

numbers and they are poorly developed. The same is true of Peyer's glands, which do not reach their proper development till the second year of infancy. In a healthy infant the greater part of the food is absorbed from the small intestine. The mucous glands of both stomach and small intestine are more numerous in the infant than in later life, and if unduly stimulated pour forth a copious secretion which readily undergoes acid fermentation and becomes an irritant. The secretion of the pancreas is for the first few months very deficient; three of its ferments are present at birth, viz., trypsin, steapsin, and the milk-curdling ferment, but the amylolytic ferment is quite absent till after the sixth month. Bile is early secreted in considerable quantity, but compared with that of the adult it is defective in organic salts, in cholesterin, in lecithin, and in fat.

The faeces of an infant after the first few days should be of an orange-yellow color, of soft homogeneous consistence, distinctly acid in reaction and not offensive in odor. They are chiefly composed of fats, of fatty and lactic acids in combination with lime, of cholesterin, of intestinal epithelium and mucus, with about three per cent. of the milk ingested which has remained unabsorbed. Meconium is no longer considered to be simply an admixture of bile with intestinal mucus, but is found to contain flat epithelial cells which cannot have originated in the intestinal canal, along with fine hairs and fat globules which have evidently had a cutaneous origin.

GROWTH.—The average weight of the new-born babe is a little over seven pounds, males as a rule weighing a few ounces more than females, but occasionally this average is very much exceeded. During the first two or three days of life a loss in weight of from eight to twelve ounces almost invariably takes place, due partly to the passage of urine and meconium, partly to the disturbance of nutritive processes necessarily associated with its entrance on a new life, and partly to the fact that during these days the infant is not generally able to obtain sufficient nourishment. Townsend, at the Boston Lying-in Hospital, has shown that the infants of primiparæ lose more and are slower to recover their loss than those of multiparæ; large children, however, suffer less loss of weight and recover more quickly than small ones; children which have to be fed artificially do not as a rule regain their original weight before the tenth day. That the loss is to some extent avoidable is indicated by the fact that in the young of mammals which commence to take the dug immediately after birth, increase of weight is immediate and uninterrupted. Any failure of the infant fully to regain this loss by the end of the second week should be regarded as an indication that its nutrition is at fault and special measures should be taken to increase its vitality (Rotch). After the second week there should be a weekly gain in weight of from five to seven ounces for the first five months. After this age growth gradually becomes less rapid. It is generally considered that the initial weight of the infant at birth should be doubled at five months and trebled between thirteen and fourteen months of age. The weight at one year should be doubled at six years and this weight doubled again when the child reaches fourteen years. Weighed from day to day the amount of increase in an infant may be found to vary considerably, even a uniform weekly increase is exceptional. Slight disturbances such as dentition, weaning, improper feeding, or undue excitement may interfere with or even interrupt the regular increment. The weight of an infant carefully and systematically taken is to be regarded as an excellent index of the infant's nutrition, and our most exact guide in determining the suitability and sufficiency of the food supplied. Bowditch has also insisted that actual loss in weight, and sometimes even a failure to gain, is often an early premonitory indication of the onset of constitutional disease.

The average length of the infant at birth is nineteen and three-quarter inches. During the first six months it grows from four to five inches and in the second from three to four. In the second year the gain is from three to five inches, and by the end of the fifth year the child

should have doubled its original length. Insufficient nourishment and improper food, especially in rachitic children, retard growth in length. Chronic disease of the brain (idiocy) is apt to give rise to more or less dwarfing. Cretinism, also, in a very marked degree stunts growth. On the other hand an attack of one of the exanthemata appears in some children to accelerate growth.

At birth the circumference of the head much exceeds the circumference of the thorax, but with the rapid development of the lungs the difference is notably diminished during the first few months, and at the end of the first year, notwithstanding the rapid development of the head, the thorax exceeds it. Between six and eight weeks old, the child begins to raise its head and turn it voluntarily toward a bright object and a few weeks later is able to hold it up without support. Not till about the seventh month does it acquire the power of sitting alone, and not till the close of the first year are the lower extremities sufficiently developed to enable the infant to make some effort to stand. Two or three months later it should walk alone. Growth does not always take place uniformly; the head often increases the most rapidly in size, but sometimes the extremities. When growth is too rapid, failure of strength, with anæmia and more or less emaciation, ensues.

About the sixth month dentition generally commences with the eruption of the two lower central incisors and these are followed at varying intervals by the other teeth in successive groups. Every kind of variation may be met with as to the order in which the several groups of teeth appear without any evidence being found either at the time or later of the existence of any pathological condition, mental or otherwise (Rotch). Nevertheless delayed dentition is generally regarded as to some extent an evidence of imperfect nutrition. Meret and Whitehead state that in seventy-nine per cent. of the well-developed, the first teeth appear before the eighth month has passed, while in sixty per cent. of those with imperfect development the first teeth are cut after the eighth month. The following is the formula for their usual appearance as given by Rotch:

Groups.	Time of appearance.
Two central lower incisors	6th to 8th month.
Four upper incisors	8th to 10th month.
Two lateral lower incisors and four first molars	12th to 14th month.
Four canines	18th to 20th month.
Four second molars	28th to 32d month.

During the earlier months of infancy the anterior fontanel remains open, and affords a fair indication by its size of the state of development in the cranial bones, and to some extent of the state of ossification in the body generally; and by the presence or otherwise of any distention in the membrane covering it, of the condition of the brain, whether congested or anæmic. This fontanel is of small size in the new-born, but gradually increases up to the ninth month when its size remains stationary for two or three months, and then it rapidly begins to close (Vogel). Between the fifteenth and eighteenth months in healthy, well-developed children it should become completely ossified.

The Development of the Senses and Mental Faculties in the infant is an interesting study to which in recent years considerable attention has been directed. The first movements of the new-born infant are either purely reflex, like its crying, or impulsive, and due to the unloading, in an objectless manner, of its "inherited provision of motor impulses." Tactile sensation at birth appears to be developed in lips, tongue, eyes, and hands; numerous reflexes of prenatal development also manifest themselves, e.g., respiration, swallowing, winking, coughing, sneezing, etc. With these exceptions sensation, both general and special, is in the early weeks of life very defective. The senses of taste and smell appear to be the first to make distinct and clear impressions on the mind. The new-born can distinguish between bitter and sweet, and the taste and smell of the milk first re-

ceived makes a permanent impression, so that another is often tried only to be put away. Thus memory and judgment appear to arise first in the domain of these senses.

Hearing and sight are very defective at first, but become afterward of much importance to development. All children are born deaf. Even the strongest do not notice a sharp sound earlier than six hours after birth. More frequently it is some days before we notice the infant starting at a sudden noise. This deafness is due to the fact that the Eustachian tube is closed at birth and is only gradually opened by the acts of breathing and swallowing. Until it is opened the middle ear contains no air, and the tympanum stands too obliquely. After hearing becomes active no organ of sense contributes so much toward mental development. Deaf children are much more backward than are the blind. Toward the end of the third month a child should recognize the direction of a noise and turn toward it. It requires more time, however, before children can distinguish between different sounds. Demme found only two per cent. able to recognize their mother's voice at three and a half months. At six months most babies enjoy being sung to, and are amused by the jingle of rattles.

The infant appears to be able to distinguish light from darkness almost immediately after birth, but that is all, for the movements of the lids and balls are not at first symmetrical. About the sixth week a bright light, if moved slowly, is followed by the eyes, and after the third month we may observe the quick closing of the lids on the approach of an object. By this time also the child should recognize its mother's face. After the sixth month the estimation of size, distance, and color becomes gradually developed, but not till after the third year are all the colors distinguished.

Voluntary grasping is generally noticed very shortly after the third month and with it comes the knowledge of things apart from itself.

Speech is not inborn, but the tendency to it is inherited. At first only vowels are uttered, but after the first few weeks the mental state of the child may be determined to some extent from the different sounds that it makes and its voice gradually becomes modulated to suit its mood. Toward the end of the first year the child begins its first imitation of sound. The progress is more rapid after this, but for a long time expression and gestures are the most important means of communication, and sounds are merely accompaniments. Then one word is used to signify several thoughts, showing the growth of reasoning power. Two or three words are next joined together, and finally complete sentences are formulated. All the disturbances of speech noted in the adult may have their counterpart in the child. In the one the functions are disturbed by disease, in the other the defect is due to insufficient development.

INFANT MORTALITY.—The high rate of mortality in infancy has been referred to and deplored by all writers on the subject. In England, out of 1,000 infants under one year there die annually 141.8; in France, 223.2; in Italy, 273.3 (Farr). These are the mean rates for rural and urban districts; in large cities the rates are higher. In Paris during the four years, 1863-66, the mean annual death rate of infants under one year was 290 per 1,000 living. Eross in a recent article based on statistics obtained from sixteen large European cities, states that about nine per cent. of all children born alive die before the end of the fourth week. In small towns and in the country the rates are much lower than in the cities, but even in these the percentage of deaths occurring in infancy is very large. In this country statistics are not sufficiently defined to enable us to state the exact mortality of the several months and years of infancy. In Boston, with a general death rate not exceeding 24.5 per 1,000, the mean death rate of infants under one year, determined in the four census years 1855, 1865, 1870, and 1875, was 272.7 per 1,000 infants living, while for children under five it was 95.6. These rates are still true for many of our large cities, but in others it is probable that a great

diminution in them would be found to have taken place in recent years. Wende (*Pædiatrics*, vol. ix., 1900, p. 103) states that in 1890 out of a total of 5,024 deaths in Buffalo, N. Y., 2,305 were under five years of age; but in 1898, owing to a careful inspection of the milk supplied to infants, and to greater care in the feeding of it, out of a total of 4,533 deaths, only 1,570 deaths of infants under five years were recorded.

The high mortality rate in early infancy demands an earnest consideration of the causes that may give rise to it and an effort on the part of every physician to reduce it. Unfortunately some of the causes contributing to it appear at present to be unavoidable. The great and important changes which take place in the organism with the completion of birth, and the rapid development which afterward ensues, are both fraught with special dangers, even to those naturally healthy. In many instances, however, we have the added weakness involved in hereditary disease; syphilis and tuberculosis in the parent necessarily entail an enfeebled offspring unless active preventive measures be taken. Even when we have no distinct diathetic disease to deal with, general debility and many chronic affections in the mother affect the vitality of the offspring unfavorably and render it more liable to succumb to disease. Dr. Curtis estimated that from ten to fifteen per cent. of all deaths under five years must be assigned to this class of hereditary causes. Ashby, in an analysis of the causes of death in two thousand infants under two years of age, estimates that congenital syphilis was the active agent in ten per cent. Acute zymotic disease also plays an important rôle; pertussis has its maximum fatality during the first year of life and measles in the second, while scarlet fever does not reach its maximum fatality till the third and fourth years. Ashby in the analysis above quoted states that pertussis was the cause of death in twelve per cent. and measles in nine per cent. of his cases. Unfavorable hygienic surroundings may increase largely the mortality of this class of diseases by weakening the vitality of the infant and perhaps by increasing the virulence of the poison itself, while strict isolation and thorough disinfection will undoubtedly lessen the frequency and diminish the mortality from this source.

Diseases of the alimentary tract contribute largely to this high death rate. Jacobi has estimated that the deaths from this cause alone in the first year of life amount to nearly forty-one per cent. of the total number which occur at this period of life. In the second year the mortality, although large, is not quite so great. This class of disease must be regarded as resulting almost entirely from defective knowledge and care in the feeding and hygienic surroundings of the infant, and therefore in great part preventible. Inflammation of the respiratory organs, principally bronchitis and pneumonia, is also another important cause of this high rate of mortality. Dr. Farr states that in England this class of diseases is the cause of nearly one-sixth of all the deaths under five. According to Jacobi twenty-one per cent. of all the deaths in the first year of life are due to this cause, and about thirty-six per cent. of the deaths in the second year. In the majority of the cases in this class, imperfect ventilation of living rooms, and undue exposure to wet and cold with insufficient covering to chest and extremities, conduce greatly to this result. It is surely not too much to hope that with the rapid diffusion of more exact knowledge of the important principles of hygiene and infant feeding, this excessive mortality in infancy may be greatly reduced.

INFANT HYGIENE.—Feeding.—As soon as the mother has to some extent recovered from the exhaustion of labor, the infant should be applied to the breast. Although the full supply of milk is not established until the second or third day, yet, as a rule, sufficient will be obtained to satisfy the infant; when it is very feeble, however, artificial feeding with a weak sterile cream mixture may be advisable. At this early period the infant does not require much and a frequent application to the breast is unnecessary. Should the influx of milk be

delayed and the infant be fretful, feeding with some substitute milk may be deemed advisable. For the first month it is difficult to obtain regularity in nursing, but the importance of regular feeding should be impressed on the mother, and she should be told that crying and fretting during the intervals are in general due not to hunger, but to colic, which may be aggravated by irregular nursing. After the second month an interval of at least two hours between two successive nursings should be insisted on for the day; during the night this should be lengthened to three or four. As the child grows older its stomach becomes capable of taking larger quantities at a time, and the intervals should accordingly be gradually lengthened to four hours. In some cases the breast milk of the mother does not agree with the infant and gives rise to more or less pronounced symptoms of indigestion associated with much fretfulness, sleeplessness, and either an actual loss of, or a failure to gain in weight. This condition of the milk is sometimes due to over-anxiety, insufficient sleep, an improper dietary, or irregular habits on the part of the mother, and may be remedied by securing for her a correct dietary, regular outdoor exercise, sufficient sleep and freedom from undue worry and excitement. In a few instances, however, the fault appears to be irremediable, and artificial feeding with a properly constituted food must be attempted. (See article *Infants, Artificial Feeding of*.)

In estimating the suitability of any food to an infant's requirements the important test is the weekly increase in weight. If the food is digestible, and sufficient in amount for its wants, the infant should be free from colic, happy in disposition, should sleep quietly, and gain regularly in weight. No fixed rule can be stated as to the proper time to allow artificial food in connection with breast milk. While robust mothers, with an abundant supply of milk, can easily satisfy their infants up to the age of twelve or fifteen months, many begin to feel the drain upon them by the second or third. In others, the milk, though abundant, fails to satisfy and sufficiently nourish the child, and must be early supplemented by artificial food.

Bathing.—The first bath of the infant should be given in a warm room, free from draughts, and in water of a temperature of 96° F. The infant should be dried beneath some warm flannel covering. In general, nurses are not sufficiently alive to the necessity of preventing undue chilling of the surface. From the fifth to the ninth day the navel string becomes detached, and not till that occurs is a second general bath advisable. After that the bath should be given daily in water at a temperature of about 92° F. This temperature, after the age of eight or nine months, may be lowered carefully to 90° or 85°, according to the strength of the infant and the vigor of its reaction. Too prolonged chilling of the surface during bathing and dressing is the frequent beginning of catarrhs of all sorts.

Clothing.—In the dressing of the new-born care should be taken that there is no injurious dragging on the navel, that the usual abdominal band is not applied so tightly as to interfere with respiration or digestion, and that sufficient warmth be secured for the extremities. Later on, caution should be enjoined that none of the clothing press unduly on either chest or abdomen—all should hang loosely from the shoulders; neck bands should not be tight, and the extremities should always be efficiently and warmly covered. No sudden change in the amount or character of the clothing is, on any account, to be permitted. Special care is also to be given to the shoes. The leather should be pliable, and the shoes made broad and loose about the toes, so as to allow freedom for movement and growth.

Sleeping.—For the first few weeks of its life an infant should sleep eighteen hours out of the twenty-four. As it grows older, it gradually requires less. A fretful and wakeful baby is ailing in some way, and the cause of its fretfulness should be found out and remedied. When possible, the nursery should be large and well ventilated. For the first few days of infant life it may be desirable

that the room in which it is kept should be somewhat darkened, but after that fresh air and sunlight should never be excluded. At the same time draughts and rapid changes of temperature are fraught with much danger.

Exercise is important, but the manner of it is equally so. No infant should be carried about upright until it is able to raise its head and rotate it easily; nor should it be encouraged to walk or stand till nearly a year old, and if there be any tendency to rachitis this must be postponed still later. After an infant is three months old—a little later, in the winter season—it should be "short-coated," and the fullest liberty given to its arms and legs. It should be encouraged to lie on its back in its crib with loose clothes and enjoy, as it will do, the liberty of kicking. Every day it should be taken out regularly during the more suitable portion of the day, unless the weather be blustery. When it is sufficiently old, walking forms a pleasant exercise, but it should never be carried to the extent of much fatigue.

Weaning should, if possible, be effected gradually, and the digestive organs should be accustomed to some suitable artificial food before lactation is altogether stopped. Abrupt changes in its food try an infant's digestion, and frequently upset it. In selecting the time to make the alteration, attention should be given to the following points: 1. An interval between the eruption of the several sets of teeth should, if possible, be chosen, as we sometimes notice at these times irritation of the nervous system with hyperæmia and increased peristalsis of the alimentary canal. 2. It is never desirable to take the breast from an infant while it is sick or recovering from sickness, unless it is manifest that the milk of the mother is injurious. Even an inadequate supply will often be all-important for the nourishment of such an one (Busey). 3. Regard must be paid to the season of the year. Any change during the hot months is very undesirable.

In the **EXAMINATION** of infants much tact and observation are necessary. All appearance of abruptness is to be avoided; no harshness in voice or manner is allowable; the physician's hands must be warm; and a full supply of patience must ever be ready to be exercised if demanded. If the infant be asleep on the physician's arrival, it should on no account be awakened until he has seen its decubitus, counted its pulse and respirations, and noted their character, and made such other superficial examinations as are possible without disturbing it. The pulse and respirations in an infant just awakened are always extremely rapid. With regard to its decubitus, a healthy young infant in sleeping generally assumes the position he is supposed to have had *in utero*. An older infant, even if lying on its back, should incline its head to one side or the other, so that its cheek comes in contact with the pillow. If it be found with closed eyes and face directed straight upward, it is probably suffering from serious disease. If it be lying with its head retracted, cranial disease should be thought of. If it sleep on its belly, or resting on elbows and knees, it is probably suffering from abdominal discomfort. Healthy children should sleep quietly. Much tossing, any twitching of the muscles, or screaming and talking in sleep, indicate feverishness or digestive derangement.

Much may be learned from the character of the child's cry. Unappeasable screaming, without any other symptom, often results from earache. The temperature should always be taken with a sensitive thermometer, preferably in the rectum; if not convenient there, in the groin. The armpit is not so good, as infants object to the necessary restraint of the arm. In many abdominal troubles the skin and extremities may be quite cool, yet the thermometer in the rectum show a temperature of 104° or 105°. The respirations, if practicable, should always be counted. At the first examination we should always insist on having the infant stripped, otherwise no thorough examination can be made. Care should at the same time be taken that the infant be not chilled by a too prolonged examination. Passing downward, we note: (1) shape of child's head and state of fontanel; (2)

shape of chest, character of the breathing, whether there be any retraction of chest walls or intercostal spaces. With warm hands palpation should be made, and the expansion, and also the presence, if any, of rhonchal fremitus should be noted; (3) shape of abdomen, whether protuberant or retracted, whether the walls are tense or lax. Gentle pressure may be made by the hand, and any tenderness of the abdomen or enlargement of liver or spleen detected; (4) condition of the lymphatic glands.

In addition, the color and elasticity of the skin and the general nourishment of the tissues should be observed at this time. In auscultating the chest, the infant should be placed on the left arm of the nurse, leaning over her left shoulder, with its arms around her neck. In this way only are the muscles of the back equally relaxed and correct results obtained. Percussion should always be gentle. Immediate auscultation never gives the exact results obtained by the use of the stethoscope, but any painful pressure by the instrument must be carefully avoided. In infants, symptoms of disease are more frequently found at the back than at the front, and at the base rather than at the apex. Nevertheless, no part should be omitted in the examination. Inspection of the mouth and fauces should always be left to the last, as giving rise to more or less resistance. To effect this the infant should be seated on the nurse's lap before a bright window. Sometimes with a little gentle pressure on the chin the mouth is opened and the tongue seen. To examine the fauces requires the use of a depressor, for which nothing is better than the smooth handle of a spoon. This can always be slipped in behind the teeth and over the tongue to its base. When the pharynx is reached the mouth involuntarily opens, and, if the physician be on the alert, a good view of the fauces is obtained. Lastly, the secretions should be examined, if in any way at fault. Trouble is sometimes experienced in obtaining the urine. If necessary, a small silver catheter may be passed and a sample drawn off.

In making our diagnosis and prognosis in infancy, the following points must always be remembered as modifying disease at this period:

1. The wide diffusion of symptoms met with at the onset of an acute attack.
2. The severity of the initial symptoms often bear no proportion to the gravity of the local lesion.
3. The extremely rapid rise and fall in the temperature of the body frequently observed.
4. The rapidity with which functional mischief may pass into organic.
5. The extent to which local disease is modified by certain diatheses.

For an account of the special diseases to which the infant and new-born are liable, the reader is referred to the separate articles on these diseases.

Alexander D. Blackader.

The following papers and treatises have been referred to and made use of:

- Thomas Rotch: *Pediatrics*, 1901.
L. Emmett Holt: *Diseases of Infancy and Childhood*, 1897.
Colton: *Lessons on Anatomy, Physiology and Hygiene of Infancy and Childhood*, Chicago, 1900.
Alfred Vogel: *A Practical Treatise on Disease in Children*; translated by H. Raphael, 1885.
Fred. Treves: *The Anatomy of the Intestinal Canal and Peritoneum in Man*, London, 1885.
A. Jacobi: *Infant Hygiene*. *Buck's Hygiene and Public Health*, 1879.
Thomas B. Curtis: *Infant Mortality*. *Buck's Hygiene and Public Health*, 1879.
A. Jacobi: *Anæmia in Infancy and Early Childhood*. *Arch. of Medicine*, vol. v., No. 1, New York, G. P. Putnam.

INFANTS, ARTIFICIAL FEEDING OF.—When for any reason the infant is deprived of its mother's milk, its natural and most perfect food, the necessity of supplying it with nourishment from some other source is forced upon us. This may best be done by means of a healthy, efficient wet-nurse, if such can be obtained; but this is always a difficult matter. Very seldom can one be found who fulfils all the requirements demanded by the physi-

cian, and who is willing to submit to the careful dietary and regular mode of life necessary to insure a wholesome and even supply of breast milk to the foster child. In the great majority of cases, therefore, we have to find some artificial nutriment which shall fulfil the important conditions of being easily digested by the infant and at the same time of supplying in due amounts all the elements required for nutrition.

Nitrogenous material it must have to provide for the wants of the growing tissues; without a sufficient quantity of this element in the food, growth and development will be defective. Carbohydrates must also be present. Not only are they essential to nutrition, but they are also necessary for the production of heat in a being whose muscular activity is comparatively slight, yet in whom the activity of the vital processes would be much impaired were the body heat lowered in any degree. These carbohydrates must be in a condition easily assimilated, and it is to be remembered that during the early months of life no provision is made by nature for the digestion of starch; they must, therefore, be supplied in the form of some sugar; and of the various sugars milk-sugar appears for the infant to be the most assimilable. Fats appear to be closely associated with new cellular growth, and must be supplied in a state of fine emulsion. The food must also contain a due amount of mineral matter, calcium phosphate for the hardening bone, and sodium chloride and iron for the blood, daily increasing in amount. Salines are also undoubtedly of much service in the vital processes of digestion, absorption and nutrition; processes for which water is demanded in larger amounts than required by the more adult constitution.

To supply a food suitable in all these respects to the wants of the infant organism, and yet easily digested and assimilated by the imperfectly developed alimentary tract of the infant, is a problem demanding much thought and care. Its importance will be appreciated when we consider the disastrous results which frequently follow attempts made in thoughtlessness and ignorance to hand-feed infants. The enormous death rate which in all countries occurs among those deprived in early days of maternal milk is appalling, while among those that survive, poor health, defective nutrition, and stunted growth plainly attest the defective nourishment supplied. As a recent writer says, it is proper or improper nutriment which makes or mars the perfection of the coming generations.

The problem, although at all times demanding careful thought, is one of very varying difficulty. If the powers of digestion are naturally strong, and especially if the infant has received the advantage of maternal nursing until the gastric and intestinal secretions have become to some degree developed, the task of supplying a suitable food may be a comparatively easy one. But if the infant inherit a weak constitution with feeble powers of digestion and assimilation, still worse, if it must be bottle-fed from its birth, much difficulty will be experienced; our difficulties are still further increased during the hot season and under the unsanitary influences associated with city life. It is only within the last few years that advancing knowledge has enabled us to cope, for the most part successfully, with these various difficulties, and it must be acknowledged that for the greater part of this advance we are indebted to American physicians.

In the preparation of a substitute food for infants, it must be our aim to copy as closely as possible in all particulars the food which nature supplies. The substitute food must resemble maternal milk in the elements entering into its composition, in the percentage of them present in the food, in its freedom from the presence of noxious micro-organisms, and in the fact that it is an animal food. To enable us to attain this result, many careful analyses have been made to find out the exact composition of mother's milk.

Rotch gives us the following as a summary of several of the more recent analyses of human milk: