bottle-fed child).

are finished for all time, and no matter how poorly the work has been done, nothing can in any way improve their imperfections. When a mother realizes how much of this work is accomplished during lactation, she cannot fail to appreciate how great is her obligation to furnish proper materials that the quality of this workmanship may be of a high order. Not only must she consume suitable food, but she must keep her body as well as possible in other ways. Poisons in the mother's blood from disease have a detrimental effect on the child's teeth. An adult's teeth are largely made or ruined in infancy.

RICKETS IN THE BREAST-FED.—Breast milk may be abundant in amount and "test high" as regards fats and proteins, yet be lacking in minerals and vitamins. Not every child that is increasing in weight is making a consistent and proper bone development. Often it is the over-fat child who develops rickets most readily. While it is true that artificially nourished infants show evidences of scurvy and rickets more frequently than do breast-fed ones, yet the latter develop these deficiency diseases frequently enough to convince us that the human mother's milk may lack bone-forming elements. For an adequate supply of the vitamins breast-fed children depend upon the mother's milk which, in turn, is dependent upon the mother's diet. Studies of rickets among the negro children of New York, who are almost universally affected

by this disease, have led certain eminent authorities to conclude that its wide prevalence is due in part to inadequacies of the mothers' diets. It was found that the average negro family lived on root vegetables together with carbohydrates and meats. There was a great lack of milk and green vegetables, our most potent sources of the fat-soluble A. The popular belief that green foods in the mother's diet are harmful to the child is erroneous. They must be included if the infant is to be supplied with the necessary vitamins and the proper amount of minerals to guard against rickets and anemia. The reader will recall from Chapter III the results of our experiments with nursing mother rats, and the effect upon their young of the mother's incomplete diets.

The Anti-scurvy Factor.—It seems difficult for the mother to furnish in her milk a sufficiency of the C vitamin to meet the needs of her nursing for a very great period. Hence it is advisable to give orange or cabbage juice to the babe direct as early as the third month, weeks before any other form of artificial food is administered. When necessary, diluted orange juice may be safely given at the end of the first month.

The diet of the nursing mother should be ample in amount and consist of simple foods with enough variety to be palatable. It should include the three vitamins, which are best obtained from butter fat, green vegetables, whole grain cereals, and fresh fruits. In addi-

tion there must be a sufficiency of liquid to supply the amount secreted by the mammary gland. If these primary necessities are observed a lactating mother has done her part, dietetically, to insure to her child sound health, sturdy physique, strong bones and teeth, and a long, useful life.

MENUS FOR THE PREGNANT OR NURSING WOMAN

I.

Breakfast

Luncheon

Stewed fruit.

Waldorf or any fruit salad.

Whole wheat cereal, milk and sugar.

Cottage cheese.

Poached egg or creamed dried beef or codfish.

Graham bread, butter.

Fig pudding.

Whole wheat bread, toasted.

Coffee, cocoa, or milk.

Dinner

Spanish rice, scalloped lima beans, or corn.

Creamed cauliflower.

Head lettuce salad—cabbage or tomato.

Rolls

Butter

Jelly

Gingerbread, with whipped cream, cottage or fig pudding.

II.

Breakfast.

Luncheon.

Oatmeal with dates, milk and sugar.

Omelet with asparagus tips.

Creamed potatoes.

Baking powder biscuits, butter, jam.

Bread, butter.

Marguerites, tea.

Coffee, cocoa, or milk.

Dinner.

Baked salmon with egg sauce.

Stuffed potatoes.

Spinach.

Whole wheat bread.

Butter.

Fruit gelatine.

III.

Breakfast.

Fresh berries.
 Cereal, top milk and sugar.
 Graham muffins, butter
 Marmalade.
 Beverage.

Luncheon.

Cream of spinach soup.
 Crackers.
 Peanut butter sandwiches.
 Fruit salad.

Dinner.

Roast beef with brown gravy.
 Browned potatoes. Green beans or peas.
 Sliced tomatoes.
 Rye bread. Butter.
 Cup custard.

The sample menus given above are meant only as a basis from which any number of meals may be elaborated. Changes may be made in respect to fruits, cereals, soups, meats, and vegetables, interchanging and substituting others of like character. Care should always be exercised in preparing a menu that all the food elements as well as the vitamin-rich substances are included daily.

CHAPTER VI

BREAST FEEDING

THE World War taught us many things regarding the physical strength and weakness of our people. Our pride in our national health was rudely shattered when the draft law revealed the astounding fact that one-third of our adult males were physically unfit. Probably the same tests applied to our females, would give similar results. The causes of the imperfections and ill-health of adult life are now being sought at their source—the mistakes of infancy. The helpless, innocent, crying babe, once considered a by-product of obstetrics, has become the centre of a sociological and medical movement such as the world has never known. The baby is coming into his own, and his first and greatest demand is for the food God intended, his mother's milk.

Effect on Mother. MENTAL AND MORAL.—As has been shown in the preceding chapter, the health of adult life depends in a measure upon the diet of the mother during the months of gestation. Granting that she has been conscientious and scientific in this respect, that she has, together with other considerations, been careful to consume such foods as are necessary to insure

a strong, robust, disease-resisting body to her offspring, does her responsibility cease when she has brought this little life into the world? No, her responsibility is but begun. While during the months of expectancy she cannot but choose to nourish in a measure her child's life, after birth she can evade her duty and refuse to continue as the source of his sustenance. Yet to the mother, nothing but good can result from fully completing the cycle of motherhood. The mental and moral effects are hard to explain or define, but she is always a better and finer woman for having nursed her child.

PHYSICAL.—The physical effect on the mother is more readily demonstrable. For nine months the organs of the abdomen have furnished sustenance for the developing young life, with an attendant increased blood supply to meet the demand upon these organs. After delivery, the suckling of the child tends to divert this excess blood supply to the breasts, causing the pelvic organs to shrink to their former size and weight. Often, when a mother fails to nurse her child, the abdominal organs maintain a permanent enlargement, and various misplacements and ill health result. On the other hand, many a delicate frail young woman has attained robust physique and radiant health by the complete experience of motherhood.

Effect on Child.—Even more noticeable and more important than the effect on the mother is

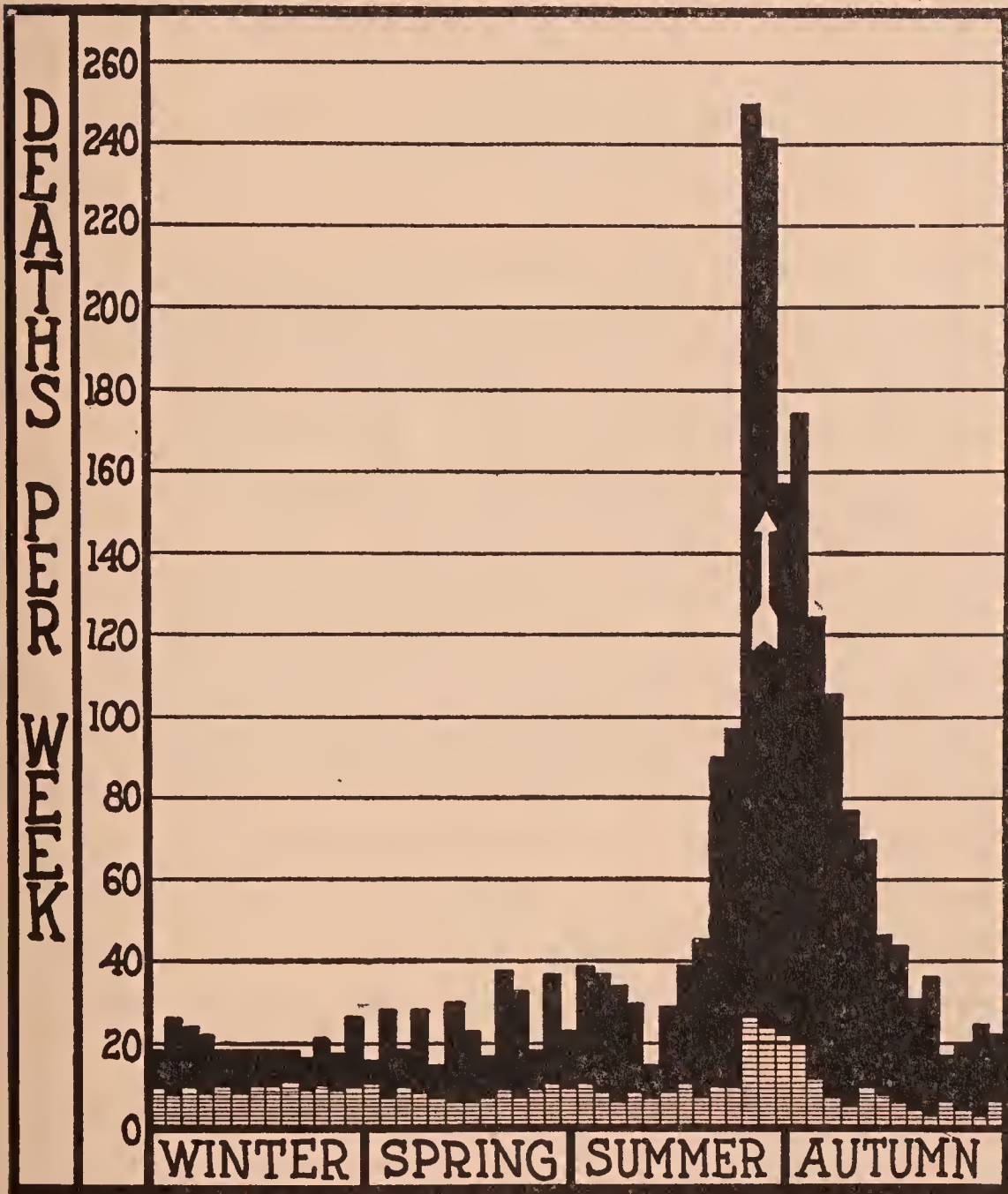
that upon the nursing babe. Practically all authorities now agree that there can be no adequate substitute for mother's milk. During the period from 1840 to 1910, when calories were considered the most important consideration of nutrition, commercial companies did their best to persuade mothers and physicians that certain artificial foods were almost more scientific than breast milk. The picture of the overfat child, nourished by some patent baby food, is still a too familiar sight in magazines and in drug store windows. These advertisements do not tell us that when a contagion, such as measles, pneumonia or influenza comes along, these same overfat, artificially nourished infants are the first to succumb to the disease. Artificial foods are dead foods. They contain calories, but they are deficient in vitamins and in other factors present in breast milk. Even cow's milk, superior as it is to all other forms of artificial food, is far inferior to breast milk. There are marked chemical and physical differences between them, which account for the inferiority of cow's milk in infant feeding. Differences exist in the protein, sugar, fats, salts, and ferments, both as to quantity and character. There is three times as much protein in cow's milk as in human milk, and it is of a much tougher nature, far more difficult of digestion by the human stomach. In addition to the dissimilarities in the chemical composition of the two, human milk contains

“protective” substances against human diseases, which naturally are lacking in cow’s milk. These disparities have an important bearing upon the metabolism and development of the artificially fed child. The babe’s digestive apparatus, which has a natural tolerance for breast milk, suffers from a greater or less intolerance for cow’s milk. The latter can never be modified so as to approximate the former in composition or digestibility. The Metropolitan Life Insurance Company states that they have found the death rate among bottle-fed babies, ten times as great as among those breast-fed; other estimates place the ratio at six. Hence, from the standpoint of life itself, it is, at least, six times as safe to be breast-fed as it is to be artificially fed.

Jacobi stated that 85% of the deaths the first year of life are in bottle-fed infants. Statistical studies in England tend to prove his statement correct. In Paris a careful compilation of deaths per week among bottle and breast-fed babies was kept for an entire year. As shown in Fig. 11, the deaths every week were always greater among the bottle-fed. When summer diarrhoea or any contagious disease comes along, the death rate is many times greater among the bottle-fed. In this case during the worst week there were only 26 deaths in the breast-fed infants compared with 248 deaths

in those artificially fed, or the death rate was 10 to 1 in favor of the breast-fed.

COMPARATIVE DEATH RATES



■ = BOTTLE FED ▨ = BREAST FED

FIG. 11.—Chart showing deaths per week during an entire year in Paris (A. B. Marfan).

SANITATION.—When we consider the unsanitary way in which cow's milk is not infrequently

handled, the barns from which it comes, the workmen who come in contact with it, the cans in which it is transported long distances, the time elapsing before its delivery, the difficulty of caring for it properly in the home, and finally the greater difficulty of cleansing and sterilizing the nursing apparatus, we cannot but concede the superiority from a sanitary standpoint of warm, human milk, direct from the breast to the baby's mouth, untouched by human hands, undefiled by bacteria, undiluted and unchanged by artificial means.

EFFECT ON TEETH.—However, there are far more subtle causes of disease than bacteria. Rickets with its attendant deformities of bow-legs, knock-knees, decayed teeth, and misshapen chest and skull, is frequently traceable to artificial feeding. Dentists long ago called our attention to the manifold defects of artificially nourished teeth. As we have shown in the preceding chapter, the materials for building strong teeth and jaws, are found more abundantly in mother's milk than in any artificial food.

A dentist, who had become especially interested in this phase of the subject, made a study of children's teeth over a period of several months. During this time, he treated patients between the ages of three and ten to the number of seventy-eight. Of these, seventy-four had been bottle-fed as infants; only four of the num-

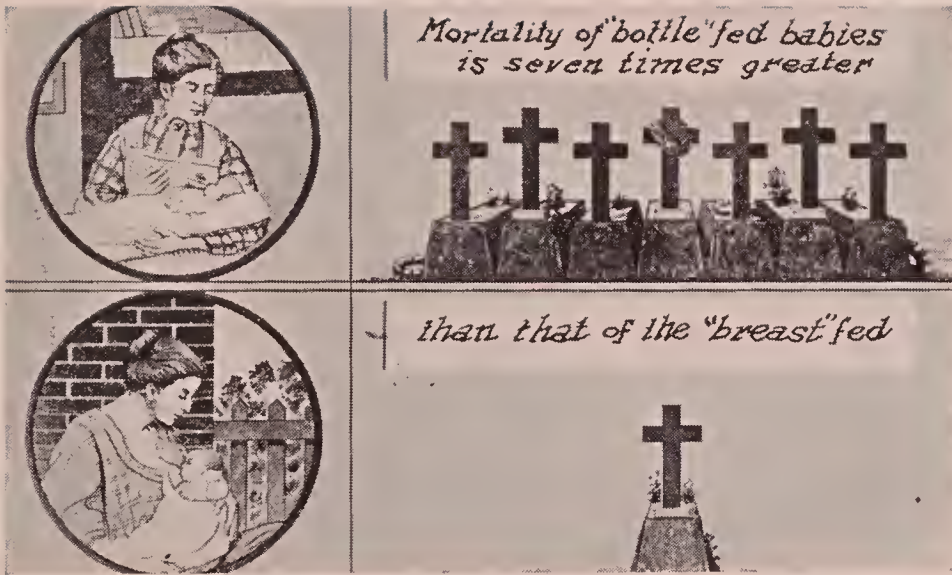


FIG. 12.—Illustrating two methods of feeding and the death dealing effect of artificial foods. (Courtesy, Dr. I. A. Abt.)



FIG. 13a.—Twins 3 years of age reared in a cultured home. Their environment, care, and feeding were similar except that the one with good teeth was breast-fed for 10 months, while the other was bottle-fed.

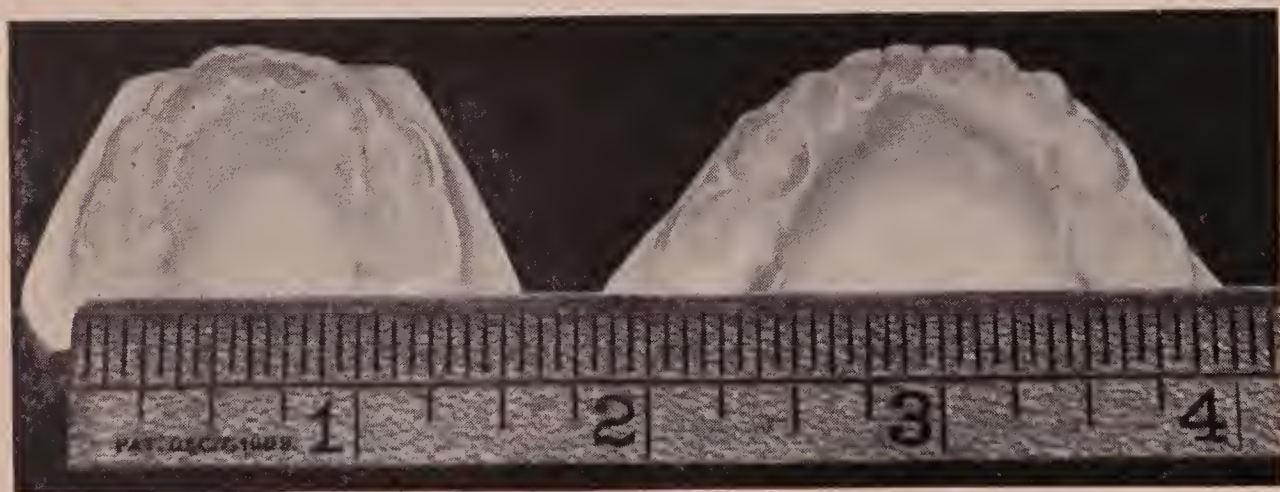


FIG. 13b.—Impressions of teeth of the twins shown above in Fig. 13a. In the breast-fed one the jaws are nearly 40% broader and the teeth show proper separation for the age. Could one ask for any better demonstration of the benefits of breast-feeding upon the development of jaws and teeth?

ber had been breast-fed and these required comparatively little work. His experience has led him to conclude that the breast-fed child rarely needs any extensive dental service on his temporary teeth. Another dentist who specializes in straightening children's teeth, reports that practically every child coming under his care, has been bottle-fed. The few exceptions to the rule are children who have been permitted to suck the thumb, or who have been allowed to eat exclusively of soft foods.

Another direct and visible effect is the one that results from the mechanical process of suckling. The act of drawing the milk from the mother's breast, requires sufficient muscular effort to bring a goodly supply of blood to the mouth, nose, and throat. This strengthens the muscles of the cheeks and lips, broadens and develops the tongue, opens up the nasal passages, and produces a well formed arch for the roof of the mouth. Feeding from a bottle requires little effort on the part of the child, as the milk usually runs into his mouth from a large opening and he merely swallows as he would in drinking. The jaws are not strengthened and widened and the tongue remains narrow and poorly developed, with a consequent narrow, high-arched palate. The outcome is usually adenoids and enlarged tonsils followed by over-lapping, irregular, protruding teeth. To insure a proper development of the

mouth and nasal passages, an infant should "work for his living," not merely swallow his food.

EFFECT ON MUSCLES.—The effect on the muscular tissue is greatest with the smooth muscle fibres, noticeable first in the abdomen. Practically all artificially nourished children have large protruding abdomens. The muscular layers of the arteries and veins are also affected, especially those in the vascular system of the lungs. These facts explain the frequent occurrence of lung and intestinal diseases among persons improperly fed in infancy. A certain victim of lifelong dyspepsia says he would give half a million for good digestion. An investigation of his case revealed the fact that he was breast-fed only three weeks. Had his mother foreseen her son's future suffering, she would surely have put forth every endeavor to give him nature's intended food. He cannot go back and start life over, but he is helping to save others from similar misfortune by furnishing funds for nutritional research.

MENTAL EFFECT.—How much the brain and nerves are affected must be judged by fretfulness in the babe, nervousness in the older child, and nervous and mental diseases in the adult. An eminent English specialist in mental diseases, studied into the causes of insanity. He found it so frequent among persons who had

been bottle-fed in infancy, that he gave up his specialty and has since devoted his life to a campaign for breast feeding. His conclusions were, "Breast feeding will *prevent* more insanity than can be *cured* by all the insane asylums of the world."

Capability of Breast Feeding. WHO CAN NURSE HER CHILD?—It is a curious fact that many persons, and we occasionally find a physician among the guilty number, believe that with our highly civilized, modern, city life, many mothers are incapable of nourishing their infants for more than a few weeks. It is perhaps true that it is not so easily accomplished as with our grandmothers, who lived a more simple and natural existence. It is, however, just as possible if we meet modern conditions with modern methods. As Milton says "Accuse not Nature; she hath done her part. Do thou but thine." So long as nature renders a woman capable of conceiving and giving birth to a young life, she is not going to fail to furnish support for that life after birth. It may be laid down as an axiom that *every mother can nurse her child*. The modern woman, with proper observance as to rest, exercise, and diet, and with a determination to succeed, can accomplish marvellous results along this line. The only instances in which a mother should not try to nurse her offspring, both for her own and the child's sake, are in cases of cancer, active tuberculosis,

or insanity in the mother. In the last two instances the child should be taken from the mother entirely.

EFFECT OF MENSTRUATION.—The recommencement of menstruation is not an indication for weaning as so many mothers suppose. The quantity of milk very frequently is less during this period, and this is usually the cause of any peevishness the child may exhibit. Sometimes, however, the milk undergoes a chemical change and acquires a bitter taste, so that the child either vomits the food or refuses to nurse. A mother should accustom herself to the taste of her own milk, and if she finds it distasteful during menstruation, and it seems to disagree with the child, she may resort to artificial feeding for a few days. She must, however, carefully express the milk from the breasts at the regular nursing hours, so that there may be no diminution in the amount when the period is past.

Pregnancy, per se, is not an indication for immediate or premature weaning of a child. The common idea that pregnancy renders the milk unwholesome is an erroneous one. The condition of the mother and nursing infant should largely determine when the weaning shall take place. Naturally, it is too much of a strain upon a woman for her to feed one child at the breast and another *in utero* for a very long period, and all three may suffer by the process if too long continued. Usually, it is the unborn

child who is injured most in such a case. However, if a woman is in good condition, no great harm can result from nursing her child two or three months after she again becomes pregnant. This gives the mother time to wean the nursing infant gradually, avoids many ills, with their consequent worry, that come from abruptly making this change, and does not necessarily affect the unborn child.

So-called Reasons for Weaning.—Excuses for premature weaning of infants from the breast are the following: “the milk dried up,” “poor quality of milk,” “thin or watery milk,” “the breast milk disagreed with the child,” “poisonous,” “made the child vomit,” “caused green stools,” “caused constipation,” *et cetera, ad libitum*.

No experiments have been published that prove that breast milk is ever poor in quality. Milk is often examined to ascertain the percentage of fat or other elements. Since the amount of fat varies, being small at the beginning of the nursing and increasing in proportion toward the end of the same nursing, and since it varies at different times of day, the only accurate test for fat would be that made upon the total amount of milk secreted in twenty-four hours. A high or a low percentage of fat, accurately ascertained, is no indication that the milk is unsuited for the child's use. A Jersey cow furnishes milk high in fat and a Holstein, milk that is low

in fat, yet each calf thrives best on its own mother's milk. The blood that feeds the child before birth is the best blood to furnish it food after birth. In practically all cases where the quality of the milk is condemned, the quantity alone is at fault.

Hygiene for the Lactating Mother.—The diet for the nursing mother need not differ from that of any normally fed, healthy woman except in amount and in respect to liquids. A fuller discussion of this subject is to be found in Chapter V. The lactating mother should, of course, maintain as perfect health as possible, taking daily outdoor exercise, sufficient rest and sleep, and avoiding all unnecessary worry. If the baby requires much care at night, some member of the household other than the mother should give the needful attention. When the mother of a young babe is forced to lose a goodly share of her night's rest, she cannot be expected to secrete an adequate amount of milk the next day. Housework, if the heavier tasks are avoided, does no harm to the mother, and it is better that she have some duties other than the care of her child. Exciting and exhausting social activities, on the other hand, should be avoided entirely during the first weeks of nursing and, quite generally, until the baby is weaned. Any such sacrifice the mother may make is more than compensated for by the future health of her child, and her own comfort

and satisfaction growing out of his sound health. A nursing mother should keep her bowels open by the use of fruits and coarse cereals. Cathartics should not be used as they lower her vitality and react upon the child.

Care of the Nipples.—The breasts and nipples should be bathed with soap and water at the time of the general bath. The mother's hands should be freshly washed before she nurses the babe. The nipples should be sponged with a piece of gauze dipped in sterile water before and after the feeding, or a clean piece of gauze should cover the nipples between nursings, to protect them from contact with the clothing and to absorb any milk that may trickle out. The gauze should be thin enough to permit of a free circulation of air. Neither boric acid solution nor other antiseptics should be used on the nipples, either before or after nursing, as these cause an irritation which often results in painful nursing or in cracked or bleeding nipples. Frequently, when they become sensitive to touch, exposure to the air for a two-hour interval twice a day is the only remedy required. Bathing the nipples with cold water tends to harden them and prevent irritation.

Technique of Nursing.—Maternal love and devotion are portrayed both in art and poetry by the babe at the mother's breast. Artists usually present the mother holding the child in a natural

nursing position. In an analysis of the correct position, certain facts must be considered.

RECLINING.—The babe first takes the breast while the mother is in bed. She should assume a comfortable position upon one side. The babe should rest on a pillow or folded blanket, his head steadied by the mother's arm, so that his mouth is in easy contact with the nipple. The child's nose should be free for breathing, not smothered against the mother's body. If necessary, the mother may hold the breast away from the baby's nostrils with the fingers of her free hand. When the milk seems to come with difficulty she may assist by alternately compressing and relaxing the fingers upon the breast; if the flow is too rapid, she can retard it by maintaining a steady pressure.

SITTING.—A low chair is best for the mother's use, as less effort is required to elevate the infant to the proper height, and the mother's lap furnishes a more comfortable seat for him. Some mothers prefer an arm chair, that they may have more support in maintaining the child's position. The babe should be supported by the mother's arm, so that he may grasp the nipple easily and naturally. Many babies swallow air when nursing, and this distends the stomach and causes discomfort until belched up. If allowed to collect until the end of the feeding, a considerable quantity of food may be regurgitated with the air bubble. An infant thus troubled should be

elevated to the mother's left shoulder once or twice during the nursing period, and gently patted upon the back, that he may relieve himself of this excess of air before the stomach is full. By this means, discomfort to the child and loss of his food may be avoided.

Schedule for Nursing.—Only in rare cases should there be more than six feedings during the twenty-four hours. For the convenience of the mother and the welfare of the child, the following schedule for the first month has proven of practical value; 6 and 10 A.M., 1, 4, 7, and 11 P.M. After the first month or six weeks, the normal child should have but five feedings daily. These should be given at four hour intervals beginning at six in the morning and continuing throughout the day until 10 at night or 6-10-2-6-10. From 10 P.M. to 6 A.M. the child should receive nothing, except possibly a little water. This allows the stomach a full eight hour period of rest, which is the best means of preventing colic and other forms of indigestion. Such a schedule affords the mother time and opportunity for rest, exercise, and relaxation all of which are very necessary to her well-being. The old-time method of very frequent nursings often rendered the feeding of her child an irksome duty to a young mother, and this reacted in a psychological way upon the effectiveness of the attempt.

Alternate Nursings.—The child should be nursed regularly fifteen minutes on one breast

and five on the other alternately, so that each breast is emptied partially or completely at each feeding. Very frequently a child secures his food more easily from one breast than from the other. Unfortunately, this sometimes results in a neglect of the more difficult one. In many women there is a slight difference in the size or development of the two breasts, but this should not be exaggerated by permitting the child to nurse from only one. Such a course necessarily results in an abnormal disproportion in the size of the two glands; likewise, if the functioning breast should develop cracked nipples or become abscessed, temporary relief cannot be obtained through using the other breast. Fig. 14 illustrates a normal difference in size and development of the two breasts; Fig. 15 shows how this normal variation may give place to an abnormality amounting almost to a deformity when only one is nursed. In this case, the child at two months, refused the right breast. The mother humored his whim and continued to give him only the left breast. The accompanying photograph shows the results when the babe was seven months old. For these reasons the breasts should share equally in the demand made upon them. To maintain a proper flow of milk, it is necessary that each breast be emptied four times a day. Occasionally a nipple yields milk so readily that the child secures an adequate amount in less than twenty minutes. Whatever

the length of the nursing period, three-fourths of the time should be spent on one breast and one-fourth on the other alternately. If the child shows every indication of being satisfied after a fifteen-minute feeding, and is gaining normally, he should not be forced to nurse longer. However, a mother should assure herself that he is getting an adequate amount, and is not merely falling asleep from exhaustion.

Value of Weighing.—The only true means of determining the exact state of affairs is by careful weighing. A normal infant should gain from four to six ounces weekly during the first six months. A larger gain than this indicates overfeeding, while a persistent failure to gain an average of five ounces per week is sufficient proof that the child is undernourished. Minutely accurate scales of the balance type should be used, as the ordinary spring scales are not reliable. Proper scales indicate a very slight variation in weight and also furnish the only means of determining the quantity of food the child obtains from the breast. This information is gained by weighing the child before and after nursing, during a period of twenty-four hours. There should be no change of clothing between the two weighings of one nursing period. Up to three months of age, the child should take daily enough breast milk to equal one-seventh of the body weight for a normal infant of that age. That is, if he weighs eight

pounds he should receive daily eighteen ounces of breast milk. From the third to the sixth month his daily ration should equal one-eighth his body weight; from the sixth to the ninth month, one ninth his body weight is sufficient. The importance of weekly weighings of a young infant cannot be over emphasized, and if the gain is doubtful, daily weighings should be resorted to for a time.

AVERAGE WEIGHTS

Age	Boys	Girls
	Pounds	Pounds
Birth	$7\frac{3}{4}$	$7\frac{1}{2}$
Months		
1	9	$8\frac{3}{4}$
2	$10\frac{1}{2}$	$10\frac{1}{4}$
3	12	$11\frac{3}{4}$
4	$13\frac{1}{4}$	13
5	$14\frac{3}{4}$	$14\frac{1}{2}$
6	16	$15\frac{1}{2}$
8	18	$17\frac{1}{2}$
10	20	$19\frac{1}{2}$
12	$21\frac{1}{2}$	21
15	$23\frac{1}{2}$	22
18	$24\frac{3}{4}$	$23\frac{1}{4}$
21	$25\frac{3}{4}$	$24\frac{3}{4}$
24	27	$26\frac{1}{4}$

Errors in Breast Feeding. OVERFEEDING.—One of the most difficult truths to impress upon mothers is that a baby may easily be overfed. This may arise from two causes, too frequent feedings or too large an amount at each feeding. The former, however, is the more usual cause

of disturbances arising from this source. Our grandmothers believed that whenever a child cried he was hungry and should be fed. Today this same belief among grandparents is one of the serious obstacles to a sensible and scientific course of procedure in infant feeding. Restlessness, peevishness, and chewing of the fists, are not necessarily signs of hunger, as is so often supposed, but are frequently indications that the child is suffering discomfort from too much food. After nursing, it requires from three to four hours for the stomach to empty itself completely. If another feeding be given in two hours or so, the fresh milk is poured into that which is partly digested, with the result that the former feeding must remain too long in the stomach or the latter one be rushed out before it is thoroughly digested. The little stomach has no rest, but is constantly working to care for the fresh intake of food. No muscle can work continuously without growing weak and inefficient and showing evidences of pain. One of the curious facts about colic is that it rarely causes trouble during the morning hours, but in the afternoon or early evening makes its regular and periodic appearance. The reason is evident; during the night, when the feedings are fewer, the little stomach has a chance to empty itself and get a little rest. When the frequent daytime feedings recommence, the stomach is again gorged, the walls are stretched to their

limit, digestion is halted, and pain ensues. Naturally, the little fellow cries and chews his fists. How false is the idea that this can be cured by further filling up the already overclogged digestive apparatus! The pain is similar to that of hunger, and causes an increased flow of saliva, such as is present when the body is calling for food. The obvious remedy is to lengthen the intervals between feedings.

Results of Overfeeding.—Serious results arise from the habit of overfeeding, such as, indigestion, dyspepsia, “colic,” nervousness, various forms of bowel trouble, flat feet, bow legs, and a general lowering of resistance to disease. Instances of severe eczema develop in children from the third to the ninth month, which require months to cure, with a tendency to recurrence remaining throughout life. Such cases usually give a history of a rapid gain in weight during the first three months, accompanied by nightly orgies of colic.

ACUTE INDIGESTION.—As overfeeding continues, one of the most common results is acute indigestion. Fever and diarrhœa may develop with a loss of appetite. For a day or so the child may refuse the breast altogether. As a consequence of this cessation of stimulus to the mammary gland, the amount of milk secreted quickly diminishes. When the child recovers from his acute trouble, the food supply is insufficient to meet his needs. In his weakness, he

is unable to furnish a strong enough suction to reëstablish an adequate flow. He secures less and less from the breast, and hence grows less vigorous in his demands, until the breasts dry up altogether. Thus the vicious circle progresses, and finally, when the mother realizes that the child is getting almost nothing, bottle feeding is resorted to. The fact that this condition usually reaches its climax about the end of the third month, explains why so many mothers seem unable to nurse their infants longer than the first trimester.

UNDERFEEDING.—The picture of the really underfed child is quite the opposite, and often is very deceptive to the uninitiated. If the child is fretful and peevish, he is fed; but frequently such a child is drowsy and quiet, spending much of its time in sleep. Its very quietness reassures the parents that it is doing well, until the trouble has progressed so far that there is a very noticeable failure to gain in weight. This may arise from an insufficient quantity of milk, from weak suction on the part of the child, or from a breast that yields milk with difficulty. In the last case, the circular muscle that controls the flow of milk from the nipple may be very rigid and unyielding. Such a breast requires a much stronger suction on the part of the babe than does an easily functioning nipple. Often the child has not the strength to pursue this strenuous task, but tires and falls asleep after a

time, and the mother, concluding he is satisfied, removes him from the breast. During the first few weeks of life, a babe may not nurse well, because the sucking reflex may be poorly developed or because of weakness. In such instances the babe will nurse a few minutes, sleep, then nurse again, continuing this for thirty minutes or more. *Whenever a child habitually desires to nurse more than twenty minutes, the amount obtained from the breast is inadequate for normal growth.* Frequent nursings do not avail in such a case, but may aggravate it. Some of the symptoms may simulate those of overfeeding, such as, green and slimy stools, vomiting, and stationary weight.

Correction of Overfeeding and Underfeeding.—If the babe shows signs of being overfed on a correct schedule, it indicates that the mother's breasts are secreting more than the child needs. The amount may be reduced by giving only one breast at a feeding. There are two reasons for this—first, it is during the first five minutes of nursing that the flow of milk is more active, so that with five minutes on each breast, the child receives far more than he does in a longer time on only one breast; and second, emptying each breast less frequently reduces the amount secreted. If the child still gains too rapidly, an ounce of water may be given, just before the nursing, which will lessen the amount of milk the child will take. Not so simple a

matter is the correction of underfeeding. One may resort to complementary feeding: that is, supply the deficiency in the amount of breast milk with an artificial milk mixture. This, however, should rarely be done, except as a temporary measure. A poor, underfed, emaciated little creature has his chances of living decidedly lessened if he is put upon artificial feeding. If the quantity of breast milk is insufficient, the imperative need is to develop or increase the flow. A strong infant can do this for himself. With a weak infant it must be accomplished by artificial means. When a temporary illness of the child, or of the mother, or some other cause has led to an arrest of milk secretion then the flow should be reëstablished. This is altogether possible and practicable, and the method is considered in detail in the following chapter.

CHAPTER VII

DEVELOPMENT OF BREAST MILK

THE mother with a healthy infant, who takes the breast readily and who works diligently to obtain his food, usually has little trouble in supplying an adequate amount of breast milk. If, on the other hand, the child is weak, takes the breast reluctantly, or the milk is tardy in making its appearance in the breast, artificial means must be employed to bring about the desired results. Various methods of increasing breast-milk have been used, four of which will be considered here.

Drugs.—Practically every drug known to man, various proprietary and patent medicines, as well as malt and spiritous liquors, have all been employed for the purpose of breast development. Each in turn has proven of no value. Some drugs may increase the amount of milk in a given time, by acting upon the minute muscle fibres in the breast and thereby hastening the flow, but the total amount secreted in twenty-four hours remains unchanged. A mother, however, may require a tonic which, by improving her general health, indirectly increases her ability to manufacture milk.

Massage.—The effect of massage, manual or

electrical, is more or less beneficial. This with hot and cold applications, followed by suction with the breast pump undoubtedly results in an increased amount of milk. The method, however, is tedious, expensive, and requires trained workers to carry it out successfully, and then usually attains less definite results than one could wish.

Diet.—The influence of diet on breast milk has long been a mooted question. A lactating mother should have additional food and liquids to compensate for the daily loss of each through the milk secreted. Carefully controlled experiments have shown that if the mother has a glass of milk, one egg, or its equivalent in meat each day, the protein content of her breast milk will be normal. Even if her diet is wholly inadequate for two, it does not necessarily result in a diminution of the milk supply, for one of the laws of nature is that a mother shall furnish food for her offspring even at the expense of her own nutrition. Except among the very poor, a mother's diet is usually adequate from the standpoint of calories. The vitamin content of her food has no effect on the quantity of her milk but only upon its efficacy. Probably the most common mistake in practice is to overfeed a nursing mother, especially upon a milk diet. The idea prevails extensively among the laity that cow's milk poured into the stomach

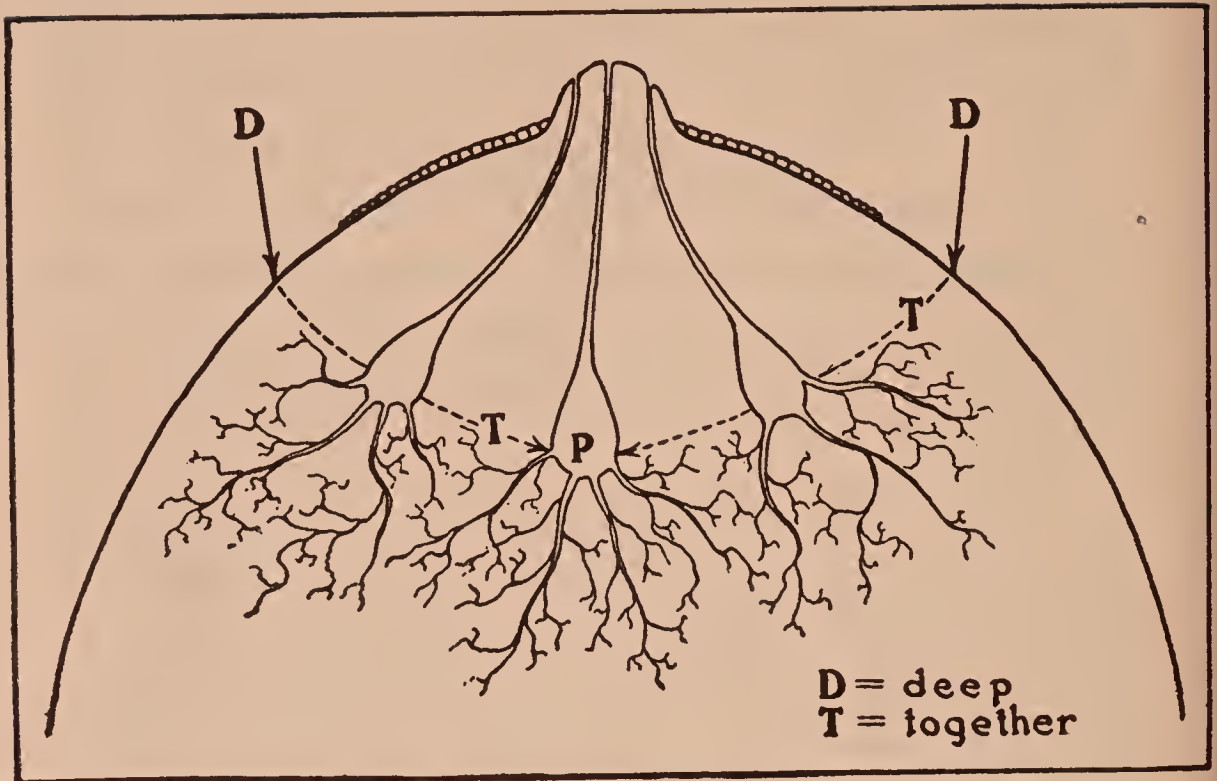


FIG. 18.—Illustrates the movements needed to force milk out of the little pockets "P" in which it collects. Place a finger and a thumb on opposite side of the nipple at "D" and "D". Press deeply into the breast in the direction of the black arrows. Then compress the breast together in direction of the dotted line toward point "P". This will force the milk out of the ducts in streams. "Deep" and "together" express in two words the motions required.

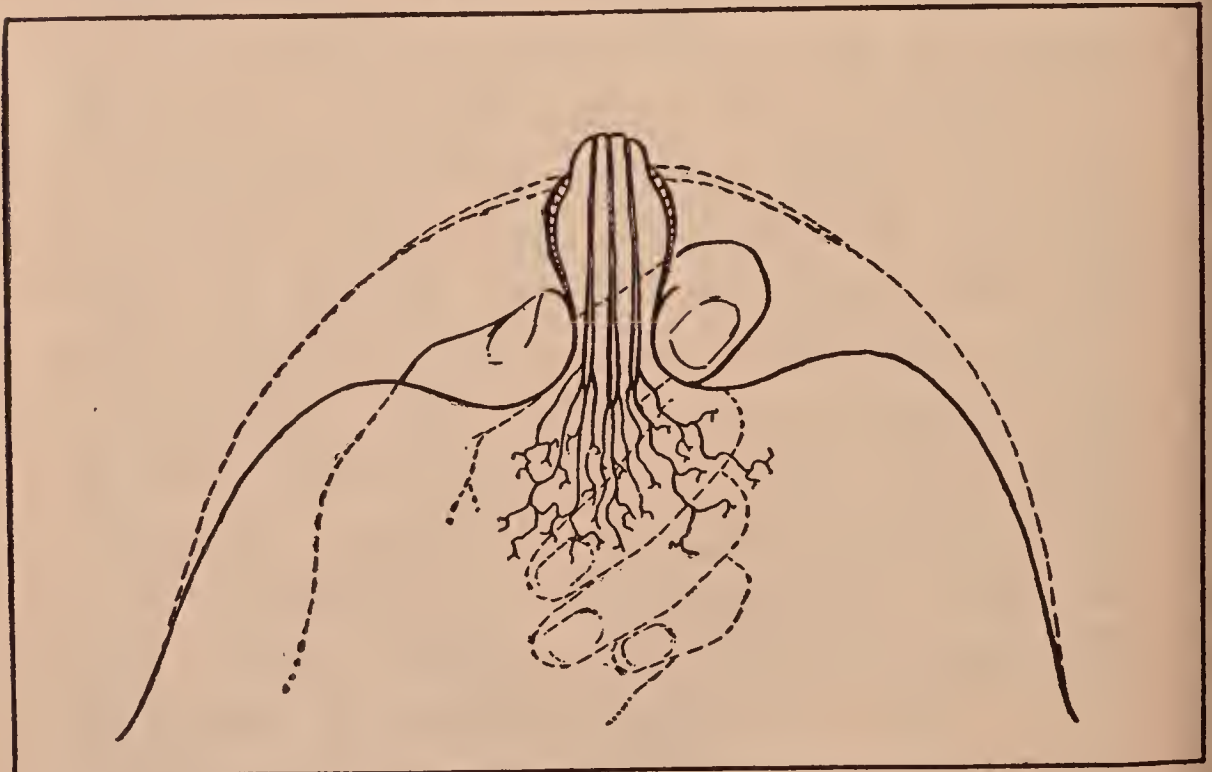


FIG. 19.—Diagram showing the method of expressing the milk from the breast by compressing the milk pockets between the thumb and forefinger. The three unused fingers may be folded as indicated or used to support the breast. This represents the second or "together" motion.

appears again in the mammary gland. Instead it usually fattens the mother, often disagrees with her, and if the breasts have begun to dry up, they continue in that course. Breast-milk cannot be increased by forced feeding of the mother.

Manual Expression.—The fourth method of increasing breast-milk is expression by hand. Soranus, of Ephesus, as early as A.D. 100, recognized that complete emptying of the breasts increased their activity. The whole foundation for the theory of manual expression lies in this truth. A parallel case exists in the animal world. It is a well-known fact among dairymen that the only way to maintain a full flow of milk for an adequate length of time in their dairy cows is to empty the milk ducts completely at regular and systematic hours, and that if this routine be in any degree interfered with, a reduction in the amount of milk is readily noticeable. Emptying of the human breast is best accomplished by means of a robust infant. When, for any reason, the child fails to do his duty, then we must give him assistance. Why manual dexterity in this art has been so long neglected is one of the mysteries of medicine. There are various text books which make reference to milking out the breast by hand, but until recently there was none very explicit as to the details of the process.

*Technic.**—We had used manual expression with success in various cases, but when on Red Cross duty in Italy and France during the war, we attempted to teach the method to the doctors and nurses who couldn't understand English, it was found necessary to make a more careful analysis of the motions constituting the process. In consequence, the following formula was evolved. First: with the thumb above and finger below, about one inch from the nipple, press deeply and firmly backward into the tissue of the breast; the "deep" motion. Second: maintaining this pressure, with the same fingers compress the breast behind the base of the nipple: the "together" motion shown in Figs. 18 and 19. This forces the milk out of the little pockets in which it accumulates. The fingers do not move forward nor change their position on the skin during the process. Only one hand is required for expression; the other holds the glass which receives the milk. With a little practice this motion can be repeated fifty to one-hundred times a minute. If manual expression is properly performed the milk comes in *streams*, not in *drops*. When one can project the milk streams

* Our original description of the technic of manual expression, published in 1919, included three motions. Additional experience in teaching, however, has shown that the third motion "out" is unnecessary and often misleading. The words "deep" and "together" describe more accurately and correctly the motions involved.



FIG. 20.—First position in the expression of breast-milk from a large, pendant breast, showing the thumb and fingers properly placed and pressing backward.



FIG. 21.—Second position, showing compression of the breast between the thumb and fingers, well behind the nipple, and the milk coming in streams.



FIG. 22.—Second position showing the thumb and finger pressed deeply into the breast, at the same time compressing the breast well behind the nipple. This deeper pressure is necessary in a round, virginal-shaped breast.

a distance of three feet from the nipple he has properly mastered the technic.

The accompanying diagram (Fig. 18) illustrates the anatomical structure of the breast and the reasons for the motions outlined above. Fig. 19 shows the proper position of the finger and thumb with reference to the nipple; Fig. 21 the resultant streams of milk when the "together" motion is correctly executed. In Fig. 20 we have a photographic representation of the same position of the fingers shown diagrammatically in Fig. 18.

CARE OF EXPRESSED MILK.—The hands of the mother or nurse, who is to express the milk, should be carefully washed in warm water and soap. The nails should be well cleaned and short enough so as to cause no abrasion upon the breast. No antiseptics should be used upon the nipples, but they should be cleansed with soap and water at the daily bath. Just before manual expression they should be gently sponged with warm, sterile water. The milk is then expressed into a glass or large-mouthed nursing bottle, which has been thoroughly sterilized. The sterilizing is accomplished by placing the bottle in cold water, which is slowly brought to a boil and boiled hard for ten minutes. The fingers or nipples should not be allowed to touch the inside of bottle, the contents of which should be emptied into a larger sterile receptacle often enough to prevent the milk overflowing. A nursing bottle is large enough to hold the usual amount expressed from the breast at one time without emptying, and the same

bottle can be used for feeding at the next nursing period. When the breasts are completely emptied, the bottle of milk should be carefully covered and kept on ice until the next feeding time. It is then given to the child after he has obtained all he can from the breast by his own efforts. The milk may be warmed by placing the bottle with nipple adjusted into a pan of water, which in turn is heated over the fire. To test the temperature of the milk let a drop fall upon the inside of the wrist. It should feel only lukewarm to the skin.

Conduct of Case.—In treating these cases of breast development our procedure is as follows: At the nursing period the babe is put to the breast and encouraged to take all he can get in twenty minutes, spending half on each breast. The mother or nurse then expresses by hand what remains, allowing at least ten minutes for each breast. Even though at first the supply of milk is exhausted sooner, this amount of time should be given to expression as the milking motion further stimulates the secretory function of the breast. The expressed milk is kept on ice and is given the infant from the bottle following the next nursing. If this is insufficient for the child's needs an additional amount is given of an artificial mixture. In order that the latter may taste as much like the mother's milk as possible, milk sugar should be used for sweetening. Each day, as the

breast milk increases, the amount of artificial food is proportionately reduced. Usually, after a few weeks, the bottle may be discontinued entirely. As the child gains in strength, he is able to exert more and more suction, so that he secures an adequate amount directly from the breast. All food, either maternal or artificial, given from the bottle, should come through a nipple with a very small opening. The babe should work as hard to get his food from the bottle as from the mother's breast. If the former comes too easily, the child will grow lazy, and not exert himself at the breast.

Classification of Abnormal Cases.—There are several types of cases one encounters in this work of insuring breast-milk for every baby and these may be classified under three general heads:

1. Establishment.
2. Reestablishment.
3. Development in case of:
 - a—Spastic nipple muscles.
 - b—temporary reduction.
 - c—Weak baby.

Establishment.—The establishment of a flow of milk usually is accomplished without difficulty if undertaken within two weeks after the birth of the child. In some instances, tiny babes are with difficulty induced to take the breast, and some do not nurse well for two or three weeks. Such a failure on the part of the child, results

in a stimulation of the mammary gland insufficient to establish an adequate secretion. This stimulation must then be supplied by other means. The babe should be placed to the breast at the regular feeding time and the milk should be expressed directly into his mouth. The act of swallowing reacts on the muscles of the mouth so as to develop the suckling reflex. As the child grows and gains in strength, he begins to draw lustily for his food, and soon there is no further need of manual expression. In such cases, if the child is given no assistance, the mother later reports that the milk "never came" or "was very meagre in amount, and what little did come affected the child unfavorably." In reality, the fault is not in the milk at all, but in the failure of the child to take what there is and increase this amount by proper suction. *The breasts must be emptied regularly to stimulate an increased flow.* By perseverance, even foster mothers have been able to establish a secretion of milk more or less adequate to nourish the adopted child. In Oriental countries, grandmothers frequently nurse their daughter's children. With such instances to confront us, no normal mother should doubt her ability to suckle her babe.

Reestablishment.—Reestablishment of breast milk becomes necessary when for any reason the milk has been allowed to dry up prematurely. If the babe has been weaned for six

weeks or less, our rule is to put him back on the breast and attempt the reestablishment of a flow of milk. In exceptional cases, the attempt has been made where the child had been weaned for a much longer period. Often the breasts have shrunken almost to their virginal size; only a small drop of milk can be expressed and this with considerable difficulty. Such cases require the most patient effort, but success awaits the persevering mother and physician. In view of the life-saving, health-promoting value of breast milk, every effort at reestablishment becomes an imperative duty.

In Milan, Italy, at the opening of our Red Cross Refugee Hospital, the only nurse was an illiterate Italian woman without hospital training. Almost immediately, we received two little souls who had been born in box cars during the "Great Retreat." Both had been weaned, one for eight and the other for eleven weeks. We put them back on the breast, and had each mother nurse her child every four hours. The nurse would then express all remaining milk. Following each nursing, the babe received the milk expressed after the previous feeding, and in addition a complementary feeding of cow's milk. The amount given from the bottle varied inversely as the amount procured from the breast, growing less each day as the flow of milk increased. As the little ones grew stronger, they emptied the breasts more completely, thus stimu-

lating further production, so that in a few weeks both babes were being fed naturally and growing steadily.

Development.—This phase of the subject is our most common problem, and comprises those instances in which a babe on the breast is making an unsatisfactory gain. Many mothers need to make some effort at development, if they are to nourish their infants for the full nine months. Whenever a breast-fed child persistently fails to gain, it indicates that for some reason he is getting an insufficient quantity of food.

SPASTIC NIPPLE MUSCLES.—The tense, unyielding nipple muscle is one cause for the babe's inability to secure an adequate amount from the breast. When a physician, accustomed to manual expression, finds that it takes all the strength of his fingers to force the milk through the nipple, he can appreciate what a heroic effort the tiny babe is compelled to make to secure his food. This difficulty is encountered even in women who have previously borne children. Spastic nipples are occasionally found in a woman who has had her first child rather late in life, and who is "firm knit," that is, has tense, hard, firm muscles. Spastic nipples seldom occur in the soft, pendant breast, but more frequently in the firm round, virginal-shaped gland. The only remedy for the trouble is manipulation and massage to loosen the tenseness of the muscles so that they will more readily release the



Fig. 23.—Child of six weeks suffering from starvation, due to mother's spastic nipples. Manual expression increased the milk and relaxed the tight nipple muscle.



Fig. 24.—Child shown in Fig. 23 is here seen as a husky, breast-fed youngster of ten months.



FIG. 25.—Breast-fed child of three months slowly starving from insufficient nourishment due to weakness of suction. Weight at birth five and one-half lbs. (Home scales). Weight at three months, six and one-eighth lbs.



FIG. 26.—Same child shown in Fig. 25 after three months of breast development. Weight at six months, thirteen and one-eighth lbs; gain in weight seven lbs.

milk from the ducts. Manual expression accomplishes this end, and at the same time secures the needed sustenance for the child. A typical case of spastic or hypertrophied nipple muscle is herewith presented. The mother came to our clinic with a tiny, wizened, emaciated infant six weeks of age. She had been nursing him regularly and faithfully, but he steadily continued to lose in weight, cried a great deal, was severely constipated, and, if permitted, would nurse for an hour and a half at a time. Upon examination the mother's breasts were found to be hard, round, and full of milk; manual expression procured only a few minute drops and even that required great muscular effort. The difficulty was explained to her and she was taught to express the milk by hand. At first, her most patient effort secured less than a teaspoonful at a time; but in a few weeks the milk had increased in amount and the muscles had relaxed to such an extent that she was able to express the milk freely. The babe (Figs. 23 and 24) who had been getting only two-thirds of an ounce per feeding at the breast, was able a few weeks later to secure by his own efforts all that his body required. Such spastic nipples never become as yielding as those that permit the milk to ooze out freely at all times, but the difficulty can be overcome to such an extent that the child may secure his full allotment of food directly from the mother's breast. It is better that he should

have to draw lustily for his food than to secure it with no special effort on his part.

Temporary Reduction.—A temporary reduction in the amount of milk may result from an acute illness of the mother, from severe fright, from intense or sudden grief, or, occasionally, from the recommencement of menstruation. The earlier in the life of the child this reduction occurs, the more serious are the results. The amount of milk secreted is proportionately smaller and the child has less reserve strength to withstand even a temporary diminution in the amount of his food, and, therefore, less power to aid in bringing the breast-milk back to a normal amount. Assistance must be rendered him in order that the temporary reduction may not become permanent and a complete loss of milk result. Manual expression should be employed until an adequate flow is reëstablished and the child is again gaining normally.

Weakness of Baby.—The most common cause for an inadequate quantity of breast-milk is the child's inability to do his part. A weak baby cannot exert strong enough suction to develop a sufficient secretion of milk. His weakness may be due to prematurity, immaturity, acute illness, or partial starvation. Many twins at birth are subnormal in weight, and this immaturity renders them incapable of exerting themselves sufficiently to develop milk secretion. A severe "cold" with obstruction of the nasal pas-

sages, so that the babe must stop nursing to breathe, may prevent his emptying the breasts properly.

In all these cases of *insufficient breast-milk*, whatever the cause, manual expression should be employed as long as is necessary to establish and maintain a proper secretion of breast-milk. In the case of a weak baby or spastic nipples, a wet-nurse with a robust infant can be employed to good advantage. The mothers exchange babies at nursing times. This works benefit in two ways: the weaker child obtains sufficient nourishment with less effort and thus gains strength to draw harder, while the stronger suction of the other child upon the poorly secreting breast, rapidly stimulates production there. Manual expression is simple enough to be mastered by anyone, and has been taught successfully to mothers, doctors, and nurses in America, England, France, and Italy. No case has yet been encountered where breast-milk could not be developed with proper perseverance, if undertaken within six weeks after the weaning of the child. Some authorities maintain that breast feeding is contra-indicated in women who have not been able to nurse former children. That this is no criterion the following case aptly illustrates. A mother came from a distant city with her fifth child, a babe of seven weeks. She had never been able to furnish breast-milk for any of her children and

all had been artificially fed. One had died from malnutrition at the age of four weeks. With the fifth baby, she had made an unsuccessful effort at breast feeding for two weeks, at which time artificial feeding was resorted to. After five weeks on the bottle the child was brought in weak and emaciated. The mother was informed that the babe must have breast-milk, and that the establishment of an adequate flow in her own breasts was entirely possible. The mother and child were placed in a hospital, and instruction was given as to the method of manual expression. To the mother, the effort was amazingly successful; the babe thrived, and after seven weeks was entirely breast-fed. A year later a letter from the grateful father, contained the following: "This last baby is better natured, healthier, brighter, and more normal than any of the others, all of whom were bottle-fed." Previous failures at breast feeding need not discourage any mother from attempting breast development.

Two Cases in Detail.—To demonstrate more fully the value of manual expression in developing breast milk, two cases are presented in detail; one of which illustrates the development, the other the reestablishment type. The first shows also to what dietetic extremes mothers will go in their endeavor to increase the flow of breast-milk.

DEVELOPMENT CASE.—This mother came with

the statement that her milk was drying up, that it "caused vomiting," and that a physician had told her that her milk was "poor in quality." She stated that her daily diet consisted of three regular meals, with the addition of fifteen pints of milk, six or more cups of tea besides broth, soups, and in defiance of prohibition, a bottle of beer. Furthermore, she said that she disliked milk, and that it constipated her. The baby, a second child, was normal in every way, and weighed at birth $6\frac{1}{2}$ pounds (hospital scales). It had been fed at the breast every three hours, and for eight days past had received in addition after each nursing, three ounces of an artificial milk mixture. It was 21 days old when seen, and weighed two ounces less than at birth. The mother was assured that her breast-milk was doubtless normal in quality, and she was allowed to discontinue drinking milk and was directed to eat a normal, balanced diet. The baby was put to the breast every four hours, being weighed before and after nursing. The mother was taught the method of manual expression, and was instructed to use it after each nursing. By weighing the baby before and after nursing, we definitely ascertained that it was getting only $7\frac{1}{2}$ ounces from the breast per day. This was far below its requirements, both as to liquid and calories. That the baby was ill and losing in weight was inevitable, while the conclusion of those in charge that the milk was disagreeing

was a natural one. The child being weakened by starvation was unable to nurse a sufficient amount for its needs. There remained in the breast a residue of $10\frac{1}{4}$ ounces of milk. This was expressed by hand, and given to the baby as complementary feedings. Completely emptying the breasts five times a day rapidly increased the milk. Thirty-four days later, the amount obtained from the breast by direct suction had increased from $7\frac{1}{2}$ ounces to 20 ounces, a gain of 266 per cent. The child had increased $4\frac{1}{8}$ pounds in weight, a gain of 65 per cent. The mother began giving a pint of breast milk each day to charity and bemoaned the fact that she didn't have twins. The results are tabulated below.

Development of Breast Milk

Case No. 681

Date	Age	Weight	Milk obtained in 24 hours	
	Days	Pounds		Ounces
May 17	21	6 $\frac{4}{16}$	By child	$7\frac{1}{2}$
			By hand	$10\frac{1}{4}$
			Total	$17\frac{3}{4}$
June 20	55	10 $\frac{6}{16}$	By child	20
			By hand	18
			Total	38

Reestablishment Case.—This case was the second child of healthy parents. As the mother was unable to nurse the first child, no better

results were expected with the second one. After two weeks of unsuccessful effort, the baby was put on goat's milk. Though it weighed $6\frac{3}{4}$ pounds at birth, when seen at five weeks it weighed only $6\frac{1}{2}$ pounds. The child was still losing in weight, was vomiting frequently, and cried day and night. Following an explanation of the necessity of maternal feeding, the mother was assured that, if she did her part, the flow of milk could be reëstablished, even though the baby had been weaned for three weeks.

Method.—The goat's milk was discontinued, and the following formula substituted:

Whole cow's milk 6 ounces

(Boiled 1 min.)

Cereal Water 12 "

Milk Sugar 1 "

The child was placed to each breast for ten minutes, six times daily, and was then given from the bottle 3 ounces of the formula. Manual expression was employed after each nursing. At first the baby secured no appreciable amount from the breast, while expression gave only a few drops. At the end of the second week, the amount obtained by direct suction and by hand amounted to $6\frac{1}{4}$ ounces daily. As the breast-milk increased, the complementary feedings were proportionately diminished. In three months time, the secretion from the breast had increased from a few drops to practically a

quart daily, an amount sufficient to nourish adequately a child of that age. Watching the development of this child during nearly three years has been a distinct pleasure. The difference in the physical condition of the two children of this household is beyond comparison. Contrasted with the perfect teeth, strong chest, straight limbs, smooth skin, and glossy hair of the breast-fed child are the discolored, decayed and broken teeth, the thin bow-legs, pointed and grooved chest, pale skin, and harsh, stiff hair of her older brother who was denied his birth-right. The tabulated results of this case are given below.

Reestablishment of Breast Milk

Case No. 637

Date	Age Weeks	Weight Pounds	Breast Milk in 24 hours Ounces
Jan. 27	5	6 7/16	0
Feb. 12	7	6 6/16	6¼
Feb. 20	8	6 8/16	9¾
Mar. 1	9	7 3/16	15½
Mar. 11	11	7 13/16	20¼
Mar. 25	13	8 12/16	21½
Apr. 8	15	9 7/16	27
Apr. 30	18	10 11/16	30½

There is a vast amount of missionary work to be done in spreading the gospel of breast feeding. The benefits of maternal feeding are

being promulgated in many places by various organizations and individuals. Results are everywhere apparent. Whereas a few years ago artificial feeding seemed about to displace breast feeding, now the latter has become so general that few infants are entirely deprived of maternal sustenance. This is one of the reasons why the infant death rate has been lowered so materially in nearly all parts of the country. The ultimate effects will be more apparent in the next generation, for breast feeding not only saves lives but insures a stronger, sturdier race.

CHAPTER VIII

CARE AND FEEDING OF THE PREMATURE INFANT

THE life of a premature infant is as dependent upon its care as upon its food. It is, therefore, hardly feasible to consider a diet for these handicapped little beings, without giving some consideration to their general care.

Premature.—The term “premature,” correctly used, applies to an infant who quits the uterus before the end of nine months gestation. The cause may be chronic or acute illness of mother, fright, accident, overwork, twins, etc. If the birth occurs before the sixth month, there is no possibility of saving the child’s life, and this is rarely possible in one born before the seventh month of gestation. Many seven-month infants live if they have proper care from the very first. There is no other babe that needs the constant, persistent, painstaking, and scientific care that a premature requires. Many cases that succumb do so because this exacting care and attention have been denied. Some authorities claim that a child must have completed the seventh month of uterine life, and must weigh at least three and a half pounds, in order to be strong enough to endure extra-

uterine existence. However, there are some cases on record of babes who have been born at six or six and one-half months, and weighing not more than two and one-half pounds, who have made a successful fight for life. It is always worth while to try to save any babe who makes its exit from the mother's womb alive.

IMMATURE.—By the term “immature,” is meant a child who has not a normal development at birth. This includes, of course, prematures, but all immature infants are not necessarily premature. Illness on the part of the mother, lack of a well-balanced diet, overwork, and similar causes, may produce an immature infant even though born at full term. However, whether the child be premature or only immature, the conduct of the case is largely the same. The problems presented are identical: to simulate as nearly as possible the intrauterine conditions, until the time arrives when the child is mature enough to face the world as a normal infant.

Characteristics.—There are certain definite and pronounced symptoms which characterize the premature infant. The thin, undersized, oldish looking babe with its claw-like hands and weak, wailing cry is a more or less familiar picture. The skin either seems stretched across the bones or is much wrinkled, as if too large for the infant it covers. In either case, there is no layer of fat under the skin, which tends to

be dry and cold. The premature may feel as cold and clammy as a frog. The skin easily becomes blue or purplish in appearance with a deeper hue about the eyes; the nails of fingers and toes may be only partly formed; the skull, like all other bones, is unusually soft and the fontanelles are wide open. This lack of nails and the softness of the bones is accounted for by the fact that it is largely during the latter weeks of pregnancy that minerals are supplied to the babe from the mother's body. The premature usually lies in a somnolent condition, and this is well, as it has neither strength nor development for much activity.

Care.—The chief object of concern in the care of the little premature is its instability of body temperature. It is truly a cold-blooded animal and almost wholly dependent upon outside sources for its body heat. This must be established immediately after birth, and must be maintained at all times. In cases where the temperature is allowed to fall, it sometimes takes days to bring it back to normal. Immediately after birth, the child should be rubbed with olive oil, wrapped in cotton wool, then in blankets and placed in an incubator. This latter may be one of the patented kinds, but if this is used, the top should be removed, as the premature child needs fresh air as much as any other. A failure to realize this fact has caused the suffocation of many babes in incubators. A large basket

heated with hot water bottles has proven quite as satisfactory. The basket should be lined with oil cloth or rubber sheeting to prevent drafts or escape of heat; upon this in the bottom of the basket are placed three hot water bottles, which, in turn, are covered with a two-inch pad and blankets. The bottles are refilled every two or three hours with water at 120° F. (49° C.). By means of this contrivance an even temperature of 80 to 85° F. (29° C.) inside the clothing can be maintained. The rectal temperature should be taken at least twice daily and should be maintained between 98 and 100° F. (37-38° C.). The babe should be handled as little as possible, and should not be given water baths. Instead, oil rubs are used. For diapers, small pieces of cotton-wool should be used. The room should be kept at a temperature of about 70° F. (21° C.) and should have some arrangement for change of air. This method of care is continued until about the time the child would have completed its nine months of uterine life, or until he is thriving well and growing normally.

Feeding.—Next to the very important subject of the care for these little weaklings is the equally important question of food. All that has been said previously as to the urgency of maternal feeding for the normal infant, can be repeated even more emphatically for the premature. The rule may be laid down that a premature who does not obtain breast-milk

has little chance of living. Since he has been denied his full rights before birth, every effort should be made to compensate for this in the only way possible—by giving him maternal sustenance outside the uterus in the form of breast-milk. This is necessary not only to insure life, but to overcome the tendency to rickets which all prematures exhibit, due to the lack of sufficient calcium in the bones at birth. If the maternal flow of milk is tardy in establishing itself, a wet nurse should be employed, or expressed breast-milk, obtained from some other source, should be given. At the same time, every effort should be made by manual expression and, whenever possible, by the suction of a sturdy, normal infant, to establish a flow in the mother's own breasts. Usually a premature is too weak and under-developed to nurse normally even when there is a goodly secretion of milk. In all such instances, the milk should be expressed by hand into a sterilized glass or large-mouthed bottle and fed to the babe by means of a stomach tube or a Breck feeder (Fig. 27). It may be advisable to dilute the breast milk with water for a time, as the babe may not handle the whole milk well. A premature has a larger food requirement than the normal full-term infant in proportion to size, and must not be starved. He must not be overfed, however, for this leads to indigestion, which no premature can afford to face. An amount of food equal to about one-

sixth his body weight is a good rule to follow. This should be given at regular intervals, not less than three hours apart, and excellent results have been obtained on the four hour interval, with six feedings in the twenty-four hours. Water is usually unnecessary, but if the skin be dry, or if vomiting be present, it may be administered by mouth or by bowel. The premature should be weighed weekly on accurate scales. At first, his gain need not be more than four ounces a week, but later, it should be from five to seven ounces. As soon as the child has attained sufficient size and strength, he should be put to the breast and taught to nurse. He must be kept awake during this effort, and may be encouraged to "draw" by having the milk expressed into his mouth directly from the mother's breast. His muscles contract with this stimulation, and the act of suckling is accomplished.

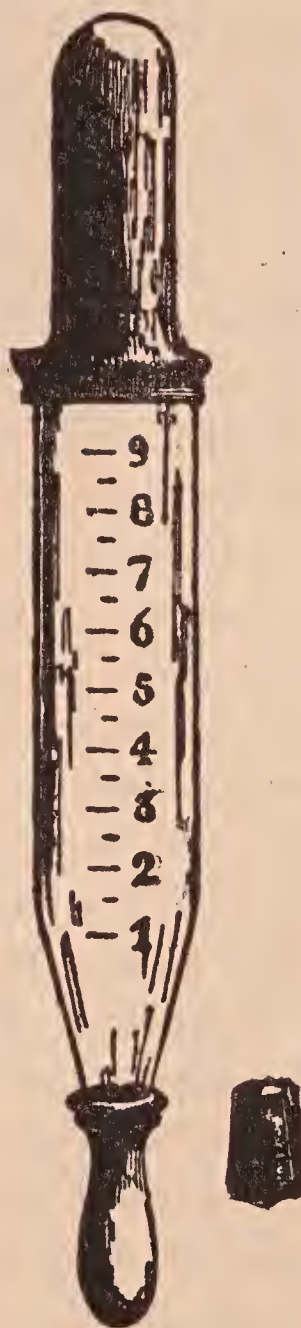


FIG. 27.

TENDENCY TO INFECTION.—Every precaution should be taken to safeguard the handicapped premature from infections of all sorts, as

he is even more susceptible to them than the normal infant. An ordinary "cold" may be the fatal last straw to his already heavy burden of maintaining life. A person suffering from any form of coryza, common "head cold" or any other infectious disease, should be barred from contact with the child. This is so important that if the mother is thus affected, she should wear a mask while nursing or attending the child, or whenever she comes within seven feet of him. This rule applies admirably also in normal cases.

Later Care.—If the mother, with the aid of competent attendants, has been able to bring her little premature through the first trying three months, and has a healthy, growing, breast-fed youngster at the end of that time to reward her for her efforts, then she has done something worthy of all praise. It is seldom that a child born much under term escapes rickets, though with proper breast feeding this may be prevented from attaining alarming or disfiguring proportions. Because of this tendency, solid food should be added to the diet at an earlier date than is usually done. Vegetables, fruits, and cereals should be given by the fifth or six month, with special attention to those containing the vitamins and minerals. Slow development and a tendency to nervousness are evidences of premature birth that often persist far into childhood. Hence all the child's food

should be so selected as to correct these undesirable results as far as possible. In some cases, it is wise to delay his entrance into school until the seventh year, so that any tendency to slow mental or physical development may not prove a handicap when he meets his fellows in the school room.

Note.—As an illustration of what can be accomplished in the case of a premature with proper care and breast-feeding, the reader is referred to the frontispiece. This child, born two months prematurely, weighed only $2\frac{7}{8}$ pounds at birth. He is here reproduced at the age of 6 months.

CHAPTER IX

DIET FROM SIX TO TWENTY-FOUR MONTHS

MANY children, who experience little or no digestive disturbance while on breast-milk, exhibit all sorts of troubles soon after they are weaned. Mothers who realize the necessity for some sort of routine and for some degree of care in feeding a young infant, often discard all precautions as to the child's diet, as soon as the first teeth appear. Such children are allowed to partake of the same food as the adults of the family, without any regard to seasoning, digestibility, nutritive value, or vitamin content. Many parents complacently boast, that: "Year-old Johnny eats anything the rest of us do." Pickles, rich pies and pastries, puddings, sweets, peanuts, salads, ice cream, and quantities of candy are consumed by very young children in many households without a thought on the part of the parents. From such injudicious and indiscriminate consumption of unsuitable foods arise various digestive disorders. These may manifest themselves at once as acute disturbances, or may assume a slower and more insidious form, such as chronic malnutrition or the indigestion of later life. Care equal to

that applied to the feeding of nurslings should be directed to the gradual change from breast feeding to the general diet of older children.

Before the Sixth Month.—If a child is properly and adequately breast-fed, there is usually but one addition to the breast-milk necessary before the sixth month. Some form of the C vitamin should be given by the third month, for even mother's milk is sometimes deficient in this food factor. This is best administered in the form of orange or raw cabbage juice, diluted with equal parts of water. It is advisable to give this about an hour before one of the nursings, preferably the forenoon feeding. At first, only a teaspoonful should be allowed, and this is gradually increased until, by the fifth month, the child is receiving at least two tablespoonfuls daily. The babe, should also be encouraged to drink from two to six ounces of water daily during these early months; this should be boiled and allowed to cool, and may be taken at first from a bottle or spoon, and later from a cup.

DIET AT SIX MONTHS

Schedule

- 6 A.M. Breast feeding.
- 9 A.M. Orange juice or raw cabbage juice (2 tablespoons).
- 10 A.M. Cooked cereal, breast feeding.
- 2 P.M. Breast feeding.
- 6 P.M. Cooked cereal, breast feeding.
- 10 P.M. Breast feeding.

During the time the child is wholly breast-fed, he is dependent for his minerals upon those stored up in his body before birth, and upon those he receives from his mother's milk. By the sixth month, his reserve is becoming depleted, and the mother's milk furnishes an inadequate supply; this is especially true of iron, as a nursing mother is very likely to become more or less anæmic. Also, as the supply of breast-milk may cease to be sufficient for a rapidly growing child, it is best to add some additional food by the sixth month. At times this is necessary as early as the fifth month. However, as we are here considering the normal, healthy infant, and as variations from this need special medical attention, we will advise no additional food until the sixth month. Cereals, well cooked, can be safely given to a child at this age, beginning with two teaspoonfuls and gradually increasing the amount during the month, up to two or three tablespoonfuls per day. It is advisable to begin with refined cereals. Later on, the whole grain preparations will replace these. Pearls of Wheat, Wheat Hearts, Farina, or Cream of Wheat may be used at this age. These should be cooked for two hours in a double boiler. In place of the orange juice, tomato or raw cabbage juice may be used, the latter prepared as described on page 34.

Method of Feeding.—The cereal should be

given without milk and with only a sprinkle of sugar, if any is used, and should be fed from a spoon rather than from a bottle. There are two reasons for this: first, he must learn to eat from a spoon to facilitate matters when weaning time arrives; and second, if the cereal is given through the nipple, it must, of necessity, be so dilute as to be practically a liquid. When thus diluted, it gives the child no chance to learn to handle solid food, which is a more important matter than many persons realize. An early effort should be made to teach the child to use his jaws, tongue, and later his teeth for mastication, and to discourage the lazy method of merely swallowing his food. This exercise develops the jaws and teeth, and aids digestion by inducing a greater flow of saliva.

DIET AT SEVEN MONTHS

Schedule

- 6 A.M. Breast feeding.
- 9 A.M. Orange juice or raw cabbage juice.
- 10 A.M. Cereal, breast feeding.
- 2 P.M. Vegetable juice or soup, toast or zwieback, breast feeding.
- 6 P.M. Cereal, breast feeding.
- 10 P.M. Breast feeding.

VEGETABLES.—If a child has been gradually accustomed to taking cereals from the sixth month, there will be little difficulty in adding vegetable juices and soups when he reaches the

seventh month. This, of course, must be accomplished gradually and sometimes is done most easily by combining with the cereal. By vegetable soups, is meant merely the water in which vegetables have been cooked, which contains many of the elements of the plants themselves. If vegetables are cooked in small amounts of water, the juices will be quite concentrated. By commencing with these, one avoids the disturbances that sometimes result if the whole vegetable is given this early. At the same time the child is becoming accustomed to the taste he benefits by the minerals contained. Few children show a dislike for vegetables, provided these have been given during the first year. Whereas, if one waits until the second or third year as was formerly done, it is almost impossible to inculcate a liking for certain vegetables, which usually happen to be the ones most beneficial. Spinach and carrots are the two which meet with the greatest disapprobation in older children, who have failed to acquire a taste for them in infancy, while babes of eight or nine months consume them with a relish.

CEREALS.—Wheat Hearts, Cream of Wheat, Farina, or Oatmeal may be used and with these should be combined an equal amount of whole-wheat (graham) flour, that the child may have the benefit of the germ and the minerals of the whole grain. By the end of the seventh month

given without milk and with only a sprinkle of sugar, if any is used, and should be fed from a spoon rather than from a bottle. There are two reasons for this: first, he must learn to eat from a spoon to facilitate matters when weaning time arrives; and second, if the cereal is given through the nipple, it must, of necessity, be so dilute as to be practically a liquid. When thus diluted, it gives the child no chance to learn to handle solid food, which is a more important matter than many persons realize. An early effort should be made to teach the child to use his jaws, tongue, and later his teeth for mastication, and to discourage the lazy method of merely swallowing his food. This exercise develops the jaws and teeth, and aids digestion by inducing a greater flow of saliva.

DIET AT SEVEN MONTHS

Schedule

- 6 A.M. Breast feeding.
- 9 A.M. Orange juice or raw cabbage juice.
- 10 A.M. Cereal, breast feeding.
- 2 P.M. Vegetable juice or soup, toast or zwieback, breast feeding.
- 6 P.M. Cereal, breast feeding.
- 10 P.M. Breast feeding.

VEGETABLES.—If a child has been gradually accustomed to taking cereals from the sixth month, there will be little difficulty in adding vegetable juices and soups when he reaches the

very hungry, he ate it all, and since that day refuses any bread except crusts, and these he prefers without butter. He learned how good these long-rejected crusts really were, and his mother accomplished more than she dreamed by her punishment.

DIET AT EIGHT MONTHS

Schedule

- 6 A.M. Breast feeding.
- 10 A.M. Orange juice or raw cabbage juice, cereal, toast or zwieback, breast feeding.
- 2 P.M. Vegetables (one tablespoon), toast, broth, breast feeding.
- 6 P.M. Cereal, toast, breast feeding.
- 10 P.M. Breast feeding.

At this age, the orange or raw cabbage juice may be given at the beginning of the 10 A.M. feeding rather than an hour earlier. A teaspoonful of butter daily should now be used on his toast or on his vegetables. During the month there are two important changes in the diet. The amount of solid food is gradually increased, and one feeding at the breast is discontinued. Although the schedule at the beginning is as indicated above, by the middle of the month the process of weaning is begun. The 10 P.M. feeding is usually the most easily discontinued. At eight months, a child is old enough to sleep from 7 P.M. to 6 A.M. without

any night feeding. When the 10 P.M. feeding is omitted he should receive a somewhat larger serving of cereal at 6 P.M. This, followed by the breast, usually satisfies him fully until morning.

BROTH.—During this month, broth made from chicken, beef or mutton, may be given. This should be cooled, all fat removed, and the broth should then be reheated before being fed to the child.

VEGETABLES.—Whole vegetables in the form of purée are now added to the diet. These should be prepared as follows: Vegetables should be cooked only until tender. (See page 36.) Spinach for example requires but ten to twenty minutes. Use as little water as possible, so that none need be drained off. Some of the most important properties of vegetables can be poured down the drain pipe of the kitchen sink. As soon as the plant is tender, it should be seasoned with salt and butter, or a little meat stock from which all traces of fat have been removed. As vegetables have too much fibrous tissue to be easily digested without thorough mastication, the vegetable portion of an infant's diet should be finely divided for him. This is best accomplished by rubbing through a sieve, and all vegetables should be so treated until the child is at least two years old. Spinach, carrots and

cauliflower may be safely given during the eighth month.

DIET DURING THE NINTH MONTH .

Schedule

6 A.M. Breast feeding.

10 A.M. Orange juice, cereal, 2 ounces milk (boiled one minute), toast, butter, breast feeding.

2 P.M. Broth, fresh vegetables (2 tablespoons), baked potato, butter, fruit, zwieback or cracker.

6-6:30 P.M. Cereal, 2 ounces milk (boiled one minute), breast feeding.

WEANING.—At the beginning of the month, the 2 P.M. breast feeding is discontinued. Two ounces of milk with the cereal is given twice daily; which to the ideally fed youngster constitutes his first contact with cow's milk. By allowing the child to nurse at the close of the evening meal, he has the breast to go to sleep on, and, if he is fully satisfied, will sleep soundly throughout the night. At nine and a half months, another nursing is discontinued, and two weeks later the fourth one is omitted. Many children will voluntarily wean themselves at about this age, but in any case the process is not difficult, if conducted gradually and systematically.

CEREALS.—The whole-grain cereals should now be used, and the healthy child of nine months experiences no difficulty in digesting them. In the list we may include whole wheat (graham) flour, rolled oats, cream of barley,

cream of rye, Pettijohns, wheat granules or cracked wheat, Scottish oatmeal or cracked oats. These may be soaked overnight and then cooked thirty minutes over an asbestos mat; or they may be cooked two hours in a double boiler, with or without previous soaking. The whole-grain cereals require a longer period for cooking than the refined ones. The toast should be made from whole-wheat bread.

VEGETABLES AND FRUITS.—To the vegetable list may be added kale, kohlrabi, Brussels sprouts, and fresh peas. All these should be prepared as previously directed, cooked in a small amount of water until tender, rubbed through a sieve, and seasoned with salt and butter. As soon as potato is added to the diet, there is a tendency to give it cooked in various forms and served with gravy. Only baked potato, served with butter, should be given to infants. Gravy should never be used with young children, as it is greasy, indigestible, and of no vitamin value. The fruits may now include apple sauce, baked apple, and cooked prune pulp.

DIET FROM TEN TO TWELVE MONTHS

At ten and a half months, depending somewhat on the time of the year and how well the baby is taking solid foods the last breast feeding

is discontinued, and shortly thereafter the following schedule adopted.

Schedule

- 7 A.M. Orange juice, cereal, milk 8 ounces (boiled one minute), toast and butter.
- 12 M. Soup, green vegetables ($\frac{1}{2}$ cup or 4 ounces), baked potato, or toast and butter, cooked fruit.
- 3 P.M. Cooked fruit pulp, small piece of toast or cracker.
- 6 P.M. Cereal, milk 8 ounces (boiled one minute), toast and butter.

AT ONE YEAR.—Thus at ten and one-half months, the child is completely weaned from the breast, and is having but three meals a day with a midafternoon lunch. These hours should be as closely adhered to as were the times of breast feeding. Remember that now the child needs regular habits, simple foods, and long periods of stomach relaxation as much as he has ever needed them. If these receive careful attention, he will experience no more difficulty than during the months of nursing. The benefit of breast feeding should not be counterbalanced by a careless later diet. The vegetables may now comprise quite an extensive list, such as, spinach, carrots, cauliflower, string beans, beets, peas, kale, kohlrabi, Brussels sprouts, and Swiss chard, all cooked of course, and put through a seive. Baked potato is per-

missible daily; soup may be made from chicken, beef or mutton, with the fat removed, and vegetables may be cooked in this broth. The fruits are as important as ever, both as food factors and to keep the bowels in good condition. The whole-grain cereals also have a function to perform in preventing constipation, which sometimes develops when the child begins taking cow's milk.

DIET FROM TWELVE TO FIFTEEN MONTHS

Schedule

- 7 A.M. Orange juice, cereal, milk 8 ounces, (boiled one minute) toast and butter.
- 12 M. Soup, green vegetables, baked potato, cooked fruit, butter.
- 3 P.M. Cooked fruit. zwieback, toast or cracker.
- 6 P.M. Cereal, milk 8 ounces, (boiled one minute) toast.

Directions.—To the whole-grain cereals may be added rice, white or brown, steel-cut oats and coarser cracked wheat. The fruits may now include cooked prunes, peaches, pears, figs and apricots. The soups and vegetables are the same as for the preceding period. A child of this age should receive one-half to one cupful of fresh succulent vegetable daily, measured after cooking. No fried foods should be used. Even the bacon is best broiled in a hot oven. About a cubic inch of butter may be given daily.

A little jelly or jam may be used at this age, if spread thinly upon the toast. Fresh cottage cheese may occasionally replace the cereal at supper; macaroni, rice, or spaghetti may be substituted for the baked potato at the noon meal.

DIET FROM FIFTEEN TO EIGHTEEN MONTHS

Schedule

- 7 A.M. Orange juice, cereal, milk 8 ounces, (boiled one minute) toast and butter.
- 12 M. Meat, green vegetable, baked potato (or macaroni, rice, or spaghetti) toast, butter, cooked fruit.
- 3 P.M. Toast or cracker with butter.
- 6 P.M. Cereal or cottage cheese, milk 8 ounces, (boiled one minute) toast and cooked fruit.

MEAT.—There are two methods of preparing the scraped beef which may be given at fifteen months.

1. A piece of raw beefsteak is scraped with a silver spoon, and the particles thus collected are formed into a small cake. This is broiled in a dry pan over a quick fire.

2. A piece of rare broiled steak is scraped with a thin-edged spoon, and the fine particles thus obtained are fed without further cooking to the child. A pinch of salt may be added.

Either of the above methods is equally good. The beef may be mixed with the child's baked potato. Begin with a teaspoonful of the beef and increase gradually.

DIET FROM EIGHTEEN TO TWENTY-ONE MONTHS

Schedule

- 7 A.M. Orange juice, cereal, milk 8 ounces (boiled one minute), toast, butter, fruit.
- 12 M. Meat, green vegetable, baked potato, or macaroni, cooked fruit or simple dessert, made without white of egg.
- 5:30 P.M. Cereal, 8 ounces milk (boiled one minute), toast, butter, cooked fruit.

Directions.—At this age, the afternoon lunch may be discontinued; to accomplish this successfully and without difficulty, the child should have been taught to eat a substantial dinner at the noon-hour. The noon-day dinner should be adhered to until the child enters school. The morning nap may be omitted, but following his midday meal he should have a long sleep. When he awakens, he may be given a drink of water and taken outside for exercise. This will lead him to forget his three o'clock lunch, and he will be able to wait comfortably for his evening meal, which may be given at 5:30 in order to shorten the afternoon interval. At this age he may have a tablespoonful or more of scraped beef. Simple desserts, such as jello, gelatin, corn starch, or arrow-root puddings, made with the yolks, but without the whites, of eggs, may safely be given. To the vegetable may be added asparagus tips, celery, baked squash and turnips. Chicken and fish, baked

or broiled and finely chopped are also handled easily by a child of this age.

DIET FROM TWENTY-ONE TO TWENTY-FOUR MONTHS

Schedule

- 7 A.M. Fruit juice, cereal, milk 8 ounces (boiled one minute), occasionally bacon, toast, butter.
- 12 M. Green vegetable, meat or an egg, potato or spaghetti, Corn bread, pudding or cooked fruit or custard.
- 5:30 P.M. Cereal or whole-wheat toast, 8 ounces milk (boiled one minute), fruit or custard and cooky.

Directions.—At this age we may begin gradually adding eggs, advancing very cautiously and watching for any signs of disturbance following their use. In any case, they should not be given oftener than three times a week, as the whites furnish a concentrated form of protein, difficult of digestion for many children. Meat and eggs should not be given the same day.

TOAST.—Whole-wheat bread, well toasted in a slow oven, should be used.

CEREALS.—Whole-wheat flour, rolled oats, cream of barley, cream of rye, Pettijohn's rolled wheat, wheat granules, Scottish oatmeal, brown rice, white rice, cracked wheat. Cook two hours in a double boiler or thirty minutes over an asbestos mat after soaking overnight.

VEGETABLES.—Spinach, carrots, string beans, beets, peas, cauliflower, kale, kohlrabi, Brussels sprouts, asparagus, celery, Swiss chard,

baked squash, turnips, baked potato and macaroni furnish a sufficiently large list to admit of choice and variety. These should be finely chopped, mashed well with a fork, or rubbed through a sieve.

MEAT.—Sweetbreads, crisp bacon, scraped beef, scraped lamb chop, chicken, fish, liver and kidney may be given in moderation, none fried except bacon. Liver is one of the most effective meat foods because of its richness in the A vitamin, and should be quite frequently used in the feeding of children. Chicken liver, stewed for an hour or less, may be easily mashed with a fork and fed without further treatment. Two recipes for the preparation of liver are here given.

Preparation of Liver for Cooking.—Wash and parboil for 5 minutes. Trim off skin and chop finely or put through meat grinder.

Liver and Rice

1 cup liver prepared as above
1/3 cup fine bread crumbs
3 tablespoons tomato juice
1/2 teaspoon salt
Mix thoroughly

Line casserole or baking dish with boiled rice and fill the centre with above mixture. Place in a pan of hot water, cover, and bake 25 minutes in moderate oven. Serve hot.

(See also page 215.)

Liver Paté

(Fowl or calf's liver may be used). Slice and boil twenty minutes in salted water. Drain. Mash well or put through food grinder. Rub up with liberal quantity of softened butter. For older children this may be served in sandwiches of whole-wheat bread.

Desserts.—These may include cooked fruits, such as peaches, apples, figs, prunes, pears, plums, apricots, tapioca, simple cakes, cookies, junket, jello, gelatin, baked custard, and other simple desserts containing eggs.

General Directions.—The child should be encouraged to drink plenty of water and should be given an abundance of green vegetables, and some raw fruit or vegetable each day, as orange or cabbage. All bread should be toasted. Precautions should be taken not to give too much milk, or meat, and not to use too much soft food. The practice of rubbing the vegetables through a sieve may be discontinued, and chopping or mashing thoroughly with a fork may be substituted. The child should be taught, long before this, to feed himself, and should be encouraged to eat his meal in a proper time, neither gulping it down unmasticated nor dawdling over it until his appetite is gone. If he does the latter, he will not take as much as he should, and in a couple of hours will be hungry

again. Not more than five minutes should be allowed for beginning his meal, and if he is not eating well by that time, he should be removed from the table and allowed to go without food till his next meal time. Every effort should be made to establish correct tastes and right habits of eating before the child is two years of age.

CHAPTER X

ARTIFICIAL FEEDING

EVERY child thrives best upon mother's milk. The benefits to the nervous, muscular, and bony systems of the body derived from maternal feeding can never be entirely duplicated by the most careful, scientifically controlled, artificial feeding. Human milk is intended for the digestion of the human infant and its chemical composition is suited to the special needs of his body. This is particularly true during the first weeks of life. If a child cannot have breast-milk for a longer period, every effort should be made to furnish it to him for at least three months. An infant who secures this portion of his birth-right usually acquires a sturdiness of physique, a resistance to disease, and a stability of digestion, which render a change to artificial feeding less disastrous.

Some sturdy infants seemingly do well from birth on cow's milk. Growth and weight, however, are not the only standards of success in infant feeding. There are far subtler effects upon the muscles, teeth, and nerves which do not become apparent until later in life. If to these are added the more immediate results of acute indigestion, the evil effects are many

times multiplied. During the first few weeks of life the difficulties arising from artificial feeding are frequently very great. The child has little tolerance for any artificial combination and his digestion is easily upset. The error is then made of thinking that the trouble is due to the special kind of food in use, and a change is made to some other brand. Frequently a poor little emaciated creature of four or five months has been the object of experiments with half a dozen infant foods, until his digestion is so weakened that it becomes a matter of the greatest difficulty to establish a tolerance for any food. It is a lamentable fact that the majority of infants who are subjected to bottle feeding are the ones least able to thrive upon it. They are very often the ones, who for some reason, have failed to make satisfactory gain on mother's milk and who already have acquired a lowered food tolerance because of digestive disturbances. What a mistake to take an already ailing child from the breast and subject it to the dangers of artificial feeding! Such a case frequently has a fatal termination.

There is usually just one reason for a child's failure to thrive on mother's milk, and that is an inadequacy in amount. This is due to insufficient suction on the part of the child, with resultant insufficient stimulation of the mammary glands. The child may be weak or pre-

mature; he may have a poorly developed suckling reflex, or a nasal or bronchial infection may interfere with his power of suction. Any of these conditions will prevent his taking enough from the breast to induce growth, and dyspepsia, apparent or real, follows. Such an infant is a poor specimen to be put on artificial feeding. Instead, the breast-milk should be increased, directions for which are given in Chapter VII. *Every mother can nurse her child* and should do so with but a few rare exceptions. A mother who is suffering from active tuberculosis, cancer, or insanity, should not be expected to perform this function, and it is better for the child if she does not. In cases of the diseases mentioned above, or in the instance of death of the mother, some other means of feeding the child must be devised. The best solution is to secure a wet-nurse or obtain expressed breast-milk from some mother, who has either lost her own child, or who has enough milk for two. If breast-milk cannot be obtained for the entire sustenance of the child, even a few ounces daily are well worth while. This must, of course, be supplemented with artificial feedings. Every effort should be made to secure breast-milk from some source for at least three months, and for six to nine months if possible; this is particularly necessary if the child is not thriving well. Mothers who must go outside the home to work should make every effort to spare three months from industry to nurse their offspring. The time

is undoubtedly not far distant when governments will make it unnecessary, economically, for a mother to leave her young infant during the first months of life. Realizing that there are mothers who, for financial reasons cannot nurse their children, and that there are certain other instances where maternal nursing is inadvisable, or where the death of the mother precludes it, this chapter on artificial feeding has been prepared, with the hope that it may never be used where there is any possibility of procuring breast-milk. There are so many difficulties and even dangers arising from artificial feeding that an infant so handicapped should have the most careful medical supervision.

Selection of Food.—When artificial feeding must be resorted to, the question of the kind of food becomes one of the greatest importance. During the past generation there have been many and varied patented foods put on the market, most of which are highly advertised. These usually consist of milks preserved by canning or drying, both of which processes tend to destroy the vitamins present in natural and fresh food. Likewise the ones in most common use and which find the highest favor among the laity are very high in sugar. Many proprietary infant foods contain over eighty per cent. of carbohydrates. The result of using such foods, provided no acute digestive trouble develops, is an excessively fat child, who makes a

good showing in an advertisement, but who is often woefully deficient in bone, nerve, and muscle development. The long continued use of evaporated, condensed, or dried milk often results in scurvy and rickets. One mother, who had raised two children on a canned food without noticing any difficulty, had come to the conclusion that prepared food was superior even to breast-milk. She was less successful with the third child, however. When eight months of age, he developed an acute and aggravated form of scurvy. The swellings above the elbow and knee are very noticeable in the X-ray pictures which were made during the height of the trouble. (See Figs. No. 28 and 29.)

CONDENSED MILKS should not be used if good fresh milk is obtainable; they are useful in times of epidemics or on journeys, when it is difficult to obtain pure fresh milk. Powdered foods, if used at all, should usually take the place of sugar in infant feeding. When artificial feeding becomes necessary, the best substitute for mother's milk is properly modified cow's milk. This is easily obtainable, moderate in price, and has most of the elements necessary for normal development.

Care of the Milk.—The utmost care possible cannot render cow's milk as sanitary as breast-milk. The best obtainable is none too good. The cows should receive some green food in

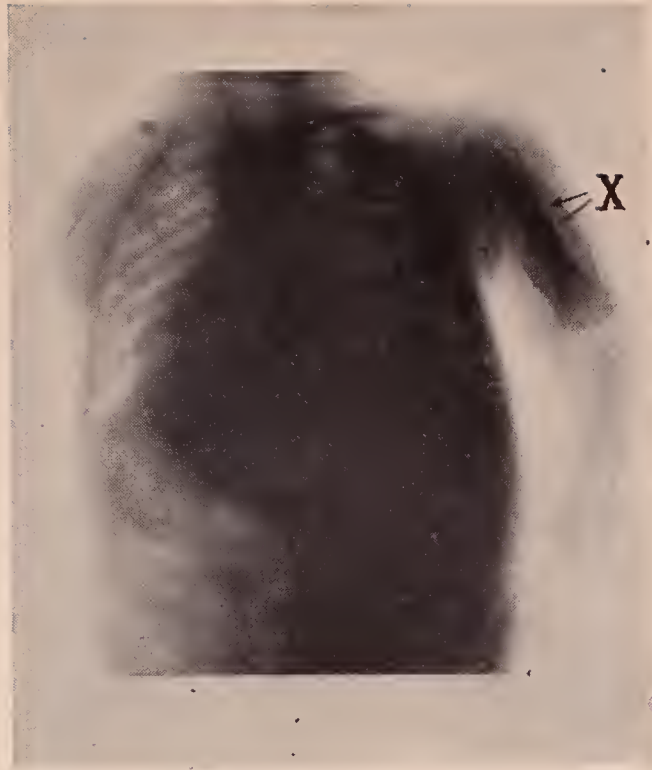


FIG. 28.—X-ray of baby, showing swelling under the periosteum of the bone at X, due to hemorrhage occasioned by scurvy. This was caused by an exclusive diet of condensed milk.



FIG. 29.—Same case as in Fig. 28, showing a scurvy swelling above left knee at X.

winter as well as summer, as this renders the milk richer in the A vitamin than when an exclusive diet of dry food is maintained. The milk should come from a reputable, inspected dairy and should be pastuerized. It should be delivered regularly daily and as fresh as possible. If the delivery is irregular, a mother is often forced to use milk left over from the previous day for one or more feedings. In some cities certified milk is obtainable, and is usually the safest for infants' use. This is provided by dairies which meet the most stringent requirements for healthy cows, cleanly surroundings, and sanitary methods of milking. The milking is done by scrupulously clean, entirely healthy individuals. As soon as drawn, the milk is placed in sterilized bottles, rapidly cooled, and maintained at a temperature below 50° F. until delivered to the customer. In the home, milk should, likewise, be kept on ice or in a cold place until ready for use.

Preparation of Food.—The amount of milk necessary for all the feedings of the next twenty-four hour period should be boiled over an asbestos mat or in a double boiler. If the former is used, the container is placed on a mat directly over the fire and, as soon as tiny bubbles appear on the milk, the fire is turned off, the pan being left on the hot mat for three minutes. In the latter method, the milk is put into a double

boiler with the water below at boiling point, and this is boiled for eight minutes. Whichever method is used, the milk should be cooled rapidly after removal from the fire by placing the container in cold running water. If a scum forms on the milk it should be removed. This is a calcium compound, of which there is an excess in cow's milk. Boiling destroys bacteria, which are always present in the milk even with the most careful handling. Many throat infections in children have been traced to the use of unboiled pasteurized or certified milk. Boiled milk is also far more digestible than the unboiled. Many infants who show marked digestive disturbances on raw milk are able to handle the same milk boiled without any difficulty. Raw milk may cause diarrhœa from the bacteria contained therein, or may lead to constipation with hard, bean-like curds in the stool, or a hard, gray "soap" stool. The casein, which is much tougher than in human milk, is softened and broken up by heating and hence rendered more digestible. The heat is not prolonged enough to affect seriously the vitamin content of the milk, and any deficiency it may exhibit in this respect is more than counterbalanced by the advantages from boiling. The C vitamin, which is the one most affected, can be easily supplied in fresh fruit juices. A tablespoonful of orange juice contains more of the

C vitamin than a quart of fresh milk. As whole undiluted cow's milk is difficult of digestion for most infants, it usually should be modified by the addition of water or, better, cereal water. The diluents are mixed with the cooled boiled milk and put at once into sterilized nursing bottles, one for each feeding of the day. These are then kept on ice or in a cool place until required for use. The milk may be warmed at the feeding time by placing the bottle in a pan of cold water and heating over the fire. The temperature of the milk may be tested by letting a drop fall on the inside of the wrist.

Diluents.—The best diluent, for several reasons, is made from whole-wheat flour, unheated in the process of milling. Various cereals may also be used. *Cereal water* is made by adding two level tablespoonfuls of the flour or cereal and one-eighth teaspoonful of salt to a quart of water and boiling the whole down to one pint. This is then strained through a boiled cheese cloth to remove any large particles which might clog the hole in the nipple. *Cereal jelly* is similarly made except that four tablespoonfuls of the cereal are added to a quart of water and the whole reduced to a pint by boiling. For *thick cereal jelly* eight tablespoonfuls of the cereal are required. Cane sugar, unless it should cause too much fermentation, is the best sugar to be used; it is pure, has a

definite caloric value, is cheap, and always obtainable. The patent baby foods in powdered form are largely sugar and in some cases of dyspepsia form an admirable temporary addition to the diet. They help to produce a rapid increase in weight and by their fermentative action tend to counterbalance the constipative action of the milk casein. They should always be considered as temporary foods or as sugar to be used in milk modification.

Technique of Bottle Feeding.—The bottle should preferably be a wide-mouthed one with a simple nipple, both of which are easily cleaned. No glass or rubber tubing or small-necked bottle should ever be used. The nipple should have a small opening to render a distinct effort on the part of the child necessary in obtaining his food. The bottle should be held in the hand of the attendant, and elevated sufficiently to prevent air being drawn in with the milk. The baby's head should be supported by the nurse's arm or a pillow to facilitate swallowing. Even when the child is older, he should not be allowed to hold his own bottle. He cannot remove it for breathing, and, consequently, drinks too rapidly, or loses the nipple, so that the milk oozes out about his head and face. As soon as the child has finished his feeding, the bottle should be removed. If he is allowed to amuse himself with the empty bottle, he will acquire the habit

of using the nipple as a pacifier, from which pernicious results follow.

Care of Nursing Apparatus.—There is no better medium for the growth of bacteria than milk. Any negligence in the care of the bottles and nipples may result in some serious form of stomach and bowel trouble. Milk should never be allowed to sour in the bottle when this is at all preventable. If such a misfortune does occur, as upon a journey, for instance, a brush should be employed to remove all traces of the coagulated milk. The proper method is to rinse out the bottle thoroughly with cold water immediately after its use. Once a day all the bottles should be sterilized by placing them in cold water which is gradually heated and boiled for ten minutes. It is well to do this just before preparing the day's quota of food that the bottles may be freshly sterilized when the food is put into them. The nipples should not be boiled, as this tends to soften the rubber. They should be carefully washed, inside and out, with soap and hot water and rinsed with boiling water. They may then be placed in a dry, sterile, covered dish until required for use. No antiseptics or strong washing powders need ever be employed in cleansing the nursing apparatus. They are unnecessary if the sterilizing is correctly done, and their use often results in an irritation of the tender membranes of the mouth.

SCHEDULE FOR ARTIFICIAL FEEDING.

Age	Number of Feedings	Amount per Feeding	Whole Milk	Cereal Water	Sugar	Orange Juice	Cereal	Toast or Zwieback	Vegetable Purée
Days		tsp	ozs	ozs	tsp				
1	3	4	$\frac{2}{3}$	$1\frac{1}{3}$	$\frac{1}{2}$				
2	6	4	$1\frac{1}{3}$	$2\frac{2}{3}$	1				
		ozs			ozs				
3	6	1	2	4	$\frac{1}{2}$				
4-7	6	$2\frac{1}{2}$	5	10	1				
7-14	6	$3\frac{1}{3}$	8	12	1				
Weeks									
2-4	6	4	10	14	1				
Months						tsp			
1	5	5	12	13	1	1			
2	5	5	14	13	$1\frac{1}{4}$	2			
3	5	6	16	13	$1\frac{1}{2}$	3			
				Cereal Jelly			Tbls		
4	5	6	18	12	$1\frac{1}{2}$	1			
							Tbls		
5	5	$6\frac{1}{2}$	20	12	$1\frac{1}{2}$	2	1		
								Slice	
6	5	$6\frac{1}{2}$	22	10	$1\frac{1}{2}$	2	2	1	
									Tbls
7	5	$6\frac{1}{2}$	24	8	$1\frac{1}{2}$	3	3	1	1
8	5	$6\frac{1}{2}$	24	8	$1\frac{1}{2}$	4	6	1	2

The above table is given as a guide for artificial feeding during the first eight months. Regular hours for feeding and a long period of rest for the stomach at night are even more imperatively necessary than with the breast-fed child. There should never be more than six feedings during the twenty-four hours, and these should be reduced to five during the second month. Six and 10 A.M., 1-4-7-11 P.M., are the most universally convenient

feeding hours for the first schedule, changing to 6-10-2-6-10 when the five feedings are adopted. The cereal water is used in modifying the milk until the fourth month, at which time the cereal jelly is substituted. After the first month orange juice should be given daily. This is especially important with artificially fed babies in order to prevent the development of a pale, pudgy, anæmic youngster. Thick cereal, beginning with a teaspoonful, should be given at five months. This is given with only a sprinkle of sugar. The cereal may precede the bottle at the 2 P.M. feeding. At the sixth month, toast or zwieback is given to strengthen the teeth and jaws, which, in a bottle-fed child, are likely to be very poorly developed. This may precede the 10 A.M. bottle. After the bottle, the hunger is appeased, and the child is less likely to exert himself to munch the toast. At seven months, vegetable purées are added. Directions for the making of these are to be found on page 131. The iron stored up in the body at birth becomes inadequate by the seventh month, and green vegetables are, therefore, very necessary at this age. The following may be used as a daily schedule for an artificially fed child of eight months.

6 A.M. Bottle.

10 A.M. Orange juice, toast, cereal, bottle.

2 P.M. Vegetable purée, toast, bottle.

6 P.M. Cereal, bottle.

10 P.M. Bottle.

At nine months change to:—

- 6 A.M. Whole milk 6 ozs., (boiled one minute).
 10 A.M. Orange juice, cereal, (whole grain) toast and butter,
 whole milk 4 ozs.
 2 P.M. Vegetable purée, 2 tpls., toast with butter; cooked
 fruit (prunes, apple sauce) whole milk 4 ozs.
 6 P.M. Cereal, whole milk 5 ozs.
 10 P.M. Whole milk 5 ozs.

Caloric Values of Foods for Infant Feeding

Foods	Amounts	Calories
Cane Sugar	1 oz.	120
Carrots, cooked	1 oz.	13
Cereal, cooked	6 T	50
Cereal water	1 oz.	3
Cereal Jelly	1 oz.	6
Cereal Jelly, thick	1 oz.	12
Cream 16 per cent.	1 oz.	54
Custard	1 oz.	60
Flour	1 oz. (4T.)	100
Flour, Whole wheat	1 oz.	100
Human Milk	1 oz.	21
Milk, whole	1 oz.	21
Milk, skimmed	1 oz.	11
Milk Sugar	1 oz.	130
Orange Juice	1 oz.	12.5
Rice, boiled	4 T.	60
Scraped beef	1 oz.	40
Soup (chicken)	1 oz.	15
Spinach, cooked	1 oz.	8

Equivalent Measures

2 T. = 1 oz. liquid	2½ T. cane sugar	= 1 oz.
6 t. = 1 oz. liquid	3 T. milk sugar	= 1 oz.
8 oz. = 1 C. liquid	16 T. cooked cereal	= 1 C. (8 oz.)
C = cup	T = tablespoon	t = teaspoon

Weaning.—The process of weaning a child from the bottle should present less difficulties than weaning from the breast. There need be little or no change in the food, except in the manner of giving it. From the sixth month, the child should gradually become accustomed to drinking from a cup, first water and later milk. If the bottle is too long continued, a youngster becomes very loath to give it up. We sometimes see a child of two years still taking his milk from a bottle. At about ten months, if he is eating well of cereals, toast, and vegetables, as he should be, and has learned to drink from a cup, the bottle feedings may be gradually discontinued. The 10 P.M. feeding is the first to be omitted. When this is done, the six o'clock meal is somewhat heavier in milk and cereal than formerly. A week or so later the 2 P.M. bottle is discontinued, and at this time the usual amount of milk is given from a cup, following a meal of vegetable purée, cereal, and toast. A few days later, if all is going well, the 10 A.M. feeding may be given without the bottle. This meal should commence with orange juice, after which cereal, toast, and a cup of milk are given. For about two weeks longer, the 6 o'clock morning and evening feedings are continued. Then the morning bottle is omitted and the child has his breakfast at seven, dinner at 11:30 A.M., lunch at 3 P.M. and supper at 5:30 or 6 P.M. The supper may end with the

bottle for two weeks or so, or until he is about eleven months of age. When the bottle feedings are entirely discontinued, the schedule for the artificially fed child becomes the same as for the breast-fed youngster of the same age. The reader is, therefore, referred to Chapter IX which contains monthly schedules for the newly weaned child.

General Directions.—Every care should be exercised to counteract the evils and dangers of artificial feeding by regular habits and well-balanced meals. All through infancy and early childhood the artificially fed child needs to be more carefully dieted than the one who has enjoyed maternal feeding. The tendency to sudden and acute digestive upsets continues sometimes far into school age. A bottle-fed child is much more likely to show later idiosyncrasies to cow's milk than does one who has been breast-fed, and often needs to be denied milk quite largely later on. The teeth demand more careful attention, the nervous system is often less stable, and the tendency to infections much more pronounced. All these factors render a physician's advice imperative, with regular and periodic examinations throughout infancy and early childhood.

CHAPTER XI

DIET FOR THE OLDER CHILD

MOST children at the end of the second year have sufficient teeth for proper mastication, and are able to handle a wide variety of food. The problem now becomes one of adequacy from the standpoint of the various food elements. A mother should not, at this time, relinquish the care and vigilance previously exercised in planning a well-balanced ration for her children. As long as growth continues, the question of diet is of the utmost importance.

PRE-SCHOOL AGE

General Suggestions.—After the second year, the diet of the normal child is more easily standardized, and need not undergo as frequent changes as formerly. The food should still be simple and nutritious and be eaten at regular hours. The child should continue for two years at least taking his meals alone, or with the other children of the household only. Rarely do we find a family in which the adults eat so simple a diet that young children may safely partake of the same foods. This is especially true of dinner and, particularly, if guests are frequently entertained. Play should be natural

and permit opportunity for development of individuality. A child who always plays under adult supervision never becomes capable of amusing himself, and develops into a fussy, peevish, nervous individual. Sleep should be abundant and undisturbed. The afternoon nap should continue until about school age.

Meals. BREAKFAST.—There should be but three meals, breakfast, dinner, and supper. In certain cases a midafternoon lunch is permissible. Breakfast should be served as early as possible after the child awakens, as he is usually hungry at this time of day. Many children eat more for breakfast than for any other meal. Cooked cereal with boiled milk, toast and butter, and orange juice or some stewed fruit furnish an ample and wholesome breakfast for children of any age. The cereal and fruit need not always be the same ones and thus variety is afforded. Occasionally, a poached or boiled egg or a piece of crisp bacon may be served also.

DINNER.—Until six years of age a child's heavy meal should be at noon. This should consist of meat or meat soup, one or two green vegetables, a baked potato or boiled macaroni, toast, and a simple dessert, as cooked fruit, custard, or plain pudding. If the child has milk for breakfast and supper none need be given at noon. Caution should be exercised not to allow too much milk. Invariably, where the child has unlimited quantities of milk, his

appetite for vegetables and cereals suffers. By permitting no milk at dinner, a child can be induced to eat other necessary foods.

LUNCH.—The midafternoon lunch may be given if the child seems to require it. This, however, should be simple and small in amount. Dry toast, an unsweetened cracker, or bread and butter are ample for this purpose. Milk should not be given at this hour as it spoils the appetite for supper. If he eats too little at the supper hour, he tends to waken with hunger during the night.

SUPPER.—A child's evening meal should be very simple and easy of digestion. A restless night with hideous dreams often follows a heavy supper. This meal may consist of a vegetable, cottage cheese, toast, and stewed fruit. A cereal with milk may take the place of the cheese. The hour should be not later than six, so that by seven the child may be in bed. No noisy or exciting play should intervene between his supper and bed time. The fact that this is the only time of the day many fathers can be with their children is unfortunate, for the tendency is to romp with them in the evening. While this contact with the father is beneficial in moral and mental ways, it is detrimental from a physical standpoint. A story or quiet form of evening play should be the rule with young children.

Habits of Eating.—Most children need to learn to masticate food properly, and hard, dry toast

is one of the best means of accomplishing this. Also, a child must be taught not to dawdle over his meal and to eat anything that is set before him. A mother soon learns the amount of food he will eat, and, unless this is unreasonably small, a larger amount should not be given him. An over-large first serving frequently destroys the appetite and causes the child to leave on his plate the least desired portion of his meal. It is far better to give a second helping than too large a first serving.

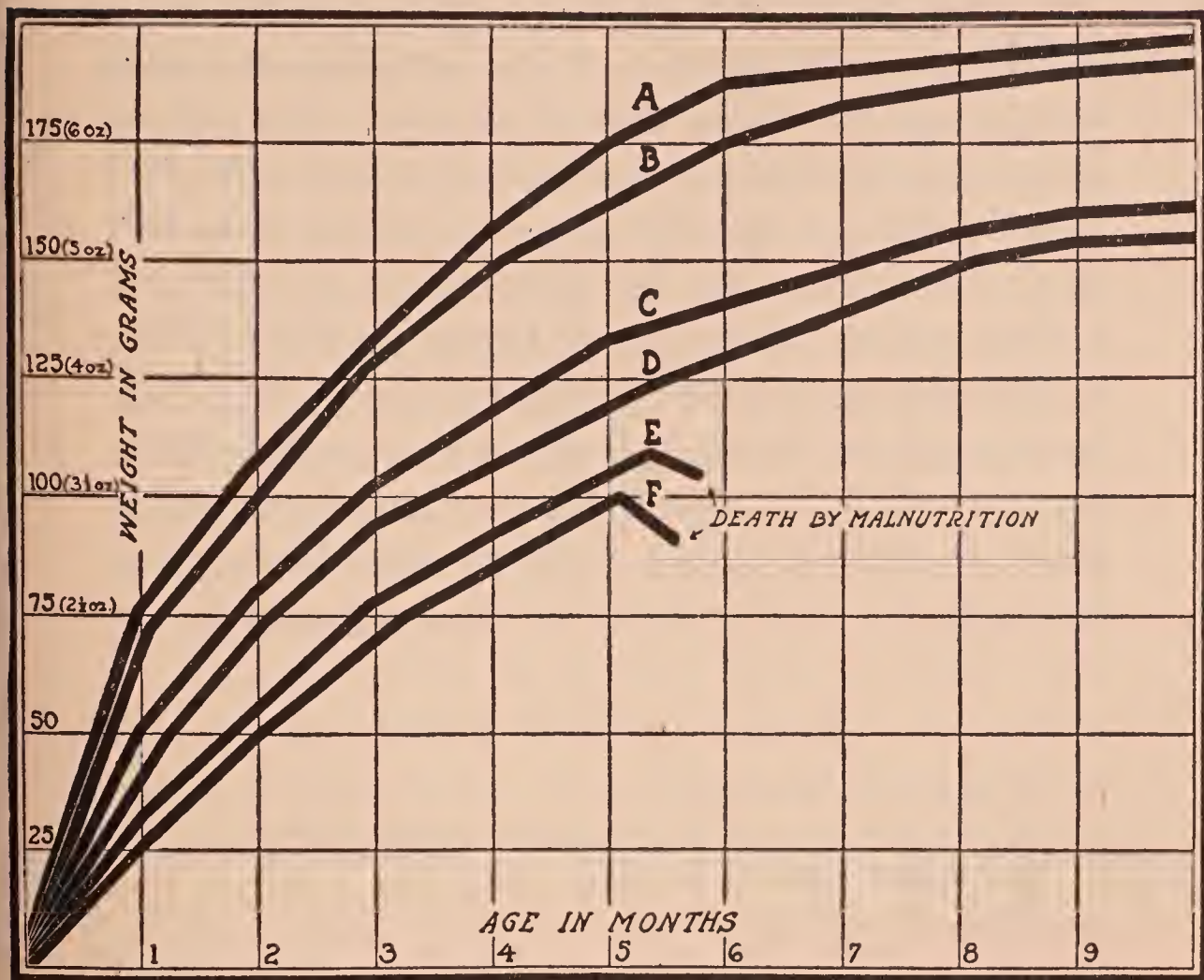
FOOD GROUPS

1. *Vegetables*—Spinach, carrots, cauliflower.
2. *Protein*—Milk, eggs, meat, fish, cheese.
3. *Cereals*—Whole wheat, oatmeal, corn meal, rice, bread.
4. *Fats*—Butter, yellow suet.
5. *Sweets*—Sugar, jelly, honey.
6. *Fruits*—Oranges, tomatoes, prunes, apricots, apples.

The above table divides foods into six groups, covering the necessary food elements and including the vitamins. Characteristic foods only are listed and each group may be considerably enlarged. If a mother will memorize the six headings and serve something from each group daily, not allowing a predominance of any one group, her family will have a balanced diet.

VEGETABLES.—These form one of the most important factors of a child's diet for, as has been demonstrated in preceding chapters, they contain more minerals and more vitamins pro-

portionately than any other class of foods. A mother should persist until a child learns to eat any vegetable served him. She should not be



Experiment by Prof. E.C. Callaway—1920

FIG. 30.—Comparative growth curves of a litter of rats fed on different breakfast foods. Rats "A" and "B" were fed a cracked wheat, or granules made from hard wheat by the old-fashioned process of milling. Rats "C", and "D" were fed a white refined wheat cereal that is sold to the trade as coming from the heart of the wheat berry, but which, in reality, is a by-product of the milling of white flour. Rats "E" and "F" were fed a toasted, flaky corn product manufactured by a special milling process. The diets of rats "C", "D", "E" and "F" therefore, contained insufficient amounts of the water-soluble vitamins.

satisfied if he likes only the starchy vegetables, such as potatoes, macaroni, rice and sweet potatoes. These are not classed as green or succulent vegetables and do not contain the same elements.

At least a half-cupful, measured after cooking, of such vegetables as spinach, cauliflower, carrots, Brussels sprouts, green beans, peas, beets, or asparagus should form a daily portion of a child's noonday meal. A half-cupful may with advantage be given also at supper. Canned or dried vegetables are much inferior to fresh ones, and should not be used except in cases of necessity. Directions for the cooking of green vegetables are to be found in Chapter VIII. Raw vegetables should be frequently used. Raw cabbage, carrots, beets, celery, onions, and lettuce, used singly or in combinations furnish palatable and nutritious salads. They should be put through the food grinder or finely chopped.

Raw Vegetable Salad

- 1 cup raw carrot
- $\frac{1}{4}$ cup raw peanuts or 1 teaspoon peanut butter
- $\frac{1}{2}$ cup raw beets or raw apple
- Salad dressing to moisten

The above are finely ground or chopped, all the juice being retained, and the whole moistened with a cooked or mayonnaise salad dressing. For younger children, the peanut butter is preferable. Celery and onions may be added for older children and adults.

PROTEIN.—If a child has a pint of milk per day he really needs little additional animal protein. Too much milk is frequently the cause of a poor appetite and should be reduced if a child

does not eat vegetables willingly. Mothers are inclined to look upon milk as a drink rather than a food, but it has a high caloric value, and if a child's hunger is satisfied by a glass of milk, he will not care for other foods. Milk is far from a perfect food and should not form the main portion of any child's diet after eighteen months of age. When two years of age he may have an egg, or a serving of meat, chicken or fish at the noon meal. It is unnecessary to give meat the same day that an egg is given. The meat should never be fried, but may be broiled, boiled, or baked. Liver, heart, kidneys, and sweetbreads are preferable to other forms of meat.

CEREALS.—These should form a daily food and, if we include breads in the list, should be given at each meal. A young child should never be given hot breads, pancakes, or waffles. These form a heavy mass, which is very difficult of digestion. Toasted bread and whole grain cereals are preferable. The superiority of freshly cooked, whole-grain breakfast cereals over other varieties is amply illustrated in the diagram shown in Figure No. 30. This represents the results obtained from the feeding of young rats on various cereals. The first group was fed exclusively on a whole-grain wheat cereal, milled in the old fashioned way without adulteration or the application of heat during the preparation. The rats so fed lived and made a

normal growth. The next group was fed entirely on a refined wheat cereal, in the milling of which the germ and much of the bran is removed, and the cereal steamed to prevent its ready spoiling. The rats on this diet were able to maintain life, but made a decidedly subnormal growth. The third group were fed a "ready-to-eat" toasted corn cereal, and on this diet death resulted in six months. Many mothers are tempted to give their families these easily served, prepared cereals, and frequently children prefer them to the more beneficial kinds, but how grave a mistake is made in so doing can be seen from this experiment. Occasionally, for variety, a prepared cereal may be served, especially during the summer season, but the deficiency should be counterbalanced by an abundance of whole-grain breads.

FATS.—Butter is the most superior fat for children and few suffer any disturbance from its use even though given freely. There is no better growth-promoting agency than pure, fresh butter. If the minimum amount a child should have, one cubic inch per day, cannot be consumed upon bread, it may be used to season fresh vegetables, or baked potato. In cases where a child has an idiosyncrasy to milk and cream, as not infrequently happens, butter may be served on the hot cereal instead of milk. Yellow beef fat is not indigestible and contains the A vitamin in goodly amounts. This forms

a very good butter substitute in the seasoning of vegetables, and makes a very palatable addition to many of them.

SUGARS.—Sweets are permissible in a child's diet, though we must remember that it is very easy to overload the system in this respect. No sweets should be permitted between meals nor until the substantial portion of the meal has been eaten. A little honey on toast is a very satisfactory dessert. Home-made jellies may also be used in this way. Sugar should be sparingly used, if at all, on the breakfast cereals. Candy may occasionally be given at the close of the meal, if a satisfactory amount of other food has been eaten. Most children have apparently a natural liking for candy and other sweets, and if these are withheld too stringently, as the child becomes older, he frequently will stoop to any means of obtaining them. Such an unwholesome desire can be avoided by a moderate indulgence in sweets from the second year or so.

FRUITS.—Fruits are necessary in a child's diet for the anti-scurvy vitamin, for their laxative effect, and as appetizers. There is something so heavy and unnatural in a diet lacking fruits that we often find children who partake of such a diet sluggish, both mentally and physically. Fresh fruits are better than canned ones, but, except for orange juice, should not be eaten raw by infants. Apples are one of the first fruits to be given uncooked, and scraped

apple may be given quite early. Pineapples, pears, bananas, and some varieties of berries seem difficult of digestion in many instances, and should be withheld where this is the case. Melons, grapes, and sweet cherries may be given older children in moderate amounts when not over or under ripe. The seeds should be removed for the child until he is old enough to do this himself.

LIQUIDS.—Children should be encouraged to drink an abundance of water. This is a very effective means of keeping the system free of waste and disease. Too much need not be allowed at meal time, and it should not be employed to wash down half-chewed food. The following rule should be well instilled: “Never drink when you have food in your mouth.” This applies equally to all drinks including milk.

Cocoa.—Hot chocolate or cocoa for breakfast is not at all essential for a child, but may occasionally be given. It furnishes a sweet drink and the chocolate contains an oil that is heavy and indigestible for some persons. In making it, milk is generally used, which adds to the child’s daily milk quota. The idea that a child must have some hot drink for breakfast is an erroneous one. A bowl of hot cereal furnishes sufficient warmth in his food.

Tea and Coffee.—These contain stimulating drugs that are very harmful to the young, causing nervousness and dyspepsia. A child who

is not allowed to acquire a taste for tea and coffee will not care for them. Neither should be given, except in cases of illness, when they are sometimes permissible as a medicine.

Treats.—NUTS are of high caloric value, but are difficult of digestion by young children; they should not be given until the child has all his teeth, and then only in small quantities and under supervision, that they may be properly masticated.

SODA FOUNTAIN DRINKS and “SUNDAES,” sweetened with heavy syrups, containing various fruits, nuts, and ice cream, should never be permitted to young children. Plain ice cream may be given safely to a child of three, provided it is known to be pure and cleanly made. Commercial ice creams, especially those made by wholesale companies, may be far from desirable. A simple fruit or custard dessert, easily and quickly frozen at home, furnishes a wholesome food and a deserved treat if not given too often.

All of these special treats for children should, of course, follow a regular meal. If given between meals or on an empty stomach, they are more likely to cause trouble than when they come at the close of a well-balanced meal.

Care of the Teeth.—By the time a child is three years of age, he should be caring for his own teeth, and should realize the necessity for clean-

ing them just as he knows he must wash his hands. The nightly preparation for bed should include a careful, thorough brushing of the teeth, under the mother's supervision. By at least the third year, regular periodic visits should be made to a competent dentist who will quickly detect any irregularities or any signs of decay. These can then be cared for with little or no discomfort to the child and the ills that arise from decayed teeth will be avoided. The former belief that it was foolish to have temporary teeth filled has changed to a realization of the necessity for doing so. The first teeth should not be removed too early, as the remaining ones tend to fill in the space thus made. This interferes with the eruption of the permanent teeth. When the first teeth become loose by the resorption of their roots, due to the growth of the permanent teeth beneath, they should be removed, or the new ones will erupt in irregular positions. We have mentioned previously how a child should masticate a piece of hard, dry toast each day in order to develop his jaws and widen his arches. If this is done from infancy, and there are no adenoids to interfere with normal development, usually the teeth begin to separate about the third or fourth year; the space between the little first teeth increases until it is half as great as the width of the teeth themselves. This is necessary, as the first teeth are only two-thirds as wide as the perma-



FIG. 31.—Impressions of a child's mouth in which the temporary teeth were allowed to decay and were extracted many years too soon. This results in a failure of the jaws to expand. When the larger permanent teeth erupted, there was insufficient space, hence, their crowded and twisted positions (Bottle-fed in infancy).

ment ones. If a parent notices that they are not separating during the fourth and fifth years as they should, then artificial means must be adopted to accomplish this. More hard food requiring extra exertion by the teeth should be given and, in addition, special exercises may be employed. One that is recommended by dentists is having the child insert a wide strip of heavy rubber between the teeth. An adult then holds this firmly, while the child pulls backward with his teeth. This has accomplished measurable results even in cases where the teeth had already erupted in irregular positions. At about six years of age, the first permanent teeth appear known as the "six-year molars." These erupt back of the temporary molars, and many parents fail to note their appearance or appreciate that they are permanent teeth. Because of this we find that very often a child sacrifices two or more of these first molars at an early age. This is a grave mistake, for they are the keystones for the arrangement of all the other teeth. If they are removed, the second, or twelve-year molars, push forward to fill the space left vacant, with a resultant irregularity in their positions that interferes seriously with proper mastication.

SCHOOL AGE

Upon entering school, the child undergoes many changes in his life. Among these his

habits of eating have a share. Often the appetite increases to a marked degree, due to regularity of habits, healthful play, and his new mental activities.

Meals.—The *breakfast* hour, in some cases, must be earlier though the breakfast should remain very much the same in quality, but increasing in quantity according to the appetite. No child should be allowed to rush off to school with his breakfast half-eaten. If necessary, the adults of the family must sacrifice a little morning sleep, in order to give the children ample time for a full and substantial breakfast.

LUNCH.—The main change lies in the fact that usually a child's dinner must now be given in the evening, rather than at noon as previously. There is seldom time at the noon intermission for a child to come home, eat a full dinner and return to school, without undesirable haste. Hence it is preferable to have him eat a simple, wholesome lunch leaving the full meal until evening. The lunch should be warm. A bowl of soup, dish of rice, or a hot vegetable, with bread and butter and some fruit are admirable for this purpose. The midday lunch of the school child should include but little meat, as this requires such a long period of digestion that the blood needed for the brain is drawn to the stomach. If the school is at a distance, so that the child must carry his lunch, the mother should give thought and care to solving the

problem of a nutritious, substantial school lunch. Sandwiches of whole-wheat bread and butter with a wholesome filling are the most satisfactory cold lunch a child can have. Peanut butter, nut and fruit marmalades, a thin slice of meat, with lettuce or tomato added, cottage cheese, or chopped celery and nuts, all furnish, toothsome and nutritious fillings for sandwiches. Lettuce or celery may be combined with almost any other filling, thus furnishing the minerals and raw vegetable needed. In addition to the sandwiches, an apple or orange and a small piece of plain cake or a cooky make a fairly complete lunch, both from the standpoint of calories and vitamin requirements. A child should never be given money and allowed to purchase his own lunch, unless it be at a cafeteria in the school building under proper management. If he is allowed to go to some nearby confectionery for his noonday meal he will be more likely to spend his money for dill pickles, candy, ice cream, pastries, or peanuts, than for vegetable soup or sandwiches.

DINNER.—With a lunch at noon when he has been accustomed to dinner at that hour, the child usually is hungry after school, but he should be discouraged in his desire to eat upon reaching home. To assist in this, the young school child should not be expected to wait until the family dinner hour if this be late, but should

be given his dinner between 5 and 6 P.M. He should then be ready for bed not later than seven-thirty. His evening meal should now be much the same as his noonday dinner has formerly been. It should be substantial, ample to satisfy his hunger, and adequate in vitamins and minerals. The strain of school life demands a great deal of nervous energy, and the nerves should be well supplied with absorbable minerals, these are best obtained from green vegetables.

Variety and Amount.—As the child grows older, he may be allowed a greater variety of foods and may eat with the family at dinner provided the food is not too highly seasoned. From eight to twelve years of age many children grow tall, losing all the roundness and plumpness of their earlier years. This rapid growth calls for an increase in calories. Many a fast-growing boy seems never to have his hunger completely satisfied, and will consume several times the amount of food that his father eats. This inordinate hunger should be appeased by substantial, adequate meals, unstinted in quantity and including a fair amount of carbo-hydrates.

Acute Indigestion.—Both older and younger children are prone to sudden attacks of indigestion, following indiscretions in diet or from common "colds." The infection from the nose and throat will often travel to the digestive organs

and cause an upset stomach. Vomiting and diarrhœa are the usual manifestations, generally with a sudden onset in the middle of the night. There may be a more or less elevated temperature and even delirium or convulsions. There should be no interference with nature's effort to rid the body of food that has proven obnoxious. She may be assisted in this by having the child drink freely of lukewarm water. No cathartics should be given, as they cause an irritation of the mucous membrane lining the digestive tract. A warm, soap-suds enema may be employed, provided the bowels are not acting freely or if there seems to be gas present. Abdominal pain can be relieved by the application of hot cloths. Cold compresses, applied to the forehead, are beneficial in reducing a high temperature or relieving delirium. Sponge baths, also reduce the fever by cooling the skin and by opening up the pores for the elimination of waste. All food should be withheld during the continuance of the vomiting, water only being allowed. Sometimes even this cannot be retained. Strong hot tea, well sweetened, and given without milk or cream, is beneficial in quieting the reflex vomiting, which is prone to continue long after the stomach has emptied itself of all food. Four hours after the tea is given and retained, other food may be cautiously administered. For this purpose, the starches in the form of cereals and toast, fats

in the form of butter, and sweets in the form of Karo syrup or sugar are advisable. This should be accompanied by an abundance of water. No vegetables, fruits, milk, or eggs should be allowed for at least twenty-four hours after the vomiting has ceased.

Constipation.—If severe or of long standing, a physician should be consulted as to the correction of constipation. A mother needs to know how to prevent the development of this condition, and then she need not worry about its cure. Whole-wheat cereals and breads, corn bread, fresh fruits, adequate amounts of water, and bulky green vegetables all have a beneficial effect in preventing this condition or in relieving it. The fruits that are especially beneficial are prunes and figs. Massage of the abdominal muscles, plenty of outdoor exercise, and regular habits as to bowel evacuation will tend to prevent or correct the trouble. Milk causes constipation with some children, as do also pork fat, rich gravies and heavy cream. If a child has been allowed to develop chronic constipation it can best be overcome by a well-balanced dietary and healthful exercise.

Treatment of "Colds."—All mothers have some idea as to the treatment of ordinary "colds." Sometimes these ideas are not as scientific as they might be. Cathartics are not advisable. If the trouble is severe or if there is fever, the child should be put to bed and a light diet

maintained. Fresh air is necessary, but the patient must be kept warm. A nasal douche of normal salt solution, made by dissolving a teaspoonful of salt in a pint of boiled water, is the best means of relieving the irritation in the nose and preventing the spread of the infection to the bronchial tubes. A cold compress about the throat is also of benefit, and in cases of persistent coughing at night, will relieve the situation more quickly than any other treatment. This compress consists of one thickness of thin cotton cloth and four thicknesses of wool. The cotton, wrung out of cold water, is wrapped around the neck, and covered with the four layers of dry woolen cloth. If the temperature is high or the cough persistent, the compress may be renewed every four hours. When it is finally removed, the neck should be bathed with cold water and briskly rubbed dry. The feet should be kept warm and care exercised that the child is never suddenly chilled upon leaving his bed. Cough syrups should not be given, except on the advice of a physician, as most cough remedies tend to produce indigestion and sometimes cause vomiting and abdominal pain. Colds should not be neglected or ignored; repeated frequent attacks often lead to heart, kidney, or tubercular troubles.

These directions for feeding the older child are largely for the normal individual. With the anæmic, underfed youngster, or one suffering

from acute or chronic indigestion, the diet must be varied to suit the requirements of the case. Every mother should be more concerned about the nutrition of her child than any other phase of his physical nature, for his whole body and even his morals may be affected by improper diet. A large percentage of the boys and girls who are committed to our state training schools are victims of malnutrition. To properly regulate the diet of a child through infancy and childhood, is probably the greatest preventive work possible, both from the medical and social standpoints.

CHAPTER XII

FAULTY DIETS

THE faces of children are as the open pages of a book upon which are recorded their dietetic histories. There are certain tell-tale evidences of unbalanced dietaries that are almost always visible in the face, form, disposition, and habits of the innocent victims. In the poorer sections of our cities one expects to meet the little underfed members of the ignorant and poverty-stricken households. In some instances, parents have not the means of providing a complete and well-rounded ration for their children, nor have they the knowledge of what constitutes a proper diet for the growing child. The poor results in physical manhood and womanhood which these homes produce are, in a measure, excusable. We must look to the public schools, with their health instruction and physical examinations, to correct these in the next generation; and to the infant welfare clinics and other health centres to give the present generation some of the fundamentals of child feeding. The sadder story, however, lies in the fact that, not alone among the poor and foreign families do we find these undernourished and improperly fed children, but they appear almost equally

often in well-educated and well-to-do families. The children of the latter class have, in addition, the handicap of a lower resistance to disease than have those of the slums. Malnutrition in the well-to-do comes from indifference, over-indulgence, or wrong instruction, any one of which furnishes a barrier to the correction of the trouble.

ERRORS IN INFANT FEEDING

Starch and Sugar Excess.—The faulty feeding of infants is very common and may take various forms. The too-frequent ingestion of food, which is perhaps the most common error, has been dealt with in a previous chapter and need not be reconsidered here. Next in frequency is the error of overfeeding with starches. This is usually in cases where a patent food, condensed milk, oatmeal gruel, or some other starch mixture has formed an almost exclusive diet for months. A case of this type frequently develops when a buttermilk formula is too long continued. The infant overfed on carbohydrates may appear fat and well nourished, due to a retention of water in the tissues, but after a time a stationary weight results, followed later by a distinct loss in weight. The recovery of such a child is slow and discouraging, and the case should always be placed in the hands of a competent specialist. If breast-milk can-

not be obtained, then a correctly modified cow's milk mixture must be resorted to. A child who is much overweight during the first year, almost invariably falls considerably below normal weight at some time before he reaches five years of age.

Whole Milk Diet.—An infant fed exclusively on whole cow's milk may appear to do well for a time, but later may develop many and varied difficulties. There is one type, usually the fair-haired, thin-skinned infant, who shows a marked idiosyncrasy to large amounts of milk. This type is afflicted with various skin affections, such as scaly scalp, eruptions on cheeks, forearms, and calves, together with a ready excoriation from wet or soiled diapers. The urine often has a strong ammonia odor and may leave a pinkish discoloration on the clothing. The stools are difficult, infrequent, a dirty-gray in color, of a hard, stone-like quality, and roll out of the napkin like marbles, leaving no stain. This is known as the "soap-stool" due to the large amount of alkali it contains. The mineral content may amount to 48 per cent. of the dried stool. At times it is even greater than the amount of mineral ingested with the food, in which case the reserve mineral supply of the body is rapidly exhausted. Rickets and nervous disorders are almost invariable results. This form of indigestion is usually due to the fat in the milk, although the protein may be the causa-

tive factor. The remedy, if the child is to remain on this diet, is to modify the milk with carbohydrates and, occasionally, it is also necessary to remove all fat. No infant should ever be given an exclusive diet of whole, unmodified cow's milk.

ERRORS IN CHILD FEEDING

So much, in brief, may be said of improper infant feeding. In the case of older children there are many one-sided diets consumed, due to ignorance, weakness in discipline or incorrect ideas of nutrition. These often work untold harm to the growing boy or girl.

Fat Excess.—Of the various forms of unbalanced diets in older children, probably the excessive use of fat is least common. However, those who deal with nutritional disorders occasionally find marked examples of this disturbance. Pork fat is the usual offender, and, naturally, more often occasions trouble in country homes where large quantities of pork are consumed. As in the infant, eczematous or other eruptions of the skin with constipation are among the noticeable symptoms. The resulting dyspepsia with a marked intolerance for all fatty foods may continue for years. Fatty meats, such as pork and sausage are indigestible for practically all children and, since they are lacking in vitamins, had best be omitted altogether. This does not include yellow beef fat, which is rich in vita-

mins. Seldom do we find a child who cannot digest butter in moderate amounts, though heavy cream may need to be removed from the diet.

Sugar Excess.—No doubt an excessive amount of carbohydrates both starch and sugar, is one of the most common errors made in the feeding of older children. White breads, cereals heavily coated with sugar, which is frequently renewed once or twice during the consumption of the serving, rich pastries, frosted cakes, cheap and easily obtained candies, made especially for the child-trade, honey, syrup, jams, and jellies, all furnish an alarmingly high percentage of sugar. The hunger being satisfied with sweets, the jaded appetite refuses to partake of more substantial foods. From an excessive use of sugar, many a child is nervous, thin, sallow, anæmic, and irritable, with an undersized body, diseased tonsils, decayed teeth, foul breath, constant "colds" and general debility. None except drastic measures can overcome the sugar habit when once well established with a youngster. Usually such a child has been so coddled and spoiled that reasoning does little good. Sometimes starving for a few meals is necessary before he is willing to partake of wholesome food. The surest and quickest means of accomplishing a cure is to take the child to the country, far away from confectioners, where he may have plenty of outdoor life to induce a

normal appetite and an abundance of wholesome food to satisfy it. Insist on the child's eating a goodly amount of vegetables, fruits, and whole-grain cereals before sweets or desserts are permitted. If the country is not available, a sojourn of two to four weeks in a hospital under proper dietetic supervision is the next best remedy. With older boys, the strict discipline and outdoor life of a boy's camp will almost invariably effect a cure.

Protein Excess.—It is a comparatively easy matter to persuade mothers of the mistake of overfeeding with sugar, but quite a difficult one to convince them of the error of an excessive amount of protein. The results of protein excess, however, are as grave and often more disastrous than those from excessive carbohydrates. The free use of milk and eggs easily leads to protein extravagance. Children who have been bottle-fed in infancy are far more sensitive to protein excess than are those who have been breast-fed. The white of egg, our purest and most concentrated form of protein, is not readily assimilated by many children. Magazine articles and popular lectures have long heralded milk as the perfect food, easily digested, and cheap in comparison with meat, fruit, vegetables, and even bread. Advertisements of dairies, conspicuous on signboards, in street cars, and local papers, admonish mothers to “feed their children nature's

own food—fresh, rich milk” and present the apparently convincing illustration of a robust-looking infant beside a full bottle. Health-centres have tended to over-emphasize milk in order to induce certain mothers to use it at all. In view of all this publicity, it is not surprising that the general public very reluctantly relinquishes this firmly established belief that milk is the one perfect and essential food for growing children. No doubt many poorer homes are unduly stinted in their milk supply, but it is equally true that children in general, consume far too much milk. Governmental and other food experts, who formerly advised a quart of milk daily for each child, now recommend a pint as entirely adequate. Protein excess develops either a phlegmatic, overweight child, lacking a corresponding development of muscle and nerve tissue, or a thin, nervous, underweight specimen, subject to various acute disturbances. Chronic eczema is one of the results of excessive protein. This may be so mild as to be considered only an irritation of the skin due to the wind and sun. This form of eczema is characterized by a bright redness of the cheeks, often more pronounced upon one cheek than the other, roughness of the skin, and occasionally minute red blotches. There may be also an irritation behind the ears and in other folds of the skin.

Asthma.—Another affection rarely attributed to dietetic causes is asthma, yet the “ingested”

form of this disease is due entirely to wrong feeding for that particular individual case. An excess of milk or eggs are the two most common causes, with oatmeal a poor third. In numerous cases of both eczema and asthma in children, the most effective treatment consists in a regulation of the diet, usually discontinuing eggs and milk altogether for a time, then reinstating in very small quantities and increasing gradually. One severe case of chronic "bronchial asthma" in a little girl nine years of age is typical; practically all her young life she had been a victim of this distressing affliction; expert care and treatment had been accorded her, thousands of dollars had been spent trying to find a climate that would be beneficial or a cure that would be effective. Her daily diet contained eggs and from two to three quarts of milk. When she was able to attend school which was very irregularly, she carried milk to drink at recess. The treatment instituted was wholly dietetic. Eggs were eliminated, milk was reduced and later removed entirely. A diet adequate in calories was prescribed, consisting of fruits, whole-grain cereals, whole-wheat bread, meat, butter, and an abundance of green vegetables. The child responded wonderfully and in a few weeks was experiencing no more trouble with her enemy—asthma. X-ray pictures of the chest which formerly revealed a marked thickening along the bronchial tubes, later showed a decided

improvement in this condition. She gained rapidly in weight (nine and three-fourth pounds in five months). The pinched, drawn look about her nose and mouth disappeared; the red, eczematous cheeks became softly rosy and smooth; her disposition changed from a nervous snappy, petulance to that of a quiet, hearty, normal child.

General Effects.—An excess of milk not only works a pernicious influence in a positive way, but likewise has a negative influence that is equally harmful. Milk is a ready-made, liquid food, which calls for no exercise of the organs of mastication; an inadequate development of jaws and teeth results. By satisfying a child's caloric requirements, so that he does not feel the need of other food, he comes to subsist largely upon milk, and doesn't learn to eat vegetables and cereals. In practically every case where a mother complains that her children will not eat vegetables, they are found to be drinking milk freely. Any child can be taught to like vegetables, provided a proper limit is placed upon his ingestion of milk, eggs, and sweets. A pint of milk a day is all any child over 18 months of age needs. Eggs had better be omitted from the diet of children under two years of age; after that time one to four eggs per week may be allowed.

Lunches.—The between-meal lunch is a pernicious habit in many homes, resulting in an

almost constant nibbling at sweets, crackers, bread and butter, apples, nuts, and ice cream cones. As a result a child's appetite is jaded and, when he comes to a properly balanced meal, he is with difficulty persuaded to eat at all. Plain foods have no appeal for him, and he is willing to consider only such as are highly seasoned or sweetened. In a few hours he is again hungry, and demands other lunches before the next regular meal time, and so the vicious circle progresses. One mother had often complained that she could not induce her little daughter to eat wholesome food. The child was much underweight, had badly decayed teeth, and was extremely nervous. The following is a sample of her daily diet: Breakfast, consisting of hot cakes and syrup, was eaten hurriedly so as not to be late to school. At noon she rushed home and lunched upon coffee and bananas, eaten from the pantry shelf. After her release from school, in the afternoon, she ate almost continuously of apples, candy, nuts, popcorn, bananas, and cookies. At dinner, the first wholesome meal of her day, she merely nibbled at her food and went to bed without having met any of the food requirements of her body, except possibly that of calories. This was in a home of more than average means, in which the children were denied nothing. Not many mothers commit such flagrant errors in child feeding, yet many are at fault to a lesser degree.

Perversions of Taste.—Occasionally we meet

a child whose taste is so perverted by improper training or wrong diet that there is an inordinate craving for minerals, such as excessive amounts of salt and lime. Cases are not uncommon of girls nearing puberty, who devour blackboard chalk or plaster dug from the walls, and of younger children who eat earth with avidity. These perversions of appetite in children, mentally normal, simply indicate a marked deficiency in those minerals which the body requires for development and growth. A complete, wholesome, and well-balanced diet is the only cure for such abnormal habits and desires.

Corrective Measures.—Parents who realize the inadequacy of a child's diet often allow it to continue unchanged because of the difficulty involved in trying to correct it. It is beyond question a difficult matter to reform a child's tastes and to substitute for a one-sided diet a well-balanced one. Firmness of conviction and purpose, even with strict discipline, will not always accomplish the desired end. A mother may remove the undesirable ration and introduce a proper one, but many a child will go hungry rather than eat food for which he imagines he has a dislike. It's the old story of leading a horse to water but not being able to make him drink. Starving a child for a meal or two will accomplish results in many cases. The mother must see that the child has sufficient outdoor exercise to induce a proper appetite, and that this is in no way appeased by

lunches or by sweets, until he has eaten a wholesome meal. If reasoning and persuasion fail, then more subtle methods must be devised. Rewards may be given or pleasures withheld according to the results obtained. Praise of the food by other members of the family has a beneficial psychological effect; parents can hardly expect a child to eat what they refuse. Sometimes a child who eats alone acquires very limited tastes, and this may be overcome by placing him at table with adults, provided the food served is suitable for a child's consumption. For the sake of their children, parents will often simplify their own diets, with resultant benefit to themselves. Sometimes the parents need disciplining more than the children, and frequently a grandmother is the chief source of the trouble. In some homes "grandmotheritis" is one of the greatest hinderances to the application of modern, scientific methods in the feeding of children. Fantastic games and fairy tales may be devised to accompany the disappearance of the unwelcome food. Likewise, the wonderful story of the digestion and assimilation of food by the cells of the body, and a description of the various needs of these cells will usually awaken an older child's interest and enthusiasm. A change to country or seaside is often a successful means of inducing a child to eat wholesome food; equally effective is placing him under authority other than that of the parents.

CHAPTER XIII

SOME COMMON FALLACIES IN THE CARE AND FEEDING OF CHILDREN

THROUGH the centuries past there have grown up many erroneous ideas in regard to the care of children. The innocent victims of these fallacies have, as a consequence, suffered pain, inconvenience, malnutrition and, at times, even death itself. Some firmly-held misconception or superstition regarding child-care can render a scientific régime in diet ineffective.

Dress. BANDS.—The infant's abdominal band is a valuable support and protection to the dressings of the cord and an aid in keeping the abdomen warm. As soon as the navel is entirely healed, the abdominal binder should be discontinued and the band with shoulder supports be adopted. A binder which may be only comfortably snug when adjusted, may become so tight after a full feeding as to cause pain and serious interference with digestion. The binder is a pernicious thing if worn too tightly; it not only causes discomfort, but if too long continued, materially weakens the abdominal muscles and frequently results in hernia.

WOOLENS.—Many adults are sensitive to wool, and infants, with their soft, tender skins, are nearly always irritated by contact with

woolen undergarments. More babies are overdressed than otherwise and the poor little things, in their effort to make their discomfort known, are fed and coddled and made more uncomfortable. Crying that is considered the evidence of colic or insufficient food often is occasioned by too much clothing. Many babies are covered with a fine, red rash from this cause alone; naturally they are irritable and discontented. Except for stockings, it is advisable to use no wool next to the skin of an infant. Many of the best hospitals use only cotton garments on new-born babes. If wool is desired, it should be used over the cotton.

Heliotherapy or The Sun Cure.—Older children are also frequently overdressed. Many youngsters four or five years of age wear woolen undergarments throughout the summer months. Cases of malnutrition which are slow in responding to treatment, often begin to show improvement as soon as the amount of clothing is reduced. During the summer youngsters may well be dressed very scantily. They soon become so accustomed to the air upon their bodies that they are not cold, even on cloudy, damp days. Improved circulation in the skin gives it a warm feeling similar to that occasioned by a fever. As soon as the body is exposed to the sun and air, the nutrition of the child always shows remarkable improvement. Typical results were obtained in a four year old boy, who was suffering



FIG. 32.—Boys dressed only in trunks and sandals playing in the snow.



FIG. 33.—Impression of child's mouth showing the irregular, protruding teeth and receding chin, due to thumb sucking and early loss of first molars. If not regulated by artificial means, the condition will become progressively worse as more permanent teeth crowd into the insufficient space. (Bottle-fed in infancy).

from a severe malnutrition and anæmia. He had been in the habit of sitting listlessly for hours, showing no interest in things around him and no desire to enter into the play of other children. Correction of his diet resulted in little improvement. As it was midsummer, the parents were advised to allow him to play in the sun, dressed only in trunks and a straw hat. Within three weeks he was an alert, wide-awake, normal child, with a keen appetite for food and for play. His anæmia was rapidly disappearing, and he had gained two pounds in weight. The father became so enthusiastic over the results that he allowed the younger child to dress in a similar manner, and extended the treatment far into the winter. The accompanying picture (Fig. 32), shows the two boys, in their scant raiment, gleefully rollicking in the December snow. "Back to nature" applies as well in clothing as in food or exercise.

Antiseptics.—When the destructive power of certain drugs over germs was first discovered, surgeons began operating in a spray of carbolic acid. Many a patient, as well as doctor, lost his life through carbolic acid poisoning. The remedy was worse than the disease. It was then discovered that absolute cleanliness of instruments, hands, and parts adjacent to the wound was all that was necessary to prevent infection. This was obtained by sterilization and was termed *asepsis*.

NAVEL.—The same truth applies in the care of infants. Many nurses and some doctors deem it necessary to use antiseptics lavishly in the care of new born babies. Neither boric acid nor any other antiseptic should be used on the freshly cut cord. Their use results in an irritation of the parts and produces granulation tissue, which bleeds easily and causes the navel to be very slow in healing. Recently, an infant was seen shortly before its death, who had a deep ulcer at the navel, surrounded by an inflamed area fully two inches in diameter. The non-professional attendant at the time of birth had freely applied a strong antiseptic in dressing the cord. This caused an irritation of the skin which permitted germs to enter. The autopsy showed that the infection at the navel had caused death. The best treatment for the cord is the use of dry, sterile dressings renewed daily or whenever soiled.

MOUTH AND NIPPLES.—A few years ago it was considered necessary to swab out the infant's mouth with boric solution every day. As a result many a poor little victim developed a sensitive mucous membrane which was susceptible to all sorts of infections, notably thrush. A well baby's mouth needs no cleansing. In like manner, boric solution is often applied to the mother's nipples before and after nursing. The drug irritates the skin, makes nursing painful, and permits infections which cause fissures and

bleeding nipples. These are so painful that they are not an infrequent cause of weaning. If the nipples are bathed with pure, boiled water before and after nursing, no further treatment is necessary to render them clean before being introduced into the infant's mouth.

Gargling.—Older children and adults often use various antiseptics for gargling the throat, in the hope of avoiding the contraction of some disease. This continuous gargling produces the very result which they aim to prevent. By causing an irritation of the mucous membranes, the person is rendered more susceptible to invading germs. The best non-irritating gargle is normal salt solution, which is made by dissolving a level teaspoonful of salt in a pint of water.

SLEEP.—All young children should sleep alone and, if possible, in a room by themselves. An infant who shares his mother's bed has his sleep interrupted and broken, fusses more frequently to nurse, and in many cases does nurse, almost continuously, throughout the night. A child who has his individual bed is less nervous, is more easily trained, and gets a more adequate amount of sleep. His bed should be in a room which has a goodly supply of fresh air, with some protection from strong, direct drafts. The day-time naps are best taken on a porch; to a child accustomed from birth to outdoor naps there is little danger from cold even in quite severe weather provided he is suffi-

ciently protected with warm garments. A young babe should spend at least twenty hours a day in sleep. This is gradually lessened as the child grows older, but all children up to nine years of age require ten to twelve hours of sleep. The very pernicious habit of allowing children to keep the same hours as their elders is accountable for a goodly percentage of nervous disorders. No young child should be taken to an evening function which keeps him up later than nine o'clock.

HOURS OF SLEEP

	Hours per day
New-born infant	20-22
At six months	18-20
At one year	16-18
2-4 years	12-14
5-6 years	12
6-9 years	10-12
9-12 years	10
After 12 years	9

FONDLING OF INFANTS.—There is nothing in all the world more universally appealing and altogether adorable than a young babe; and it is more to gratify our own selfish delight that we handle and fondle them, than for any good they may derive from such treatment. Many babies come to like it, however, and will cry to be held or carried. The extremes to which young parents will sometimes go in their efforts to quiet a crying youngster by such indulgent methods are

almost beyond belief. One young couple had a spoiled child that enjoyed being carried, and likewise had a peculiar fondness for headgear. This father said in all seriousness that more than one night, clad in his pajamas and hat, he had walked the floor for hours with that child in his arms.

A weak, poorly nourished child should not be subjected to handling, as it uses up energy needed to keep him alive. A healthy youngster, after it is ascertained that there is nothing wrong, may be allowed to cry for an hour or two a few times, until he learns that he must lie quiet even when awake. A child who is thus trained from early infancy, and taken up at intervals only for necessary attention, or at rarer intervals for relaxation, will develop the power to amuse himself; and, when he becomes older, will not demand constant entertainment by an adult. The handling and fondling habit develops a nervous, irritable child that demands continual change and excitement.

KISSING is an abomination not to be tolerated by modern mothers. No good results to the babe from the habit, and frequently diseases are transmitted in this manner. If fond admirers must thus indulge themselves, let them kiss the top of the babe's head or the back of his neck. Kissing on the mouth or face should not be permitted with young children. With older chil-

dren the French custom of kissing on the cheeks is permissible.

Thumb-sucking.—The first movements of an infant's hands are toward his mouth and he instinctively puts everything possible into it. The muscles respond to the stimulus and at once begin the act of sucking. The mouth is not supposed to work incessantly, however, and needs rest as much as any other part of the body. If worked continuously through the habit of thumb-sucking the muscles become overdeveloped and draw the soft cartilaginous bones out of their normal relationships. The arch becomes narrow and high, the front teeth protrude, and the nasal passages become crowded, giving an ideal opportunity for the growth and enlargement of adenoid tissue. The adenoid face, with the lips pursed forward in the sucking position and no grooves between them and the cheeks, resulting in the blank, idiotic expression so characteristic of a child thus burdened, is familiar to us all. Likewise the teeth are misshapen and the hands deformed by the thumb-sucking habit. (Fig. 33). The germs that enter the system by this means, after the child begins creeping, are multitudinous. For these several reasons, it is better to prevent a child's forming this habit if possible. If it has become quite firmly established, it should not be allowed to continue longer than the first half-year.

METHODS.—The child may often be easily cured of his thumb-sucking by tying a rubber glove finger over the thumb or finger used. Sometimes more strenuous methods must be adopted, such as a paste-board cuff about the elbow which renders it impossible for him to raise his hand to his mouth. This should extend from above the elbow to the wrist; the ends of the shirt sleeve should be pinned back over it, so that it may be held in place and the edges of the cuff may not irritate the tender skin. Aluminum mitts are also of value for this purpose. During sleep, the child's sleeves may be pinned to the bed to prevent his raising the hands to the mouth.

“*Pacifiers.*”—Whatever the evil effects of thumb-sucking may be, these are intensified by the use of a rubber nipple known as a “pacifier.” It is more constantly in use, it is far more uncleanly, and the habit is a much harder one to correct. More serious defects to teeth and jaws come from the pacifier than from thumb-sucking. There is never any excuse for the forming of this pernicious habit. Who has not witnessed a child noisily sucking on a pacifier in some public place, when, suddenly, the object would roll across the floor; hurriedly the mother would recover it and wiping off the most apparent of the filth collected in its journey, instantly return the unclean object to the howling child? It is hard to imagine a more disgusting practice.

Teething.—Abraham Jacobi once said that if we judged the causes of death by those given in death certificates, more persons had lost their lives from teething than from all the wars of history. He was the first to point out the fallacy of this idea, and to demonstrate that this natural and physiological process is unjustly blamed for many of the ills of infancy. Teething is no longer accepted by health boards as a sufficient cause of disease or death.

If the child has had his organs of mastication properly developed by hard food, he will suffer little or no disturbance with the eruption of his teeth. Children who are unwisely fed have latent digestive troubles which become acute whenever there is a slight variation in their physical condition. There may be an increased flow of saliva, due to the local irritation occasioned by the pressure of the teeth against the gums, and the child may exhibit some peevishness, but severe symptoms, such as fever and diarrhœa, never result from the simple physiological process of the eruption of the teeth.

“**SECOND SUMMER.**”—The fear of the second summer has long been a well-known bogy. It is as unfounded as the erroneous beliefs regarding teething. If a sensible regime has been followed in the feeding of a child, there is no more occasion for concern regarding this time of a child's life than any other summer season.

The reason for the "second summer" fallacy is that many mothers have ceased to give sufficient attention to a child's diet at this age. With the coming of hot weather, when foods are less sterile and when the body's resistance is lowered because of the heat, acute digestive troubles develop easily. During the second summer a child often is taken about to public places for the first time. He goes upon picnics and excursions, mingles in promiscuous crowds, eats a variety of undesirable and unsuitable foods, all of which leads to alimentary troubles. Cases of infectious diarrhœa are frequently contracted in this way. The observance of a few simple rules will usually avoid any such trouble. Additional caution should always be exercised during the extreme heat of summer in the sterilization and care of milk, fruits, and vegetables, as bacteria grow so much more readily in hot weather and foods spoil so much more easily. Simple home-cooked meals, somewhat less in amount during the hot season, plenty of pure water, and an avoidance of crowds, will usually result in freedom from digestive troubles, whether it be a child's second summer or any other.

CATHARTICS.—One of the most firmly established of the erroneous ideas pertaining to the care of children is the one regarding castor oil and other cathartics. For every ill of childhood, from indigestion to the more serious contagious diseases, most parents and some physicians will

immediately administer a dose of castor oil. In certain instances, the use of this drug is responsible for the death of the child. Where there is a hard fight ahead, castor oil depletes the patient's strength and hurries the end. Its rapid action is due to its irritation of the mucous membrane lining the bowel; for days after the drug is given the stools contain red blood cells. The purpose in administering the oil is to clean out the large bowel; the stomach and small bowel rarely need cleansing. The large bowel can be emptied much more quickly, safely, and painlessly by a warm water enema. How foolish we would consider the housewife who, in order to scrub her kitchen floor, would turn the hose in at the front door and force the water clear through the house to the kitchen. This is exactly what is done when castor oil is given by mouth to clean out the lower bowel. Even enemas should not be used frequently, or the bowel soon learns to wait for this extra stimulation. It is not always necessary for an infant or child to have a movement daily. Many breast-fed infants so completely assimilate all the food taken that they do not have a sufficient residue of waste matter to require a daily evacuation. So long as the child indicates no discomfort and the former movements have been normal, a mother need feel no alarm should two or three days elapse between movements. Chronic constipation must be corrected by some change in the diet, such as, the addition of fruit juices, fruit pulp, or green

vegetables. Regular habits and massage of the abdomen are beneficial also in relieving this condition.

Uncleanliness. Toys.—It is a dangerous and pernicious habit to allow small children to exchange toys, as they almost invariably introduce these at once into their mouths. Infants' toys should be of such a nature that they can be scrubbed frequently with soap and water and should be individual possessions. Children should not be allowed to pick up playthings found upon the street, or elsewhere, and use them without a careful cleansing.

FOOD.—Children of even fastidious parents are permitted to share alternate bites of food with companions, and to eat candy or fruit that has rolled upon the floor of railway stations and other public places. The fruit from a public stand should not be eaten without a thorough cleansing, as it is exposed to the dust of the street and germs from the mouths of passersby. There is no better medium for the growth of bacteria than fully ripe or partly decayed fruit. Many instances of acute minor disturbances as well as typhoid, tuberculosis, and influenza have originated from contaminated food. Why will a parent, fastidious to a degree in respect to her own food, permit her child to creep over the dirty floor of a public waiting room and pick up particles of food? Yet one frequently sees this dangerous and disgusting practice. Every effort should be made to teach a child, while

very young, never to put anything into his mouth that is not known to be clean.

Bedtime Stories.—It is an accepted fact supported by psychologists that one of the most effective methods of instilling right thoughts and habits into a child's consciousness is by stories told at bedtime, when the child's body is quiescent and the conscious mind drowsy with sleep. The subconscious self, which is then in control, may be moulded, by suggestion, into what we desire it to be. The mistake is often made, however, of relating at this hour tales of thrilling adventure and exciting wonder. By such stories, the child is wrought up to a nervous pitch that often persists throughout the night. The bedtime story should be one of Mother Nature, or one illustrating a certain trait of character desired in the child. It should be told with a calm, unimpassioned voice, such as induces a quiet restful sleep. At all times the stories children hear or read should be suited to their ages and to their mental development. They are injured by stories which tax their minds, just as they are by doing school work that is beyond their capabilities. Children who spend too much time reading and too little time in exercise develop their minds at the expense of their bodies. No parent should try to make his child too precocious, but should be satisfied with a normal mental growth corresponding to the physical development.

APPENDIX

FOODS AND FOOD COMBINATIONS IN 100 CALORY PORTIONS

	C = cup	T = tablespoon	t = teaspoon
Food	Food measured as served		
Almonds	10-15		
Apples	1 large		
Apple sauce	½ C.		
Apricots	3 large halves, 2 T. juice		
Asparagus	20 stalks, 8 in. long		
 B			
Bacon	Slice 5 x 1¼ x ⅛ in.		
Banana	1 large		
Beans, navy	1 C.		
Beans, lima	1 C.		
Beans, string	2¼ C.		
Bean soup	1 C.		
Beef, round, lean	3 x 2½ x ½ in.		
Beets	1½ C. diced		
Biscuits	2 small		
Blackberries	1 C.		
Bread—Graham	1 slice 4 x 4½ x ½ in.		
Bread—white	1 slice 4 x 4½ x ½ in.		
Brown Betty	1/5 C.		
Butter	1 T.		
Blanc Mange (corn starch)	¼ C.		
Buttermilk	1⅛ C.		
 C			
Cabbage	5 C. shredded		
Cakes—angel	4 x 2 x 2½ in.		
Cakes—butter	¾ x 1 x ¾ in.		

Cakes—chocolate	2½ x 2½ x 1 in.
Cakes—sponge	1½ x 1½ x 2 in.
Carrots	2 C. diced
Cauliflower	1 very small head
Cantaloupe	1 melon 4½ in. diam.
Celery	4 C. of ¼ in. pieces
Cheese, American	1 x 1 x ¾ in
Cheese, cottage	½ C. scant
Cherries	1 C.
Chicken	¼ C.
Chocolate (made with milk)	⅓ C.
Cocoa	2/5 C.
Cocoanut, shredded	1/5 C.
Cookies, plain	3-2 in. diam.
Cookies, molasses	2-3 in. diam.
Corn, fresh	½ C.
Corn, canned	½ C.
Corn bread	2 x 2 x 1 in.
Cornmeal mush	9 T.
Cottage pudding	2 x 2 x 2 in.
Cream 16 per cent.	¼ C.
Cream whipped	2 T.
Cream vegetable soups	½ C.
Cream of wheat	¾ C.
Crackers—graham	2½
Crackers—soda	4 (large)
Cranberries	2 C.
Custard	⅓ C.

D

Dates, dried	4
Date pudding	1 x 1 x 2 in.
Dried beef creamed	¼ C.

E

Eggs	1⅓
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F

Farina	$\frac{3}{4}$ C.
Figs, dried	3 medium
Fondant	1 T.
Fudge, chocolate	$1\frac{1}{2} \times \frac{3}{4} \times 1$ in.
French toast	$3 \times 3 \times \frac{1}{2}$ in.
Filberts	8-10

G

Gelatin	4 T. scant
Gingerbread	$1 \times 2 \times 2$ in.
Grapes	1 large bunch
Grape Juice	$\frac{1}{2}$ C.
Grape Fruit	$\frac{1}{2}$ medium

H

Halibut steak	$3 \times 2 \times 2$ in.
Ham, smoked	$4 \times 3 \times \frac{3}{8}$ in.
Heart	1 oz.
Hominy grits	2 T.
Honey, strained	1 T. to $1\frac{1}{2}$ T.

I

Ice cream	$\frac{1}{4}$ C.
Ices	$\frac{1}{2}$ C.

K

Kidney	2 oz.
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L

Lemonade	$1\frac{1}{2}$ C.
Lettuce	2 medium heads
Liver	2 oz.

M

Macaroni, with cheese	$\frac{1}{2}$ C.
Macaroni, with tomato and bacon	$\frac{1}{2}$ C.
Marmalade, orange	1 T.
Milk, condensed	$1\frac{1}{2}$ T.
Milk, skimmed	$1\frac{1}{8}$ C
Milk, whole	$\frac{5}{8}$ C.
Muffins	$\frac{1}{2}$

O

Oats, rolled	$\frac{1}{2}$ C.
Olives	5-6
Onions, fresh	2 medium
Oranges	1 large—2 small
Orange juice	1 C.
Oysters	$\frac{2}{3}$ C.
Oyster soup	$\frac{1}{2}$ C.

P

Peaches, fresh	3 medium
Peaches, canned	2 large halves, 3 T. juice
Pears	2 medium
Peas	$\frac{3}{4}$ C.
Pies, apple	$1\frac{1}{2}$ in. at circum.
Pies, cream	2 in. at circum.
Pies, lemon	1 in. at Circum.
Pies, pumpkin	2 in. at circum
Pineapple	1 slice—3 T. juice, $\frac{1}{4}$ C.
Plums	3-4 large
Pork chops	2 x 2 x $\frac{1}{2}$ in.
Potatoes, Irish	1 medium
Potatoes, sweet	1 small
Pecans	12 meats
Peanut butter	$2\frac{1}{2}$ T.
Prunes, dried	5 or 6
Puffed rice	$1\frac{1}{2}$ C.
Puffed wheat	$1\frac{2}{3}$ C.

R

Raisins	$\frac{1}{4}$ C.
Raspberries	$1\frac{1}{8}$ C.
Rice (cooked)	$\frac{1}{2}$ C.
Rice with cheese	$\frac{1}{2}$ C.
Rice with raisins	$\frac{1}{2}$ C.
Rice pudding	$\frac{1}{3}$ C.
Rice with tomatoes	$\frac{1}{2}$ C.

S

Salad dressing, cooked	$4\frac{1}{2}$ T.
Salad dressing, French	$3\frac{2}{3}$ T.
Salad dressing, mayonnaise	1 T.
Salmon, canned	$\frac{1}{2}$ C. scant
Salmon, loaf	$\frac{1}{3}$ C.
Sherbet, milk	$\frac{1}{4}$ C.
Shredded wheat	1 biscuit
Strawberries	$1\frac{1}{3}$ C.
Steak	4 x 1 x 1 in.
Sugar	2 T.
Sugar loaf	$3\frac{1}{2}$ lumps
Squash	$\frac{1}{2}$ - $\frac{3}{4}$ C.

T

Tomatoes, fresh	3 medium
Tomatoes, canned	2 C. scant
Turnips	2 C.

W

Walnuts	8-16 nuts
White sauce	4 T
Whole-wheat Cereal (Cracked or Granular) (See also page 154.)	$\frac{1}{2}$ C.

RECIPES FOR SIMPLE DISHES

MOST OF WHICH ARE SUITABLE FOR CHILDREN

SOUPS

*With Meat Stock**Beef Broth*

2 lb. shin of Beef	1 teaspoon Salt
1 quart cold Water	1 diced Carrot
1 small Onion	1 small Turnip

Wipe the meat and cut the lean part in small pieces. If brown stock is desired, put the lean meat in a hot frying pan in marrow from the bone and brown well. Put bone, browned meat, water and salt into a soup kettle and heat slowly for one and one-half hours. Remove scum as it rises. Add vegetables, any seasonings desired, and cook for one-half hour. Parsley, marjoram, bay leaf, thyme, celery leaves, and pepper give desirable flavors if soup is used for adults only. Strain and cool. When cold remove the fat. This may be kept in a cool place and used as desired for broth or as a stock for vegetable soups. A white soup stock may be made by using knuckle of veal.

Bean Soup

Beans	1 cup tomatoes (Strained)
1 quart Water	Salt
1 slice Onion	
2 cups cold baked or boiled beans	

Put the beans, water and onion in a kettle and simmer twenty minutes. Rub through a sieve. Add strained tomatoes, season. Reheat.

Corn Soup

1 can Corn	Salt
1 quart Meat Stock	

Add stock to corn and simmer 20 minutes. Rub through a sieve. Season and reheat.

Tomato Soup

2 cups strained Tomatoes. Salt

1 cup Meat Stock

Add stock to tomatoes and simmer 20 minutes. Season.

*With White Sauce**White Sauce I*

$\frac{1}{8}$ to $\frac{1}{4}$ cup Butter

1 quart milk, vegetable juice

$\frac{1}{4}$ cup Flour

or part Water

Salt

Flavoring: $\frac{1}{2}$ Onion

1 sprig Parsley

Celery Leaves

1 Bay Leaf

Any strong juiced or flavored vegetable.

Mix butter and flour. Add to the scalded milk. Cook in double boiler five minutes. Omit flavoring for younger children.

Cream of Asparagus soup

1 can Asparagus Salt

1 quart White Sauce Seasoning

Drain and rinse asparagus. Reserve tips. Push stalks through a sieve and add to the white sauce. Season, add tips and reheat.

Cream of Cauliflower Soup

1 Cauliflower (small) Salt

1 quart White Sauce Seasonings

Soak cauliflower, head down, for one hour in cold salted water. Cook in boiling salted water twenty minutes. Reserve one cup of flowerets and rub the rest through a sieve. Add to the white sauce. Season, add the flowerets and reheat.

Cream of Carrot Soup

1 pint Carrots Salt

1 quart White Sauce Seasonings

Wash and scrape the carrots. Cook in boiling salted water until tender. Push through a sieve. Add to the white sauce, season and reheat.

Cream of Celery Soup

3 cups Celery	Salt
1 quart White Sauce	Seasonings

Cook celery in small amount of water ten minutes. Push through a sieve. Add to the white sauce, season and reheat.

Cream of Clam Soup

1 pint Clams	Salt
1 quart White Sauce	Seasonings

Clean and pick over clams. Add liquor to hard part of clams, finely chopped and simmer twenty minutes. Add this and soft part of clams to white sauce. Season and reheat.

Cream of Lettuce Soup

2 heads Lettuce	Salt
3 cups White Sauce	Seasonings
2 tablespoons Rice	

Cook the rice until tender in one cup boiling water. Add it, the very finely chopped lettuce, and seasonings to the white sauce. Cook fifteen minutes in a double boiler.

Oyster Stew

1 quart Oysters	4 tablespoons Butter
1 quart Milk	Salt

Wash and pick over oysters. Heat liquor to boiling point and strain. Add oysters and milk to the liquor and cook until the oyster edges begin to curl. Add butter and salt.

Cream of Pea Soup

1 can Peas	Salt
1 quart White Sauce	Seasonings

Drain liquor from peas. Push through sieve and add to white sauce. Season and reheat.

Cream of Potato Soup

2 cups cooked Potatoes Salt
 1 quart White Sauce Seasonings

Rub potatoes through a sieve and add to the white sauce. Add seasonings and reheat.

Cream of Spinach Soup

1 cup cooked Spinach Salt
 1 quart White Sauce Seasonings

Rub spinach through a sieve and add to the white sauce. Add seasonings and reheat.

Cream of String Bean Soup

2 cups String Beans Salt
 1 pint White Sauce Seasonings

Cook beans until soft in boiling salted water to cover. Push through a sieve. Add liquor and pulp to white sauce. Season and reheat.

CEREALS*Methods of Preparation.*

1. Put required amount of water and salt in the top of the double boiler and heat directly over the flame to the boiling point. Drop in the cereal so slowly that the water keeps bubbling violently. Stir constantly. Cook directly over the flame for five minutes. Complete cooking in the double boiler for 30 minutes to one hour—more if flavor of long cooked cereal is preferred.

2. Mix equal amount of water and cereal, though finely divided cereals require more water. Add to the boiling salted water. Cook directly over the flame for five minutes. Complete cooking in a double boiler, over an asbestos pad, or directly over a slow wood fire. Cook for 30 minutes without double boiler or from one to two hours if double boiler is used.

3. (This method is especially good for whole-grain wheat and oat cereals.) Soak one cup of cereal in four cups of cold water over night in single boiler. The next morning bring to a boil directly over fire. Stir well, cover and cook slowly for 30 minutes over an asbestos mat, or one hour in double boiler.

Bran Mash.

1 cup Bran	1 tablespoon Agar-agar
1 pint Water	$\frac{1}{4}$ teaspoon Salt

Put the ingredients in a sauce pan and heat slowly to the boiling point. Simmer for ten minutes or until the Agar-agar is dissolved. Pour into a loaf pan and allow to solidify at room temperature. Serve sliced with sugar and cream for cases of constipation. A thin slice added to a cooked cereal is often more appetizing.

Cornmeal Mush.

1 cup Cornmeal	1 teaspoon Salt
5 cups Water	

Use any of the above methods of preparation.

Cream of Barley.

1 cup Cream of Barley	1 teaspoon Salt
4 cups Water	

Use any of the above methods of preparation.

Cream of Rye.

1 cup Cream of Rye	1 teaspoon Salt
4 cups Water	

Use any of the above methods of preparation.

Cream of Wheat.

1 cup Cream of Wheat	$1\frac{1}{2}$ teaspoons Salt
6 cups Water	

Use any of the above methods of preparation.

Farina

$\frac{3}{4}$ cup Farina	1 teaspoon Salt
4 cups Water	

Use any of the above methods of preparation.

Hominy Grits.

1 cup granulated Hominy 1½ teaspoons Salt
4 cups Water

Use any of the above methods of preparation.

Hulled Wheat.

1 cup Hulled Wheat 1 teaspoon Salt
3 cups Water

Look over the wheat, wash and drain. Soak in cold water eight hours. Add salt and heat to the boiling point. Boil for ten minutes. Finish cooking in a double boiler for two hours or fireless cooker for six hours.

Oatmeal.

1 cup Oatmeal (coarse) 1 teaspoon Salt
4 cups Water

Use any of the above methods of preparation.

Rice. (Boiled)

1 cup Rice 1 teaspoon Salt
8 cups Boiling Water

Pick over the rice. Wash until the water is clear. Drop into the boiling salted water which is kept bubbling violently. Boil thirty minutes or until soft. All the water should have disappeared. If any is left, drain and use for soup. Pour over the rice one quart hot water. Return to kettle and place uncovered on back of range to dry off. Kernels should be distinct; when stirring use a fork to prevent breaking kernels.

Rice. (Steamed)

1 cup Rice 1 teaspoon Salt
3 cups Water or Milk

Pick over the rice. Wash until the water is clear. Put salt and water or milk in the top of the double boiler and place on range. Add rice, stirring with a fork. Cook five minutes, cover, place over under part of double boiler and steam 45 minutes or until kernels are soft. Uncover so steam may escape.

Rolled Oats.

1 cup Rolled Oats 1 teaspoon Salt
3 cups Water

Use any of the above methods of preparation.

Scottish Oatmeal.

1 cup Oats 1 teaspoon Salt
4 cups Water

Use any of the above methods, though No. 3 gives the best results.

Wheat Germ

1 cup Wheat Germ 1 teaspoon Salt
4 cups Water

Use any of the above methods of preparation.

Wheat Granules.

1 cup Granules 4 cups Water
1 teaspoon Salt

Cook by method No. 3 for best results.

Wheat Flakes.

1 cup Flakes 1 teaspoon Salt
4 cups Water

Use any of the above methods of preparation.

MEATS**BEEF.***Flame Broiled Steak.*

Wipe with a damp cloth and trim off superfluous fat. Oil the wire broiler with some of the fat and place meat on the rack. Turn as soon as seared on one side and continue turning every minute until the meat is well seared all over,

then turn occasionally until cooked as thoroughly as desired. Steak cut one inch thick will take ten minutes, if liked rare; 15 minutes, if well done. Remove to hot platter, spread with butter and season with salt and pepper.

Pan Broiled Steak.

Prepare as above. Oil a heavy frying pan with some of the superfluous fat. When this is smoking hot put in the steak. Continue as above.

Broiled Liver.

Cover liver with boiling salted water for five minutes to draw out blood; drain. Sprinkle with salt. Place on an oiled wire broiler or in a heavy skillet and broil five minutes, turning often. Remove to hot platter, spread with butter and season.

Liver Loaf No. 1.

(For Children).

Put one-half pound of fresh calves' liver through the meat grinder, using a fine knife. Add salt and mix with two tablespoons graham flour or bread crumbs, or one egg yolk. Put into a small pan or casserole containing a tablespoon of melted butter. Bake slowly for 30 to 40 minutes.

Liver Loaf No. 2.

Parboil 2 pounds liver and then put through a food chopper. Place in a bowl, add 2 chopped onions and one cup fine bread crumbs. Season with salt, paprika and herbs. Mix thoroughly and pack in well greased mould (loaf shaped). Set in large pan containing warm water. Bake for 50 minutes in moderate oven. Serve hot with cole slaw.

Liver and Spinach.

Use one-half pound liver: scald, wipe dry, dredge in flour and broil in small amount of bacon fat. When tender remove from fire and put on hot bed of steamed spinach that has been seasoned with salt, pepper and lemon juice. Make thick milk

gravy from pan in which liver was cooked and pour over liver and spinach, or serve plain without gravy.

Roast Beef.

Wipe the meat with a damp cloth. Rub with salt and dredge in flour. Put in roaster and sear quickly in a hot oven. If meat is very lean, add fat trimmings to the pan. Baste every fifteen minutes. Decrease the heat after meat is well browned.

LAMB AND MUTTON.

Flame Broiled Chops.

Wipe chops, remove superfluous fat and place in a hot broiler oiled with mutton fat. Turn as soon as seared. Complete cooking for 12-15 minutes at a slightly lowered temperature.

Pan Broiled Chops.

Same as above, but use a heavy skillet in place of a broiler.

Boiled Leg of Mutton.

Wipe meat, place in kettle and cover with boiling water. Bring quickly to boiling point, boil five minutes, and skim. Simmer until meat is tender. When half done add one tablespoon salt.

Kidney Rolls.

Mix one-half cup stale bread crumbs, one-half small onion finely chopped and one-half tablespoon finely chopped parsley. Season with salt and moisten with beaten egg. Spread mixture on thin slices of bacon and fasten around pieces of lamb's kidney, using skewers. Bake in a hot oven twenty minutes.

Roast Leg of Lamb.

Remove caul and wipe meat, sprinkle with salt and pepper and dredge meat and pan with flour. Place in hot oven

and baste as soon as flour in pan is brown and every fifteen minutes thereafter until meat is done. Add small amount water to pan if necessary.

VEGETABLES

All vegetables should be washed in cold water and cooked until soft in a small amount of boiling salted water in a covered kettle, unless it is desirable to remove some flavor. In this case start the process in cold water and leave the kettle uncovered. If vegetable water is not served with the vegetables, save and use for soup. Avoid overcooking vegetables; use the uncooked vegetable whenever possible. For infants under two years all vegetables should be rubbed through a sieve.

White Sauce II.

$\frac{1}{8}$ to $\frac{1}{4}$ cup Butter	1 pint Milk, Vegetable Juice
$\frac{1}{4}$ cup Flour	or part Water

Mix butter and flour. Add to scalded milk. Cook in double boiler five minutes.

Asparagus.

Wash and cut off lower part of stalks as far down as they will snap. Cook in boiling salted water fifteen minutes, leaving the tips out of water the first ten minutes. Drain and season with butter.

Creamed Asparagus.

4 cups cooked Asparagus	1 pint White Sauce II
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String Beans.

Remove strings and break in one inch pieces. Wash and cook in boiling salted water 45 minutes to one hour. Drain and season with butter. Meat bone, salt pork or bacon give good flavor to beans.

Creamed String Beans.

4 cups String Beans (cooked)	1 pint White Sauce II
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Shell Beans.

Wash and cook in small amount of boiling salted water for one to one and one-half hours. Season with butter.

Lima Beans.

Soak one cup lima beans over night. Drain and cook in small amount of boiling salted water until soft. Season with butter.

Cream of Lima Beans.

3 cups Lima Beans 1 pint White Sauce II

Beets.

Wash and cook in boiling salted water until tender. Drain, put in cold water and remove the skins. Quarter and season with butter. To preserve vitamins, beets may be pared and diced before cooking that the time for cooking may be shortened.

Brussels Sprouts.

Remove wilted leaves and soak in cold water fifteen minutes. Cook in boiling salted water until tender. Drain and season with butter.

Creamed Brussels Sprouts.

4 cups boiled Sprouts 1 pint White Sauce II

Scalloped Brussels Sprouts.

Put 4 cups boiled Brussels Sprouts in an oiled baking dish, sprinkle with salt, add 1 pint White Sauce II. Cover with buttered bread crumbs and bake until browned.

Cabbage.

Remove outside leaves, shred and cook in salted water for twenty minutes. Drain and season with butter.

Creamed Cabbage.

4 cups boiled Cabbage 1 pint White Sauce II
2 tablespoons Vinegar, if
desired

Scalloped Cabbage.

Put 4 cups boiled cabbage in an oiled baking dish. Add 1 pint White Sauce II. Cover with buttered bread crumbs and bake until browned. One-half cup cheese added to White Sauce gives a good flavor.

Carrots.

Wash, scrape and slice carrots. Cook until tender in small amount boiling salted water. Season with butter.

Creamed Carrots.

4 cups boiled Carrots 1 pint White Sauce II

Cauliflower.

Remove leaves, cut off stalk and soak thirty minutes in cold salted water (head down). Cook, head up, or broken in flowerets in boiling salted water until tender. Drain and butter.

Creamed Cauliflower.

4 cups boiled Cauliflower 1 pint White Sauce II
Juice of one lemon may be added if desired.

Celery.

Wash, scrape and cut stalks in one inch pieces. Cook until tender in boiling salted water. Drain and season with butter.

Creamed Celery.

4 cups cooked celery 1 pint White Sauce II

Corn.

Remove husks and silks. Cook ten to twenty minutes in boiling water. Serve on the cob or cut from the cob and add butter.

Creamed Corn.

4 cups cooked Corn 1 pint White Sauce II

Scalloped Corn.

Put 3 cups cooked corn in an oiled baking dish. Add 1 pint White Sauce II. Cover with buttered bread crumbs and bake until nicely browned.

Corn a la Southern.

To one can corn add two beaten eggs, one teaspoon salt, one tablespoon butter and one pint milk. Bake in an oiled baking dish until firm.

Greens, Spinach, or Swiss Chard.

Pick over and wash greens. Cook in a small amount of boiling salted water until tender. Drain and season with butter.

Onions.

Remove skins from onions while under cold water. Cover with boiling salted water and boil five minutes. Drain and again cover with boiling salted water. Cook until tender. Drain and season with butter.

Scalloped Onions.

Cut 8 onions in quarters. Put in an oiled baking dish and add 1 pint White Sauce II. Cover with buttered crumbs and bake until nicely browned.

Peas.

Cook shelled peas in small amount of boiling salted water until tender. Season with butter.

Creamed Peas.

4 cups cooked Peas 1 pint White Sauce II

Spinach

Wash carefully in running water two or three times. The water that clings to the leaves is sufficient for cooking. Add salt. Boil ten minutes. Season with butter and serve. A slice of bacon may be cooked with the spinach if desired.

Squash.

Wash squash, cut in pieces, remove seeds and stringy parts and pare. Cook in very small amount of boiling salted water or steam until tender. Mash and season with butter.

Baked Squash.

Prepare as above, cutting into 3 inch pieces, but do not pare. Bake in moderate oven until soft.

Succotash.

1 cup Corn $\frac{1}{2}$ teaspoon Salt
1 cup Lima Beans $1\frac{1}{2}$ tablespoons Butter

Soak lima beans in cold water over night. Drain and add one quart boiling water. Cook until almost tender. Add salt, corn and butter, and complete the cooking.

Tomatoes.

Wipe, skin and cut tomatoes in pieces. Cook slowly until tender. Season with butter and salt.

Baked Tomatoes.

Wipe and remove a half inch slice from the stem end of the tomatoes. Make a small opening in the centre of each tomato and fill with meat, cheese, celery, onion or any left over vegetable. Sprinkle with bread crumbs and bake until tender.

Scalloped Tomatoes.

Put a layer of bread crumbs in the bottom of an oiled baking dish. Add a layer of cooked, salted tomatoes. Repeat until dish is full having the crumbs on top. Bake until browned.

Turnips.

Wash, pare, and quarter turnips. Cook until soft in very small amount of boiling salted water. Drain and butter or mash and season.

Creamed Turnips.

4 cups cooked Turnips 1 pint White Sauce II

DESSERTS

Bread Pudding.

2 cups stale Bread Crumbs.	2 Eggs
1 quart Milk	$\frac{1}{4}$ teaspoon Salt
$\frac{1}{3}$ cup Sugar	1 teaspoon Vanilla
2 tablespoons melted Butter	3 tablespoons Raisins or Currants

Mix the ingredients in the order given. Bake in a buttered baking dish in a slow oven for one hour.

Baked Apples.

6 Apples	1 cup Water
Few drops Lemon	$\frac{3}{4}$ cup Sugar

Wipe, core, and pare apples. Put apples in baking dish and add few drops of lemon to each. Fill cavity with sugar or make syrup of sugar and water and pour in the dish. Four cloves may be stuck in each apple for flavor. If apples are not pared, a line cut through the skin around the centre of the apple will prevent the skin breaking. Basting apples makes the skin tender.

Baked Pears.

8 Pears	$\frac{1}{2}$ cup Brown Sugar.
2 tablespoons Butter	

Cut pears lengthwise, remove core and sprinkle one-half tablespoon brown sugar and dot of butter on each half. Bake until tender and browned.

Bavarian Cream.

2 tablespoons granulated gelatin	1 pint whipping Cream
$\frac{1}{2}$ cup cold Water	1 can grated Pineapple
	$\frac{1}{2}$ cup Sugar

Soak Gelatin in cold water. Add the lemon juice, hot pineapple and sugar. If gelatin is not all dissolved, heat in top of double boiler. Chill. When the mixture begins to thicken, fold in the whipped cream. Mould and chill.

Brown Betty.

3 cups chopped Apples	2 tablespoons Butter
2 cups Bread Crumbs	$\frac{1}{4}$ teaspoon Nutmeg
$\frac{1}{2}$ cup Sugar	Juice and rind $\frac{1}{2}$ Lemon
$\frac{1}{4}$ teaspoon Cinnamon	$\frac{1}{4}$ cup Water

Mix sugar and spices Put one-half the crumbs in the bottom of a baking dish. Add one-half the apples, butter and seasonings. Repeat. Add water or omit if apples are very juicy. Bake until apples are tender.

Carmel Junket.

2 cups Milk	Few grains Salt
$\frac{1}{3}$ cup Sugar	1 teaspoon Vanilla
$\frac{1}{3}$ cup boiling Water	1 tablet Junket

Carmelize sugar, add boiling water and remelt any hardened sugar. Cool and add lukewarm milk. Add powdered junket tablet, salt and vanilla. Turn into mould, let stand in a warm place until set, then chill. Served with whipped cream and chopped nuts gives more flavor.

Chocolate Cream.

2 cups scalded Milk	$\frac{1}{3}$ cup cold Milk
5 tablespoons Cornstarch	$1\frac{1}{2}$ square Chocolate
$\frac{1}{2}$ cup Sugar	3 tablespoons hot Water
$\frac{1}{4}$ teaspoon Salt	3 Egg Whites
1 teaspoon Vanilla	

Mix all dry ingredients, dilute with cold milk and add to scalded milk. Cook in double boiler until thickened. Stir

constantly. Add melted chocolate to which hot water has been added. Add stiffly beaten whites of eggs and vanilla. Mould and chill.

Cornstarch Pudding.

4 cups scalded Milk	$\frac{1}{4}$ teaspoon Salt
$\frac{1}{2}$ cup cornstarch	$\frac{1}{2}$ cup cold Milk
$\frac{1}{4}$ cup Sugar	1 teaspoon Vanilla
3 Egg Whites	

Mix the dry ingredients, dilute with cold milk and add to scalded milk. Cook in double boiler until thickened. Stir constantly. Add stiffly beaten egg white, mould and chill.

Snows.

Whites 3 Eggs	Sugar
$\frac{3}{4}$ cup Fruit Pulp	

Beat the egg whites until stiff. Add the hot sweetened fruit pulp and continue beating until thoroughly mixed. Pile lightly on a dish and chill. Apple, peach, apricot or prune pulp make good snows.

Tapioca.

$\frac{1}{4}$ cup pearl Tapioca or	1 quart quartered Apples
2 tablespoons minute Tapioca	$\frac{2}{3}$ cup Sugar
$1\frac{1}{2}$ cups Water	
2 cups scalded Milk	

Soak pearl tapioca if used. Cook tapioca in water until transparent. Put apples and sugar in a baking dish, pour over them the tapioca and bake until apples are done. Other fruits may be substituted for apples.

Whips.

$\frac{1}{3}$ lb. Prunes	1 cup Sugar
5 Egg Whites	$\frac{1}{2}$ tablespoon Lemon Juice

Wash prunes. Soak over night and cook until soft. Remove stones and rub through sieve. Add sugar and cook five minutes. Beat egg whites stiff, add cooled prune pulp and lemon. Pile lightly in a buttered baking dish and bake in a slow oven twenty minutes.

NORMAL SALT SOLUTION

1 pint boiling Water
I level teaspoonful Salt

Dissolve the salt in the boiling water and let cool before using. This may be given per rectum as an enema, taken by mouth to induce vomiting, or employed as a gargle and nasal douche. Used in the latter way normal salt solution is very beneficial in the treatment of coryza or common "cold." With an infant a medicine dropper is the best means of irrigating the nasal passages. While the child is lying on his back the tip of a medicine dropper, half-filled with the solution, is inserted into each nostril in turn, and the bulb quickly compressed. When the babe has a head cold which causes him to stop nursing to breathe, the nose should be irrigated in this way before each feeding. With older children a small rubber ear-syringe is preferable to the medicine dropper. The patient leans forward with his head over a pan or bowl; the syringe is filled with the warm salt solution, the tip is inserted not more than a half inch into the nostril, and the bulb is firmly compressed. In this way all the folds of the mucous membrane are deluged, yet the solution runs out freely and is not forced into the throat or ear passages.

ERUPTION OF THE TEETH

The Temporary Teeth

The 2 lower central incisors	5- 8 Months
The 2 upper central incisors	7- 9 Months
The 2 upper lateral incisors	7-11 Months
The 2 lower lateral incisors	9-12 Months
First Molars (4)	12-16 Months
Canines (4)	14-20 Months
Second Molars (4)	20-32 Months

The above table represents the average time and order of the eruption of the temporary teeth. There are wide variations however. The first incisors may erupt as early as the third month or not until the child is nearly a year old. The order in which they appear may vary slightly also in individual cases. These are exceptions, however, and not the rule.

The Permanent Teeth.

The following table gives a fairly correct idea of the time and order in which the permanent teeth erupt:

First Molars	5 - 7 years
Central incisors	6½- 8 years
Lateral incisors	7 - 9 years
First bicuspid	9 -11 years
Second bicuspid	10 -12 years
Cuspids	11 -14 years
Second Molars	11½-13 years
Third Molars	16 -21 or later

TABLE OF HEIGHTS AND WEIGHTS

Age	BOYS		GIRLS	
	Height Inches	Weight Pounds	Height Inches	Weight Pounds
Birth	20¾	7¾	20½	7½
6 months	25½	16	25	15½
12 months	29¼	21½	28¾	21
18 months	31	23½	30	22½
2 years	33½	27	32½	26
3 years	36½	32	35	30½
4 years	39	36	38½	35
5 years	41½	41	41¼	40
6 years	44	45	43½	43½
7 years	46	49½	45½	48
8 years	48	54	48	53
9 years	49¾	60	49½	57½
10 years	52	66	51½	63
11 years	53½	71½	53½	70
12 years	55½	79	56	80
13 years	57½	86	58½	90
14 years	60	97	60	99
15 years	62¾	108	61½	107
16 years	65	122	62	113

MEASUREMENTS

Age	Height Inches	Chest Inches	Head Inches
Birth	20½	13¼	13¾
6 months	25½	16	17
12 months	29¼	18	18
18 months	31	18½	18¼
2 years	33½	19½	19
5 years	41½	21	20

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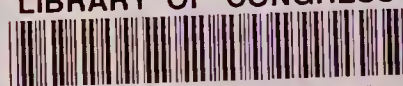
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