

The Expectant Mother – part 4 or 4 ~ Infant Feeding –Breast & Bottle

Breastfeeding - The Nursing Mother and Her Baby : Part 1 The Mother and Her Child

By William S. Sadler, M.D., Lena K. Sadler, M.D.
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About the Author: Dr. William S. Sadler M.D. was a well-known American psychiatrist and college teacher in the school of medicine at the University of Chicago. For over sixty years he practiced his profession in Chicago, thirty-three years being associated in practice with his wife, Dr Lena Kellogg Sadler. The doctors were pioneers in the research on the mysterious *Urantia Papers*.

Happy is the mother, and thrice blessed is the babe when he is able to enjoy the supreme benefits of maternal nursing. The benefits to the child are far reaching; he stands a better chance of escaping many infantile diseases; the whole outlook for health - and even life itself - is greatly improved in the case of the nursing babe, as compared with the prospect of the bottle-fed child. Maternal nursing lays the foundation for sturdy manhood and womanhood.

Out of every one hundred bottle-fed babies, an average of thirty die during the first year, while of the breast-fed babies, only about seven out of every one hundred die the first year. At the same time, nursing the babe delivers the mother from all the work and anxiety connected with the preparation of the artificial food, the dangers and risks of unclean milk, and the ever-present fear of disease attendant upon this unnatural feeding. The mother who nurses her child can look forward to a year of joy and happiness; whereas, if the babe is weaned, she is compelled to view this first year with many fears and forebodings. Mother's milk contains every element necessary for the growth and development of the child, and contains them in just the proportions required to adapt it as the ideal food for that particular child.

A dirty baby, properly fed, will thrive. A baby deprived of fresh air, but wisely fed, will survive and even develop into a strong healthy man or woman. But the baby raised according to the latest and most approved rules of sanitation and hygiene, if improperly fed, will languish and die.

Hygiene of Nursing Mothers

Outings and Exercise. It is most highly important that the nursing mother should be able thoroughly to digest her food; otherwise the flow of milk is likely to contain irritants that will disturb the baby's digestion, even to the point of making him really sick. In order to avoid these complications, exercise and outings are absolutely essential for the mother. A vigorous walk, gardening, light housework or other light athletics, greatly facilitate digestion and increase the bodily circulation, as well as promote deep breathing, all of which are of paramount importance to a good appetite and good digestion.

The Bowels. The bowels should move regularly and normally once or twice during the twenty-four hours. Unfortunately, this is not usually the case: and in this connection we would refer our reader to the chapter on "The Hygiene of Pregnancy," particularly those sections relative to the care of the bowels, recipes for bran bread, lists of laxative foods and other suggestions pertaining to the hygiene of the nursing mother.

Sleep. Nothing less than eight hours sleep will suffice for the nursing mother, and during the day she should take at least one nap with the baby.

Care of the Skin. Salt-rub baths are very beneficial taken once a week. The daily cold-friction rub described elsewhere, will tone up the system and increase digestion and improve the general well being. The soap wash may be taken once a week. The thorough cleansing of the breasts, and the frequent changing of the undergarments, will help to keep the baby happy; for oftentimes it is the odor of perspiration as well as the smell of soiled clothing that spoils the appetite of the baby, causing it to refuse food.

Recreation. Pleasant diversion is very essential for the mother, and should be indulged in at least once a week. The bedtime hours, however, should not be interfered with and the recreation should be selected with a view to amuse, refresh and create a harmless diversion for the mother's mind. Under no circumstances should the mother settle down to the thought: "No, I can't go out any more. I can't leave my baby." You should get away from the baby a short time each day, and go out among your former friends and acquaintances. Many a wrecked home - a shattered domestic heaven - dates its beginnings back to the days when the over-anxious young mother turned her back on her husband and looked only into the face of her (their) child. Nothing should come in between the filial friendship of husband and wife, not even their child. So, dear mother, if you can, go out occasionally, away from the baby, and enjoy the association of your husband and keep in touch not only with his interests, but with the outside world. You will come back refreshed and wonderfully repaid, and the face of the adored infant will appear more beautiful than ever.

Diet of the Nursing Mother

The general suggestions on diet which we made to the expectant mother are also valuable for the nursing mother. The food should be appetizing, nutritious, and of a laxative nature. Three meals should be eaten: one at seven A. M., one at one P. M. and one about six-thirty at night, with the heaviest meal usually at one P. M. As the mother usually wakens at five o'clock, or possibly earlier, she should be given a glass of milk, cocoa, or eggnog. If she awakens at six, nothing should be taken until the breakfast, which should consist of a good nourishing meal, such as baked potatoes with white sauce, poached eggs, cereal, milk or cocoa, prunes, figs, or a baked sweet apple, with bread and butter, etc.

From that hour until one P. M. only water is taken, and several glasses are urged during this interval. With nothing between meals but water and a little outdoor exercise, a good appetite is created for the one P. M. meal which should abundantly supply and satisfy the hungry mother; and then again, nothing is to be taken between dinner and supper but water. And after the supper hour, a walk out into the cool night air should be enjoyed with the husband and on going to bed about ten P. M., an eggnog or glass of milk may be taken. At the close of the other meals a cup of oatmeal gruel or milk or any other nourishing liquid may be enjoyed.

The eating of food or the drinking of nourishing drinks between the meals not only interferes with digestion and disturbs the mother, but it also upsets the baby; and it is often the reason why the appetite of the mother is so deranged at the meal time, her spirits depressed, and her milk diminished. Plenty of good nourishing food, taken three times a day with an abundance of water drinking between the meals, together with a free happy frame of mind occasioned by the recreation before mentioned, usually produces good milk and plenty of it. A nap between meals will probably produce more milk than eating between meals.

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Objectionable Foods

All foods that cause indigestion in the mother or babe should be avoided.

Some mothers continue to eat tomatoes, peaches, sour salads, acid fruits, and it appears in no way to interfere with baby's comfort; but they are the exception rather than the rule. Usually tomatoes, acid salad dressings, and mixed desserts must be avoided. Each mother is a law unto herself. Certainly none of our readers will selfishly continue any food she feels will make her baby cry. All acid fruits, rich desserts, certain coarse vegetables, concoctions of all descriptions such as rarebit, condiments, highly seasoned sauce, etc., should be avoided.

Acid fruitages, such as lemonade, limeade and orangeade, can be taken by a small percent of nursing mothers; and, since fruit acids are neutralized and alkalized in the process of digestion and assimilation, and since they are the very fruit-drinks we prescribe for patients suffering with an increased acidity, it would appear that they were in every way wholesome for the mother - if they in no way interfere with the baby. Practically, they do as a rule disturb the baby's digestion and should be avoided by those mothers who have found this to be the case.

Constituents of Mother's Milk

Mother's milk - that wonderfully adaptable, ever-changing food, so accurately and scientifically suited to the hourly and daily needs of the growing child - is composed of five different parts, totally unlike in every particular, and each part exactly suited to the needs which it supplies. The cream of the milk, as well as the lactose or sugar, builds up the fatty tissues of the body as well as helps provide the energy for crying, nursing, kicking, etc. The proteins (the curd of the milk) are exceedingly important; they are especially devoted to building up the cells and tissues of the body of the growing child. The salts form a very small part of the baby's food, but an important one, for they are needed chiefly for the bones and the blood. The fats, sugars, proteins, and salts, taken together, form the solids of mother's milk, and are held in solution in the proportion of thirteen parts of solids to eighty-seven parts of water; which so holds these solids in solution that the baby can digest and assimilate these necessary food elements. The mother's milk increases in strength day by day and month by month as the baby grows, and is the only perfect infant food on earth.

The Time of the First Feeding

Soon after the birth of the baby the wearied mother seeks rest - she usually falls into a quiet, restful slumber; the baby likewise goes to sleep and usually does not awaken for several hours. After six or eight hours the child is put to the breast and he begins to nurse at once, without any special help. This first nursing should be discontinued after four or five minutes, while he is put to the other breast for the same length of time.

If there is difficulty in sucking, a bit of milk may be made to ooze out on the clean nipple, while the baby's lips are pressed to it, after which the nurse gently presses and rubs the breasts toward the nipple. After the nursing, the nipples should be elongated, if necessary, by rubbing, shaping, or breast pump.

The baby gets but little nourishment during the first two days, but that which he does get is essential; for the colostrums - the first milk - is highly laxative in nature and serves the important purpose of cleaning out the intestinal tract of that first tarry, fecal residue, the meconium. This early sucking of the child accomplishes another purpose besides the obtaining of this important laxative - it also increases the contractibility of the muscles of the womb, which is an exceedingly important service just at this time.

Should the mother or caretaker feel that baby will starve before the milk comes, or that it is necessary to provide "sweetened water;" let us assure them that nothing is needed except what nature provides. Nature makes the babe intensely hungry during these first two days, so that he will suck well, and if he is fed sweetened water, gruel, or anything else, he will not suck forcefully; and so nature's plan for securing extra or increased uterine contractions and the stimulation of the breast glands will be seriously interfered with.

Water Drinking

As soon as the new born babe is washed and dressed he is given two teaspoons of warmed, boiled water; and this practice is continued every two hours during the day, until as much as two to four ounces of unsweetened water is taken by the tiny babe during the twenty-four hours. Inanition fever - the fever that sometimes follows a failure to give water to the new born infant - is therefore avoided. The bottle from which the water is given should be scalded out each time, the nipple boiled, and just before the "water nursing" the nipple should be swabbed with boric acid solution.

Regularity In Feeding

From earliest infancy the baby should be nursed by the "clock," and not by the "squawk." Until he reaches his sixth-month birthday, he is fed with unerring regularity every three hours during the day. Asleep or awake he is put to the breast, while during the night he is allowed to sleep as long over the three-hour period as he will. Babies are usually nursed at night: during the early weeks, at nine o'clock in the evening, at midnight, and at six o'clock in the morning. After four months all nursing after ten P. M. may be omitted.

The baby is ordinarily allowed to remain at the breast for about twenty minutes. He may often be satisfied with one breast if the milk is plentiful; if not, he is given both breasts; and may we add the following injunction? insist that nothing should go into your baby's mouth but your own breast milk

and warm or cool-boiled water; no sugar, whiskey, paregoric, or soothing syrup should be given, no matter how he cries. Never give a baby food merely to pacify him or to stop his crying; it will damage him in the end. More than likely he is thirsty, and milk to him is what bread and meat are to you, neither of which you want when you are thirsty.

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Position of Mother During the Nursing

A perfectly comfortable position during nursing for both mother and babe is necessary for satisfactory results. During the lying-in period the mother should rest well over on her side with her arm up and her hand under her head, the other hand supports the breast and assists in keeping the nipple in the baby's mouth, as well as preventing the breast from in any way interfering with baby's breathing. A rolled pillow is placed at the mother's back for support.

After the mother leaves the bed, she will find a low chair most convenient when nursing the baby, and if an ordinary chair be used, she will find that a footstool adds greatly to her comfort. Once during the forenoon and once during the afternoon the nursing mother will find it a wonderful source of rest and relaxation if she removes all tight clothing, dons a comfortable wrapper, and lies down on the bed to nurse her babe; and as the babe naps after the feed, she likewise should doze and allow mother nature to restore, refresh, and fit her for restful and happy motherhood.

Worry, grief, fatigue, household cares, loss of sleep, social debauches, emotional sprawls - all debilitate the mother, and usually decrease the flow of milk.

Nursing When Angry and Overheated

Overheating, irritability, and sudden anger, almost invariably tend to raise the blood-pressure, which means the entry into the blood stream of an increased amount of epinephrine, which disturbs the baby greatly, often throwing him into convulsions or other sudden, acute illness.

Menstruation often interferes with the nursing mother, the milk becoming weaker at this time; however, if the infant continues to gain and the mother feels comparatively well, no attention need be paid to this fact.

Another pregnancy demands a drying up of the breast at once, as the tax is too great on the mother.

The Stools

The stools of the breast-fed baby do not require as much attention as those of the bottle-fed child. In cases of constipation, after four months, from one teaspoon up to one-half cup of unsweetened prune juice may be given one hour before the afternoon feed.

In instances of colic with signs of fermentation in the stool, the mother may take several doses (under her physician's orders) of common baking soda; or, if she is constipated, calcium magnesia will usually right the condition. Nature's mother milk is so beautifully adapted to the baby's needs that it is the rule for baby to have perfectly normal stools.

Symptoms of Successful Nursing

A happy baby is a satisfied baby. He lies quietly in a sleepy, relaxed condition if he has enough to eat, provided he is otherwise comfortable and dry. He awakens at the end of two hours and perhaps cries; but plain, unsweetened, warm, boiled water quenches his thirst, and he lies content for another hour, when he is regularly nursed. He gains on an average of about one ounce a day.

Earmarks of Unsuccessful Nursing

Constant discomfort, vomiting, fretful crying, passing and belching of gas, colicky pain, disturbed sleep, greenish stools with mucus, are among the more prominent earmarks of unsuccessful nursing. These symptoms appearing in a pale, flabby, listless, indifferent or cross baby, with steady loss of weight continued over a period of three or four weeks, point to "nursing trouble;" which, if not corrected, will lead to that much dreaded infantile condition - malnutrition.

Bolting of food or overeating results in vomiting and gas, and therefore interferes with normal nursing, as also may tongue-tie. A condition in the mouth, medically known as "stomatitis," and commonly known as "thrush," often gives rise to a fretful cry when nursing is attempted. In the first place, the baby cannot "hold on" to the nipple; while, in the second place, it hurts his inflamed mouth when he makes an effort to nurse.

Long continued nursing covering three-fourths of an hour or more, seizing of the nipple for a moment and then discarding it, apparently in utter disgust, are the earmarks of very scanty milk supply and should receive immediate attention.

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Aids to the Milk Supply

Believing that many more mothers than do so should nurse their babies, we have carefully tabulated a number of aids to the milk supply, which we hope will be most earnestly tried before the baby is taken from the breast - for so many, many more bottle-fed babies die during the first year than the breast fed. The dangers of infection, the worry of the food preparation, the uncertainty of results, all call for a most untiring effort on the part of every doctor, nurse, and mother, in their endeavors to secure maternal nursing. The following is a summary of "aids to the milk supply:"

1. Regular periodical sucking of the breasts from the day of baby's birth.
2. Systematic applications of alternate hot and cold compresses, followed by massage to the breasts.

3. Three good nourishing meals each day, eaten with merriment and gladness of heart.
4. A glass of "cream gruel," milk, cocoa, or eggnog at the close of each meal, with a glass just before retiring.
5. Three outings each day in the open air.
6. Nurse the baby regularly and then turn its care over to another, you seek the out of doors and engage in walking, rowing, riding and other pleasurable exercise.
7. Take a daily nap.
8. You can bank on fretting and stewing over the hot cook stove to decrease your milk. It seldom fails to spoil it.
9. Regular body bathing, with cold friction rubs to the skin.
10. A happy, carefree mental state. Nothing dries up milk so rapidly as worry, grief, or nagging.
11. The administration, preferably in the early days, of desiccated bovine placenta; although it may be given at any time during the period of nursing.

When the Baby Should Not Be Nursed

As much as we desire maternal nursing for the babe, there do occur instances and conditions which demand a change to artificial feeding, such as the following:

1. A new pregnancy.
2. Mothers with uncontrollable tempers.
3. Cases of breast abscess.
4. Prolonged illness of the mother with high fever.
5. Wasting diseases such as tuberculosis, Bright's disease, heart disease, etc.
6. Maternal syphilis.
7. When maternal milk utterly fails, or is wholly inadequate.

When a maternal anesthetic is to be administered, or in case of inflammation of the breast or during a very short illness not covering more than two or three days, then the breast pump may be used regularly every three hours to both breasts; the baby may be artificially fed and then returned to the breast after the effects of the anesthetic has worn off or the temperature has been normal for twenty-four hours.

There may also appear definite indications in certain children which make it imperative that the nursing child should early be weaned. These manifestations of disordered nutrition and failing health admonish us to put the baby on properly modified milk, or to transfer it to a wet nurse.

These conditions are:

1. Progressive loss in weight.

2. A bad diarrhea of long standing; one which does not yield to the usual remedies, at least not as long as the baby continues to feed from the breast. These diarrheas are especially serious when accompanied by a steady loss in weight.

3. Excessive vomiting accompanied by progressive loss in weight.

The Wet Nurse

Because of the rarity of good, healthy wet nurses, it is always better to attempt to feed the baby with scientifically modified milk (not proprietary foods), good, clean, cow's milk properly modified to suit the weight and age of the child. We put weight first, for we prepare food for so many pounds of baby rather than for the number of months old he is.

If modified food has failed and the best specialist within your reach orders a wet nurse; she must have the following qualifications:

1. She must be free from tuberculosis and syphilis. 2. She should be between twenty and thirty years of age. 3. She should abstain from all stimulants. 4. She should be amiable, temperate, and should sense her responsibility.

If an unmarried mother of her first child is engaged as a wet nurse, she should not be "stuffed" or allowed to overeat, which is commonly the result of moving her from her lower life into more comfortable surroundings, or given ale or beer to increase her milk. She should continue her normal eating, take light exercise, which does not mean the scrubbing of floors or doing the family washing, and live under the same hygienic regime outlined for the nursing mother. Should she be the mother of the second or third illegitimate child, then she is quite likely to be mentally deficient and she should not be engaged. Her own babe will have to be fed artificially as very few mothers can endure the strain of two suckling children.

The baby's own mother should keep general supervision and not turn her babe entirely over to the care of the wet nurse. Remember always that no one in the wide world will ever take the same mother interest in your offspring that can spring from your own mother heart.

The Bottle-Fed Baby: Part 1

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In taking up the subject of the bottle-fed baby, we must repeat that the only perfect baby food on earth is the milk that comes from the breast of a healthy mother.

But sudden illness, accident, chronic maladies, or possibly the death of the mother, often throw the helpless babes out into a world of many sorts and kinds of artificial foods - foods that are prepared by modifying cow's, ass', or goat's milk; foods arranged by the addition to the milk of various specially prepared cereals, albumens or malted preparations, otherwise known as "proprietary foods." We should endeavor, then, in this chapter and in that on "the feeding problem," to lay down certain general suggestions to both the nurse and the mother, which may assist them in their effort

to select the food which will more nearly simulate nature's wondrous mother-food, and which will, at the same time, be best suited to some one particular baby.

The Hourly Schedule

The normal baby, from birth to six months, should receive properly prepared nourishment every three hours, beginning the day usually at six A. M., the last feeding being at nine P. M. During the early weeks an additional bottle is given at midnight, but this is usually discarded at four months, at which time the last feeding should be given at about ten instead of at nine at night.

Should the baby continue to awaken during the night before six in the morning, unless he is under weight, a bottle of warm, boiled, unsweetened water should be given.

Quantity of Food

The quantity of food to be given is always determined by the size of the baby's stomach, which, of course, depends somewhat upon the age of the child; for instance, the stomach of the average baby one week old holds about one ounce, while at the age of three months the stomach holds five ounces; so it would not only be folly to give two ounces at one week and seven ounces at three months, but it would also be very detrimental to the babe, causing severe symptoms due to the overloading of the stomach.

Refrigerator Necessity

It is highly important that the day's feedings be kept in a cold place, free from the odors of other foods as well as free from dust, flies, and filth. In order that this may be accomplished, the well-protected bottles, each containing its baby-meal, are placed in a covered pail containing ice and water. This covered receptacle is now put in an ice box; and, in order that our most economical reader - one who may feel that she cannot afford to keep up the daily expense of the family refrigerator - may herself prepare a simple home refrigerator, the following directions are given.

Homemade Ice Box

Procure a wooden box about eighteen inches square and sixteen or eighteen inches deep and put four inches of sawdust into the bottom; now fill in the space between a ten-quart pail, which is set in the middle of the box with more sawdust. A cover for the box is now lined with two or three inches of newspaper, well tacked on, and is fastened to the box by hinges. We are now ready for the inside pail of ice, into which is carefully placed the well-protected bottles of milk, all of which is then set into the ten-quart pail in the box. Five cents worth of ice each day will keep baby's food cool, clean, and provide protection against the undue growth of germs.

Preparing The Bottle

At each feeding hour, one of baby's bottled meals is taken from the ice box and carefully dipped in and out of a deep cup of hot water. A very convenient receptacle is a deep, quart aluminum cup, which may be readily carried about. The hot water in the cup should amply cover the milk in the bottle.

To test the warmth allow a few drops to fall on the inner side of the arm, where it should feel quite warm, never hot. A baby's clean woolen stocking is now drawn over the bottle, which keeps it warm during the feeding. No matter how great the danger of offending a fond grandparent or a much adored friend never allow anyone to put the nipple in her mouth to make the test for warmth of baby's food.

There are many contrivances, both electrical and alcoholic, for heating baby's bottle, many of which are both convenient and inexpensive.

Position During Feeding

And now we realize that we are about to advise against the time-honored injunction which has been handed down from "Grandma This" and "Mother That" to all young mothers who have lived in their neighborhoods: "My dear young mother, if you can't nurse your precious infant, you can at least 'mother it' at the nursing time by holding it in your arms and gently rocking it to and fro as you hold the bottle to its lips." This so-called "mothering" has resulted in regurgitation, belching, and numerous other troubles, as well as the formation of the "rocking habit."

A young mother came running into my office one day saying: "Doctor, it won't work, the food's all wrong; my baby is not going to live, for he throws up his food nearly all the time." We arranged to be present when the next feeding time came and watched the proceedings. A dear old friend had told her "she must 'mother' her baby at the nursing time," and so she had held the child in a semi-upright position as she endeavored to hold the bottle as near her own breast as was possible. The hole in the nipple was a bit large, which occasioned the subsequent bolting of the food, and then to continue the "mothering" she swayed him to and fro, all of which was interrupted suddenly by the vomiting of a deluge of milk.

The Bottle-Fed Baby : Part 2

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I drew the shade in an adjoining room, opened the windows, and into a comfortable carriage-bed I placed the baby on his side. Seating myself beside him I held the warm, bottled meal as he nursed. Several times I took it from his mouth, or so tipped it that "bolting" was impossible. Gradually, carefully, and slowly, I took the empty bottle away from the sleepy babe, and as I closed the door the mother said in anxious amazement: "He won't forget I'm his mother if I don't hold him while he nurses?" You smile as I smiled at this girl-mother's thought; but, nevertheless there are many like her - anxious, well-meaning, but ignorant.

The infant stomach is little more than a tube, easily emptied if the baby's position is not carefully guarded after nursing. No bouncing, jolting, patting, rocking, or throwing should take place either just before, during, or immediately after meals.

Time Allowance for One Feeding

From twelve to twenty minutes is long enough time to spend at a bottle meal. The nipple hole may have to be made larger, or a new nipple with a smaller hole may have to be purchased. When new, you should be able to just see a glimmer of light through the hole, and if the infant is too weak to nurse hard, or the hole too small, it may be made larger by a heated hatpin run from the inside of the nipple out; great care must be taken, else you will do it too well. If the nipple hole is too large, bolting is the sure result; while too small a hole results in crying and anger on the part of the hungry child, because he has to work too hard to get his meal.

After the Feed

We have seen some mothers, in their anxiety to prevent the sucking in of air from the emptied bottle, rush in and jerk the nipple from the going-to-sleep babe so forcibly that all thoughts of sleep vanished and a crying spell was initiated. The tactful mother is the quiet one who slowly, quietly, draws the empty bottle with its "much loved nipple" from the lips. If you observe that the babe is going to sleep, with an occasional superficial draw at the nipple, wait a moment; he will drop it himself, and you can pick it up as you quietly leave the room. In all instances, whether it be indoors or out of doors, arrange the babe in a comfortable sleeping position, remembering that nursing is warm exercise and the babe gets uncomfortably sweaty if over bundled, especially about the head and neck. No one should unnecessarily touch the babe immediately after feeding; even his diaper may be changed without awakening him while he is therefore lying quietly in his bed.

Intervals Between Meals

The three-hour interval is reckoned from the beginning of the meal, and not from its close. More than two hours is spent in the stomach digestion, and any food or sweetened water which may enter between meals only tends to cause indigestion and other disturbances. And that this important organ may have a bit of rest, we fix the interval at three hours, which in our experience and that of many other physicians, has yielded good results. As a rule we have no regurgitation and no sour babies on the three-hour schedule. Sick babies, very weak babies, and their feeding time, will be discussed in a later chapter.

Additional Foods

At six months, and often as early as four, in cases of constipation, unsweetened, well-strained prune juice may be given, beginning with one-half teaspoon one hour before the afternoon feed and increasing it daily until two tablespoons are taken. At six months, both orange juice and vegetable broths are given, whose vegetable salts add a very important food element to the baby's diet - an element which our grandmothers thought could only be obtained through the time-honored "bacon rind" of by-gone days.

Orange juice is also unsweetened and well strained, and is administered in increasing amounts, beginning with one-half teaspoon one hour before the afternoon feeding, until the juice of a whole orange is greedily enjoyed by the time of the first birthday. The vegetable juices are obtained from cut-up spinach, carrots, tomatoes, and potatoes, strained, with a flavor of salt and onion - really a bouillon - and is given just before the bottle at the six P. M. feeding. They are also begun in teaspoon amounts.

Food for the Traveling Babe

Baby travel should be reduced to a sheer necessity; never should the babe be subjected to the exposure of disease germs, the change of food, the possibilities of draughts and chilling, for merely a pleasure trip - the risks are too great and the possibilities of future trouble too far reaching.

If you are in touch with the milk laboratory of a large city, you will find that they make a specialty of preparing feedings which are good for a number of days for the traveling baby, and we strongly advise that their preparations be accepted; but in the event of not being in touch with such a laboratory we suggest the making of a carrying ice-box covered with wicker, which must be kept replenished with ice. Food kept in such a device may be kept fresh for twenty-four to forty-eight hours. Plans other than the laboratory preparations or the ice-box are risky, and should not be depended upon.

Many of our railway dining cars now pick up fresh, certified milk at stations along the line for use on their tables, and where such is the case fresh preparations of milk may be made on a trans-continental trip by the aid of an alcohol stove. Malted milk may also be used, provided you have accustomed the baby to its use a week before leaving home, by the gradual substitution of a fourth to a half ounce each day in the daily food; all of which, of course, should be done under your physician's direction.

If possible, leave baby at home in his familiar, comfortable environment in the care of a trained nurse and a trusted relative, and under the supervision of the baby's own physician. He is much better off, much more contented, and we are all aware of the fact that contentment and familiarity of sights and people promote good appetite, good digestion, and happiness - the very essentials of success in baby feeding. We spoke touchingly and sympathetically to the mother who must leave her babe; and likewise we wish to cheer her as we remind her that by wireless messages and night letters it is possible to keep in touch with loved ones though a thousand miles away.

The sanitation and modification of cow's milk, as well as stools, etc., are taken up in later chapters.

Babies - Milk Sanitation : Part 1

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Cow's milk, like mother's milk, is made up of solids and water. In a previous chapter we learned that in one-hundred parts of mother's milk, eighty-seven parts were water and thirteen parts were solid.

Mother's milk is absolutely sterile, that is, free from the presence of germs; on the other hand, cow's milk is anything but sterile - the moment it leaves the udder it begins to accumulate numerous bacteria, all of which multiply very rapidly. Cow's milk is generally twenty-four to forty-eight hours old before it can possibly reach the baby. It is just as important to keep in mind these facts of milk contamination - dirt, filth, flies, and bacteria - as it is to plan for the modification of cow's milk for the purpose of making it more nearly resemble mother's milk.

While mother's milk has about the same percentage of fat as cow's milk, it is almost twice as rich in sugar, and has only one-fourth to one-third as much protein. This protein is vastly different from

that found in cow's milk, which you recall has a tough curd, as seen in cottage cheese. While mother's milk contains a small amount of casein similar to that found in the cheese of the cow's milk, the principal protein constituent is of another kind and is much more easy of digestion than the casein of cow's milk.

This is a most important point to remember, because the baby's stomach is not at first adapted to the digestion of the heavier and tougher protein curds of cow's milk. It requires time to accustom the infant stomach to perform this heavier work of digestion. There are a number of factors which must be borne in mind in the modification of milk, whether it be cow's milk, or goat's milk (for many European physicians use goat's milk entirely in the artificial feeding of infants): namely, the cleanliness of the milk, the acidity of milk, the difference in the curd, the percentage of sugar, and the presence of bacteria.

Sugar

In the modification of cow's milk, sugar must be added to make up for the sugar which is decreased when the water was added to reduce the protein. There are several sorts of sugar used in the modification of milk. These sugars are not added to sweeten the milk alone, but to furnish a very important element needed for the growth of the baby. Sugar is the one element which the infant requires in the largest amount.

Milk sugar is probably most universally used in the modification of milk, but a good grade of milk sugar is somewhat expensive, costing from thirty to sixty cents a pound, and this places it beyond the reach of many mothers. It is added to the food mixtures in the proportion of one ounce to every twenty ounces of food. Cane sugar (table sugar) may also be used, but it must be clean and of good quality. It is used in rather less quantity than that of milk sugar, usually from one-half to one-third of an ounce by measure to each twenty ounces of food. Dextrin-maltose (malt sugar) is very easy of digestion and may be used in the modification of milk. Maltose seems to help the children to gain more rapidly in weight than when only milk or cane sugar is used. It is also exceedingly useful in constipation, as its action is more laxative than any of the other sugars; but it should not be given to children who vomit habitually or have loose stools.

Acidity

Like mother's milk, the cow's milk is neutral as it comes from the udder; but, on standing, it quickly changes, soon becoming slightly acid, as shown by testing with blue litmus paper. In fact, what is known as ordinarily fresh milk, if subjected to the litmus paper test, always gives an acid reaction. This acidity is neutralized by adding lime water to the formula in the proportion of one ounce to each twenty-ounce mixture. Ordinary baking soda is sometimes prescribed by physicians in place of the lime water. In the event of obstinate constipation, milk of magnesia is sometimes added to the day's feedings.

Cream

There may be procured in any large city an instrument called the cream gauge, which registers approximately (not accurately) the richness of milk. Some milk, even though rich, parts with its cream very slowly; while some poor milk allows nearly all the cream quickly to rise to the surface. We know of no way for the mother to determine the amount of cream (without the cream gauge)

except by the color and richness of the milk. In cities it is very convenient to send a specimen of the milk to the laboratories to be examined by experts, who will gladly render a report to both physician and mother.

The lactometer is a little instrument used to estimate the specific gravity of milk. An ordinary urinometer such as used by physicians in estimating the specific gravity of urine may also be used. The specific gravity of cow's milk should not register below 1028 or above 1033.

Herd Milk

Milk from a single cow is not to be desired for baby's food because of its liability to vary from day to day, not to mention the danger of the cow's becoming sick. Authorities have agreed that herd milk of Holstein or ordinary grade cows is best for infant feeding. This mixed-herd milk contains just about the proper percentage of fat; whereas, if Jersey milk must be used, some of the cream should be taken away. Our milk should come from healthy cows which have been tested for tuberculosis at least every three months.

Annatto is sometimes added to milk to increase its richness of color. To test for annatto proceed as follows: To a couple of tablespoons of milk add a pinch of ordinary baking soda. Insert one-half of a strip of filter paper in the milk and allow it to remain over night. Annatto will give a distinct orange tint to the paper. The commonly used milk preservatives are boric acid, salicylic acid, and formaldehyde, any of which may be readily detected by your health officials.

Sanitary Dairies

In close proximity to most large cities there is usually to be found one or more sanitary dairies. It is a joy indeed to visit a farm of this kind with its airy stables and concrete floors, which are washed with water coming from a hose. The drainage is perfect - all filth is immediately carried off. The cows are known to be free from tuberculosis, actinomycosis (lumpy jaw), and foot and mouth disease. The milkmen on this farm wear washable clothes at the milking time, and their hands are painstakingly cleansed just before the milking hour. Previous to the milking the cattle have been curried outside the milking room and their udders have received a careful washing.

The milkman grasps the teat with clean hands, while the milk is allowed to flow through several thicknesses of sterilized gauze into the sanitary milking pail. This milk is at once poured into sterile bottles, is quickly cooled and shipped in ice to the substations where the delivery wagon is waiting. In the ideal delivery wagon there are shallow vats of ice in which the bottles are placed, therefore permitting the milk to reach the baby's home having all the while been kept at a temperature just above the freezing point.

And why all this trouble? Why all this worry over temperature and cleanliness? Babies were not so cared for in the days of our grandmothers. The old-fashioned way of milking the cows with dirty clothes and soiled hands, while cattle were more or less covered with manure, with their tails switching millions of manure germs into the milking pail, produced a milk laden not only with manure germs - the one great cause of infantile diarrhea - but also swarming with numerous other mischief making microbes. Even tuberculosis, that much dreaded disease germ of early infancy, may come from the dairy hands as well as from infected cows.

There used to be many dairymen like the old farmer who, when interrogated by the health commissioner concerning the cleanliness of his milk, laughed as he reached down into the bottom of a pail of yellow milk and grabbing up a handful of manure and straw, said: "That's what makes the youngsters grow." But it does not make them grow; it often causes them to die, and even if they do live, they live in spite of such contaminated food, for the germ which is always found in the colon of the cow, probably kills more babies every year than any other single thing.

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It is possible to reduce the growth of these germs by keeping the milk at a very low temperature from the time it leaves the cow until the moment it gets to the home refrigerator. Those which survive this process of refrigeration may be quickly rendered harmless by pasteurizing or sterilizing at the time of preparing baby's food.

In the absence of the modern sanitary dairy, we would suggest that the milk supply be improved by giving attention to the following:

The cattle should be tested for tuberculosis every three months. The walls of the cow house should be whitewashed three times a year. The manure should be stored outside the barn. The floor of the cow house should be sprinkled and swept each day. The cattle should be kept clean - curried each day, and rubbed off with a damp cloth before milking. The udders should be washed before each milking. The milker can wear a clean white gown or linen duster which should be washed every two days, while his hands should be washed just before the milking. The milking pail should be of the covered sanitary order. The barn should be screened.

Certified Milk

Immediately after leaving the cow, the milk should be cooled to at least 45 F. It should at once be put into bottles that have been previously sterilized and then be tightly covered, and should be kept in ice water until ready for consumption. No matter how carefully the milk is handled, it is infected with many bacteria, but if it is quickly cooled, the increase of the bacteria is greatly retarded. Under no circumstances buy milk from a grocery store out of a large can. Go to your health officer and encourage him in his campaign for sanitary dairies and certified milk.

Such milk as we have described under the head of sanitary dairies, when it has been tested by the board of health and has received the approval of the medical profession, is known as "certified milk;" and, although the price is usually fifteen to twenty cents a quart, when compared with the cost of baby's illness it will prove to be cheaper than the dirty milk which sickens and kills the little folks.

There is no doubt that the increased use of "certified milk" has been a great factor in the reduction of deaths from infant diarrhea in recent years.

Boiling the Milk

When certified milk cannot be had, it is absolutely dangerous to give raw, not boiled, or not pasteurized milk to the baby, particularly in warm weather; for the countless millions of manure germs found in each teaspoon of ordinary milk not only disturbs the baby's digestion, but actually makes him sick, causing colic, diarrhea, and infant cholera. The only way this milk can be rendered safe is by cooking it - actually killing the bacteria. This process of boiling, however, does not make good milk out of bad milk nor clean milk out of that which is dirty, it simply renders the milk less dangerous.

There are two methods of killing bacteria - sterilization and pasteurization. By sterilization is meant the process of rendering the milk germ free by heating, by boiling. Many of the germs found in milk are comparatively harmless, merely causing the souring of milk; but other microbes are occasionally present which cause serious diseases, such as measles, typhoid and scarlet fever, diphtheria, tuberculosis, and diarrhea. It is always necessary to heat the milk before using in warm weather, and during the winter it is also important when infectious or contagious diseases are prevalent.

Milk should be sterilized when intended for use on a long journey, and may be eaten as late as two or three days afterward.

To sterilize milk, place it in a well-protected kettle and allow to boil for one hour and then rapidly cool. This process renders it more constipating, and for some children many of its nutritive properties seem to be destroyed, as scurvy is often the result of its prolonged use. When a child must subsist upon boiled milk for a long period, he should be given the juice of an orange each day. Children are not usually strong and normal when fed upon milk of this character for indefinite periods. All living bacteria (except the spores or eggs) may be destroyed by boiling milk for one or two minutes.

Pasteurization

When baby is to use the milk within twenty-four hours, "pasteurization" is better than boiling as a method of destroying microbes.

There are many pasteurizers on the market which may be depended upon, among which are the Walker-Gordon Pasteurizer, and Freeman's Pasteurizer; but in the absence of either of these pasteurization may be successfully accomplished by the following method:

On the bottom of a large kettle filled with cold water, place an ordinary flatiron stand upon which is put a folded towel. On this place the bottle of milk as it comes from the dairyman, with the cap of the bottle loosened. The cold water in the kettle should come up to within an inch of the top of the bottle of milk. Heat this water quickly up to just the boiling point - until you see the bubbles beginning to rise to the top. The gas is then turned down or the kettle is placed on the back of the range and held at this near-boiling point for thirty minutes, after which it is taken to the sink and cold water is turned into the water in the kettle, until the bottle of milk is thoroughly cooled. It is now ready to be made up into the modified food for baby.

Never let pasteurized milk stand in the room, nor put it near the ice when warm. It must be cooled rapidly, as described above; that is, within fifteen or twenty minutes.

The "spores" of the milk are not killed by pasteurization and they hatch out rapidly unless the milk is kept very cold, and, as already stated, it should be used within twenty-four hours after pasteurization.

The Care of Bottled Milk

The certified milk or the ordinary milk that has been delivered to your home and is to be used without pasteurization or sterilization, should receive the following care:

1. It should be placed at once in a portion of the ice box that is not used to store such foods as radishes, cabbage, meats or any other open dishes of food whose odors would quickly be absorbed by the milk. The milk should never be left standing on the doorsteps in the sun, for many reasons: the sun heats the milk, encourages the growth of bacteria, and a passing cat or dog, whose mouth often contains the germs of scarlet fever, tonsillitis, and diphtheria, should it be hungry, laps the tops of the bottles, particularly in the winter when the cream has frozen and is bulging over the edge.
2. It should never be kept in the warm kitchen, as when visiting her sick baby we discovered one young mother doing. In answer to my question, she explained; "Doctor, we do not take ice in the winter time, everything is ice outdoors, so I just set the bottle outside the window bringing it in whenever I need to give the baby some food. I forget to put it out sometimes, but really now, does it matter?" It really matters much, for you see, reader, the milk is first freezing then thawing and it is rendered entirely unfit for the baby.
3. Milk should be kept covered and protected from dust and flies; it should be kept in glass jars which have been sterilized by boiling before being filled, and then placed in the refrigerator. If the milk is sour, or if there is any sediment in the bottle, it is unfit for baby's use.

Babies - Home Modification of Milk : Part 1

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In a previous chapter it was found from comparing the analysis of mother's milk with that of cow's milk, that they widely differed in the proteins and sugar. The art of so changing cow's milk that it conforms as nearly as is possible to mother's milk is known as "modification." Where protein, sugar, and fat are given in proper amounts, healthy infants get along well; but when either the fats or proteins are given in excess, or when the digestion of the child is deranged, there is often no end of mischief.

There are two groups of milk formulas that are useful. First, those in which the fats and proteins are about the same, known as "whole milk," or "straight" milk mixtures; second, those in which the fats are used in larger proportions than proteins, and known as "top milk" - milk taken from the upper part of the bottle after the cream has risen. And since the larger proportion of babies take the lower fats or "whole milk" formulas, and seem to get along better than the babies who have the "top milk" formulas, we will first take up the consideration of the modification of whole milk.

Preparation for Modification

To begin with, everything that comes in contact with the preparation of baby's food must be absolutely clean. The table on which the articles are placed, and any towel that comes in contact with the articles or the mother's hands, or those of the nurse, must be thoroughly scrubbed.

There is only one way to prepare the utensils that are to be used in making the baby's food, and that is to put them in a large kettle and allow them to boil hard for fifteen minutes just before they are to be used.

Bottles

There is but one bottle which can be thoroughly washed and cleaned, and that is the wide-mouthed bottle. It should hold eight ounces and should have the scale in ounces blown in the side. The nipple for this bottle is a large, round breast from which projects a short, conical nipple, which more nearly resembles the normal breast than do the old-fashioned nipples so frequently seen on the small-necked nursing bottles. There is a great advantage in this, in that the baby cannot grasp the nipple full length and therefore cause gagging. These bottles and nipples are known as the "Hygiene," and have proven to be a great source of comfort to the baby as well as to the mother or nurse whose duty it is to keep them clean. There are a number of other nursing bottles on the market, which, if they are used, must be thoroughly cleansed with a special bottle brush each day. The neck is small and the nipple is small and great care must be taken in the cleansing of both of them.

Care of Bottles

When there is a bottle for each individual feeding in the day, immediately after each nursing both bottle and nipple should be rinsed in cold water and left standing, filled with water, until the bottles for one day's feeding have all been used. The nipples should be scrubbed, rinsed, and wiped dry and kept by themselves until their boiling preparation for the following day's feeding.

If the same bottle is to be used for the successive feedings during the day, it should be rinsed, washed with soap and water, and both bottle and nipple placed in cold water and brought quickly to the boiling point and allowed to boil for fifteen minutes. No bottles or nipples must ever be used after a mere rinsing; boiling, preceded by a thorough washing in soap and water, must take place before they are used a second time.

New nipples are often hard and need to be softened, which is readily done by either prolonged boiling or rubbing them in the hands.

All new bottles should be annealed by placing them on the stove in a dishpan of cold water and allowing them to boil for twenty minutes, and then allowing them to remain in the water until they are cold. When bottles are treated in this manner they do not break so readily when being filled with boiling water or hot food.

Preparing the Food

In a large preserving kettle place all the utensils needed in the preparation of the food - pitcher, spoon, fork, measuring glass, bottles, nipples, cheesecloth for straining, agate cup, wire strainer, in

fact everything that is to be used in the preparation of the food. Now fill the kettle with cold water and place over the gas and allow to boil for fifteen minutes. On a well-scrubbed worktable place a clean dish towel, and on this put the utensils and the bottles right side up. The nipples on being taken out of the boiling water will dry of themselves; they should be placed in a glass-covered jar until they are needed for each individual feeding, the nipples not being placed on the bottles as they go to the ice box.

Having been given your formula by your physician, proceed in the following way. Suppose we were preparing the food for a normal two-months old baby that weighed ten pounds, with the prescription as follows:

Details of Preparation

Two level tablespoons of cane sugar are placed in the agate cup and dissolved in a small amount of boiling water. The solution should be perfectly clear, and if it does not clear up put it over the heat for a few moments.

This is now turned into the eight-ounce measuring glass which is then filled with boiling water and emptied into the two-quart pitcher. We need four and one-half more ounces of boiling water to complete the prescription requirement of twelve and one-half ounces.

The bottle of milk, if properly certified, need not be pasteurized; but if it is not, it should have been previously pasteurized while the utensils were boiling according to the suggestions found in the chapter on "milk sanitation." The top of the milk bottle should be thoroughly rinsed and wiped dry, and after a thorough shaking of the milk, the cover is removed with the sterile fork and eleven ounces are measured out by measuring glass and poured into the pitcher. All is now stirred together with an ounce of lime water, which should never look murky, but should be as clear as the clearest water and should always be kept in the ice box when not in use.

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The sterile cheesecloth which has been boiled for fifteen minutes is now put over the nose of the pitcher, the contents of which is accurately measured into the seven clean, empty bottles, each containing three and one-half ounces. Over the top of each of the nursing bottles is placed a generous piece of waxed paper which is held down by a rubber band. Each meal for the day is now contained in a separate bottle, and all are placed in a covered pail of water containing ice, and put in the ice box.

If the prescription for the baby's food contains gruel, it is prepared in the following manner:

Suppose the baby is eight months old and the prescription called for two level tablespoons of flour and eight ounces of boiled water. The two level tablespoons of flour, whether it be wheat (ordinary bread flour), or barley flour, are put into a cup and stirred up with cold water, just as you would stir up a thickening for gravy; now measure out eight ounces of water and allow it to come to a boil in the inner pan of the double boiler, into which the thin paste is stirred until it comes to a boil. After

boiling for twenty minutes, measure again in the measuring glass and what water has been lost by evaporation must be added to complete accurately the prescription requirement of eight ounces; this is now added to the other ingredients of the prescription.

Table for Infant Feeding

We now offer a monthly schedule - a table which is the result of our experience in feeding hundreds of babies in various sections of Chicago. It is not a schedule for the sick baby, but it is a carefully tabulated outline for the normal, healthy, average child ranging from one week to one year in age. In offering this table we remind the mother, if the baby is six months old and not doing well on the food it is getting and a change is desired by both mother and physician, that it is far better to begin with the second or third month's prescription and quickly work up to the sixth month's. This change may often be accomplished in two or three days.

In all large cities there are to be found milk laboratories which make it their business to fill prescriptions for the modification of milk under the direction of baby specialists. This milk can be absolutely relied upon. In specialized diet kitchens in many large hospitals, these feeding prescriptions also may be filled.

Top-Milk Formula

Top milk is the upper layer of milk which has been removed after standing a certain number of hours in a milk bottle or any other tall vessel with straight sides. It contains most of the cream and varying amounts of milk. It may be removed by a small cream dipper which holds one ounce, or it may be taken off with a siphon, but it should never be poured off. To obtain seven percent top milk which is the one most ordinarily used in the preparation of top milk formulas, we take off varying amounts - according to the quality of the milk - which Doctor Holt describes as follows:

From a rather poor milk, by removing the upper eleven ounces from a quart, or about one-third the bottle.

From a good average milk, by removing the upper sixteen ounces, or one-half the bottle.

From a rich Jersey milk, by removing the upper twenty-two ounces, or about two-thirds the bottle.

Cream is often spoken of as if it were the fat in milk. It is really the part of the milk which contains most of the fat and is obtained by skimming, after the milk has stood usually for twenty-four hours; this is known as "gravity cream." It is also obtained by an apparatus called a separator; this is known as "centrifugal cream," most of the cream now sold in cities being of this kind. The richness of any cream is indicated by the amount of fat it contains.

The usual gravity cream sold has from sixteen to twenty percent fat. The cream removed from the upper part (one-fifth) of a bottle of milk has about sixteen percent fat. The usual centrifugal cream has eighteen to twenty percent fat. The heavy centrifugal cream has thirty-five to forty percent fat.

The digestibility of cream depends much upon circumstances. Many serious disturbances of digestion are caused by cream.

It is convenient in calculation to make up twenty ounces of food at a time. The first step is to obtain the seven percent milk, then to take the number of ounces that are called for in the formula desired.

One should not make the mistake of taking from the top of the bottle only the number of ounces needed in the formula, as this may be quite a different percent of cream and give quite a different result.

There will be required in addition, one ounce of milk sugar and one ounce of lime water in each twenty ounces. The rest of the food will be made up of boiled water.

It is necessary to make the food weak at first because the infant's stomach is intended to digest breast milk, not cow's milk; but if we begin with a very weak cow's milk the stomach can be gradually trained to digest it. If we began with a strong milk the digestion might be seriously upset.

Usually we begin with number one on the second day; number two on the fourth day; number three at seven to ten days; but after that make the increase more slowly. A large infant with a strong digestion will bear a rather rapid increase and may be able to take number five by the time it is three or four weeks old. A child with a feeble digestion must go much slower and may not reach number five before it is three or four months old.

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It is important with all children that the increase in the food be made very gradually. It may be best with many infants to increase the milk by only half an ounce in twenty ounces of food, instead of one ounce at a time, as indicated in the tables. therefore, from three ounces the increase would be to three and one-half ounces; from four ounces to four and one-half ounces, etc. At least two or three days should be allowed between each increase in the strength of the food.

Peptonized Milk

Another modification which at times may be ordered by your physician is peptonized milk. Since it is infrequent for the proteins of milk to be the cause of indigestion, peptonized milk has only a limited use, chiefly in cases of acute illness. The milk is peptonized in the following manner:

Place the peptonizing powder (it is procurable in tubes or tablets from the drug store) in a small amount of milk, and after being well dissolved, put into the bottle or pitcher with the plain or modified milk, after which the whole is shaken up together. The bottle is then put into a large pitcher containing water heated to about 110° F. or as warm as would bear the hand comfortably, and left for ten or twenty minutes (if the milk is to be partially peptonized). To completely peptonize the milk, two hours are required. Either of these formulas is only used on the advice of a physician.

Buttermilk

In many cases of chronic intestinal indigestion, buttermilk is used in place of the milk. It is prepared as follows: After the cream has been taken from the milk and it has been allowed to come to a boil, it is cooled to just blood heat. A buttermilk tablet, having first been dissolved in a teaspoonful of sterile water, is now stirred into the quart of warmed, skimmed milk and allowed to stand at room temperature for twenty-four hours at which time it should look like a smooth custard. With a sterile whip this is now beaten and is ready for the sugar and the boiled water which is added according to the written prescription from the doctor.

Condensed Milk

Under no circumstances should condensed milk be used as the sole food of the baby for more than one month. Children often gain upon it, but as a rule they have little resistance, and they are very prone to develop rickets and oftentimes scurvy; and, as noted elsewhere, orange juice should always be administered at least once during the twenty-four hours as long as condensed milk is used.

Of all the brands of condensed milk, those only should be selected which contain little or no cane sugar. Perhaps the "Peerless Brand" of evaporated milk is the most reliable and in the preparation of food from this evaporated milk the same amount of sugar, etc., should be added as we do in the preparation of "whole milk" or "top milk."

We do not in any way advise the use of condensed milk. Fresh milk should always be used where it is obtainable, but in traveling it sometimes has to be used. Holt says, "It should be diluted twelve times for an infant under one month and six to ten times for those who are older."

Malted milk is a preparation suitable in some cases where fresh cow's milk is not obtainable. Even better than condensed milk, this food will be found serviceable in traveling, or in instances where only very bad cow's milk is within reach.

Special Foods

Most patent foods are made up of starches and various kinds of sugars, and some of them have dried milk or dried egg albumin added. Many flours under fanciful names are sold on the market today. For instance, one flour with a very fanciful name is simply the old fashioned "flour ball" that our great, great grandmothers made; and, by the way, perhaps there is no flour for which we are more grateful in the preparation of infant food than the flour ball which is prepared as follows: A pound of flour is tied tightly in a cheesecloth and is put into a kettle of boiling water which continues to boil for five or six hours, at the end of which time the cheesecloth is removed and the hard ball, possibly the size of an orange, is placed on a pie pan and allowed slowly to dry out in a low temperature oven.

At the end of two or three hours, the ball, having sufficiently dried, has formed itself into a thick outer peel which is removed, while the heart which is very hard and thoroughly dry, is now grated on a clean grater, and this flour has perhaps helped more specialists to serve more sick babies than any other form of starch known. It is used just as any other flour is used - wet up into a paste, made into a gruel, which is boiled for twenty minutes before it is added to the milk.

Whey is sometimes used in the preparation of sick babies' food and is prepared as follows:

To a pint of fresh lukewarm cow's milk are added two teaspoons of essence of pepsin, liquid rennet or a junket tablet. It is stirred for a moment, then allowed to stand until firmly coagulated, which is then broken up and the whey strained off through a muslin.

The heavy proteins remain in the curd, and the protein that goes through with the whey is chiefly the lactalbumin.

Babies - The Feeding Problem : Part 1

The Mother and Her Child

By William S. Sadler, M.D., Lena K. Sadler, M.D.

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A friend of ours who presides over a court of domestic relations in a large city, recently told us that he believed much trouble was caused in families - many divorces, occasioned, and many desertions provoked - because improperly fed babies were cross and irritable and so completely occupied the time of the mother, who, herself, knew nothing about mother craft or the art of infant feeding. Consequently, the home was neglected and unhappy, quarreling abounded and failure, utter failure, resulted. The children were constantly cross, and so much of the mother's time was consumed in caring for these irritable, half-fed babies, that the home was disheveled, the meals never ready, the husband's home-coming was a dreaded occurrence, and he, endeavoring to seek rest and relaxation, usually sought for it in the poolroom or the saloon, with the usual climax which never fails to bring the time-honored results of debauch - despair and desertion.

In the beginning of this book we paid our respects to the present-day educational system which does not provide an adequate compulsory course in which all women could be given at least a working knowledge of home making and the care and feeding of the babies; so that statement need not be repeated in this chapter. But we wish to add, in passing, that ignorance is the basis and the foundation of more unhappy homes, broken promises, panicky divorces, and shattered hopes, as well as of more deaths during the first year of infancy, than any other cause. And in speaking of its relationship to baby craft, we believe that ignorance concerning normal stools, how many times a day the bowels should move; how much a baby's stomach holds; how often he should be fed, etc. - I say it is ignorance of these essential details that lies at the bottom of many problems which come up during the first year, particularly the "feeding problem."

Infant Welfare

In the city of Chicago at the time of this writing, the Infant Welfare Association maintains over twenty separate stations where meetings are held for mothers, where lectures are delivered on the care and feeding of babies. Babies are brought to these stations week in and week out; they are weighed and measured and, if bottle-fed, nurses are sent to the homes to teach the mother how properly to modify the milk in accordance with the physician's orders. The health authorities of our city also maintain several such stations where mothers and babies may have this efficient help. A corps of nurses are employed to carry out the instructions and to follow up the mothers and the babies in their homes, and therefore the death rate has been greatly reduced, not only in our city but in all such cities where baby stations have been instituted. In a certain ward in Philadelphia the death rate was reduced forty-four percent in one year after the baby stations were established.

Choosing a Formula

There are three classes of infants who require weak-milk mixtures to begin with: namely, the baby who has been previously nursed and whose mother's milk has utterly failed; the baby just weaned; and the infant whose power to digest is low. If these children were six months old, and the formula best suited to them is unknown, we must begin with a formula suited to a two- or three-month-old child and quickly work up to the six-month formula, which may often be accomplished within two or three days.

The Bottle-Fed Baby

When a baby is getting on well with his food, he should show the following characteristics: He should have a good appetite; should have no vomiting or gas; he should cry but little; and he should sleep quietly and restfully. His bowels should move once or twice in twenty-four hours. His stool should be a pasty homogeneous mass. He should possess a clear skin and good color. He should show some gain each week - from four to eight ounces - and he should also show mental development.

As long as a baby appears happy and gains from four to eight ounces a week and seems comfortable and well satisfied, the feeding mixture should not be changed or increased.

Make Changes Gradually

In our experience with the artificial feeding of infants, we have come to look upon the practice of gradually changing the food formula as the most important element in successful baby feeding.

We recall one mother in the suburbs who came to us with her baby who had been feeding on a certain proprietary food. She declared that it "just couldn't take cow's milk." She admitted "it was not doing well," and so she would like to have help. The baby was old enough, had it been normal, to have been taking whole milk for some time. We recall our having the mother prepare the proprietary food just as she had been used to preparing it, and each day we had her throw away one-half ounce and put in one-half ounce of whole milk, this mixture she fed the baby for two days.

The next time, we had her take out one ounce of the mixture and put in one ounce of whole milk, which we fed the baby for three successive days; and then one and one-half ounces were substituted which was fed to the baby for four days; and therefore we carefully, slowly, and gradually withdrew the proprietary food and substituted fresh, certified cow's milk. It took us a month to complete the change, but we are glad to add that it was done without in the least disturbing the child.

Now, had the change been made abruptly - in a day or two, or three days - the baby would probably have been completely upset, while both the mother and the doctor would have been greatly discouraged. Many mothers and even some physicians have jumped from one baby food to another baby food; they have tried this and they have tried that, until the poor child, having been the victim of a number of such dietetic experiments, finally succumbed.

We cannot urge too strongly the fact that, as a rule, whenever a change is made from one food to another, it should be done gradually, unless it be the change of a single element such as that of a very high percent of cream found in top milk mixtures, when it seems to be a troublesome element

in the milk. No bad effects will follow the quick change to skimmed milk with added sugar, starches, etc; but in changing from a proprietary food to a milk mixture, the change should always be made gradually, the quantity of the new food being increased gradually.

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Milk should be increased by quarter (1/4) ounce additions, and it should not be increased more than one ounce in one week; while the mixture should not be increased as long as the baby is gaining satisfactorily. A wise mother and an experienced physician can usually see at a glance when a child is doing well - by the color and consistency of the stools, the child's appetite, his sleep, and his general disposition.

Common Mistakes In Formulas

First and foremost, we believe a great mistake is often made in using too heavy cream mixtures; babies as a rule do not stand the use of too high a percentage of cream. Formulas that call for whole milk should contain four percent fat or cream; and while babies often gain rapidly on the higher percentage of cream found in a rich Jersey milk, nevertheless, sooner or later serious disturbances of digestion usually occur. Herd milk is, therefore, better for the babies because in the "whole milk" of the herd of Holsteins we have only about four percent fat.

Another common mistake is too heavy feeding at the time of an attack of indigestion; even the usual feeding may be too heavy during this time of indisposition. It is not at all uncommon for us to dilute baby's food to one-third its strength at the time of an acute illness.

Still another trouble maker is dirt - dirt on the dish-towel, dirt on the nipple, dirt in the milk, dirt on the mother's hands. Dirt is an ever present evil and an endless trouble maker, as evidenced by stool disturbances, indigestion, fretful days, and sleepless nights. A dirty refrigerator is another factor which has been responsible for much illness and distress.

Indigestion is often brought on because a nurse, caretaker, or possibly the mother, not wishing to go down to the refrigerator in the middle of the night, brings up the food early in the evening and allows it to become warm - to remain in a thermos bottle - and we are sure that had they been able to see the enormous multiplication of germs because of this warm temperature, they would never have given occasion for such an increase in bacteria just to save themselves a trifle of inconvenience.

Still another common mistake is to use one formula too long; a feeding mixture which was good for four or possibly six weeks, must be changed as the child grows older and his requirements become greater. Let the weight, stools, general disposition and sleep of the child be your guides, and with these in mind errors in feeding can be quickly detected and minor mistakes speedily rectified.

Symptoms of Dissatisfaction

Some of the pointed questions which are put to a young mother who brings her child into the office of the baby specialist, are the following:

Does the baby seem satisfied after his feeding? Does he suck his fist? How much does he gain each week in weight? Does he sleep well? Does the baby vomit? What do his bowel movements look like? Will you please send a stool to the office?

With the intelligent answers to these questions - after knowing the birth weight and the age of the child and its general nervous disposition - the physician can formulate some conclusion as to the babe's general condition and can usually find a feeding formula that will make him grow.

Vomiting, restlessness, sleeplessness and the condition of the bowels, are the telltales which indicate whether or not the food is being assimilated; and the stools may vary all the way from hard bullet-like lumps to a green diarrhea.

Babies do not thrive well in large institutions where the food is so often made up in a wholesale manner, for the simple reason that the food elements are not suited to the need of each individual baby. Some infants are unable to digest raw milk, and for them sterilized or boiled milk should be tried; others require a fat-free mixture such as skimmed milk, while still others may need buttermilk for a short time. Babies require individual care, particularly in their food, and the good or bad results are plainly shown in the stools, weight, sleep, etc.

Flatulence

Flatulence is an excessive formation of gas in the stomach and bowels leading to distension of the abdomen and the belching of gas, and often the bringing up of a sour, pungent, watery fluid.

Flatulence is seen in infants suffering from intestinal indigestion and the food is nearly always at fault. This condition is the result of the faulty digestion of the sugar and starches - particularly the starch - which should be immediately reduced. In such conditions the addition of a slight amount of some alkaline (such as soda, magnesia or lime water) to the food often produces good results. Great patience must be exercised with a child that suffers from flatulence, for immediate improvement can hardly be expected; time is required for the restoration of good digestion.

Vomiting

Vomiting is perhaps more often the result of over feeding or too frequent feeding than anything else. A healthy, breast-fed baby may now and then regurgitate a bit, but it simply spills over because it is too full. We do not refer to this as vomiting, we refer to the belching up or vomiting of very sour or acrid milk which leaves a sour odor on the clothing. This can all usually be rectified by lengthening the intervals from two to three hours and preventing bolting of food by getting a nipple whose hole is not so large. Too much cream in the food will also sometimes cause vomiting.

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Too frequent feeding at night is another cause of vomiting. When the stomach is full, the failure to lay the baby down quietly, as is so often seen in those homes where bouncing and jolting are practiced, may also result in vomiting.

Vomiting may be the first sign of many acute illnesses such as scarlet fever, measles, pneumonia, whooping cough, etc.

The treatment for acute vomiting is simple. All foods should be withheld - nothing but plain, sweetened water should be administered, while it is often advisable to give a dose of castor oil. A physician should be called at once if the vomiting continues, and not until the vomiting has entirely ceased for a number of hours and water is easily retained, should food be given, and even then it should be begun on very weak mixtures.

Over-Feeding

The size of the child's stomach should be the guide to the quantity of food given, and attention is called to the table given in a previous chapter. All food taken in excess of his needs lies in his stomach and intestines only to ferment and cause wind and colic. The symptoms of over-feeding are restlessness, sleeplessness, stationary weight (or loss in weight), and oftentimes these very symptoms are interpreted by the mother as sufficient evidence that the baby needs more food; and so the reader can see the terrible havoc which is soon wrought where such ignorance reigns.

Weight

The weighing time should immediately follow a bowel movement and just before a feeding time; then, and only then, we have the real weight of baby, as a retained bowel movement may often add from four to five ounces to the child's weight. There should be a careful record of each weighing, for there may develop a great difference if different members of the family endeavor to keep the weight in their minds. The normal baby should gain four to eight ounces a week up to six months, and from then on the weekly gain is from two to four ounces; in other words, by six months the baby should double his birth weight and at the end of a year his weight should be three times the birth weight. A stationary or diminishing weight demands careful attention; a good doctor should be called at once. Likewise, a very rapid increase in weight is not to be desired, as we do not want a fat baby, but we do desire a well-proportioned and alert baby, and, as someone has said, it is better to have little or no gain during the excessive heat than to upset the digestion by over-feeding, designed to keep the baby gaining.

In weighing, usually the outside garments are removed, leaving on a shirt, band, diaper, and stockings with the necessary pins; the little fellow therefore protected is placed into the weighing basket and at each successive weighing, these same clothes or others just like them are always included in the weight, and it should be so reported to the physician.

The Stools

In the chapter "Baby's Early Care," the first stools were described in detail, and there we learned that the dark, tarry, meconium stools are quickly changed within a week to the normal canary-yellow stool, having the odor of sour milk.

The bottle-fed babies' stools differ somewhat in appearance; they are thicker and a lighter color, but should always be homogeneous if the food is well digested. They do not have nearly the number of bowel movements each day that the breast-fed baby does. If a bottle-fed baby's bowels move once a day and he seems perfectly well otherwise, we are satisfied. And curds (white lumps), or mucus (sedimentary, slimy phlegm), indicate that the food is not well digested.

Bottle Feeding and Constipation

A bottle baby may be constipated because the proteins are too high, the fat too high, the food of an insufficient quantity or quality, or the milk have been boiled, while weak babies really may lack the muscular power to produce a bowel movement. With the help of your physician endeavor to arrive at the cause of the constipation, and, if the baby is two or three months old, from one to two teaspoons of unsweetened prune juice may be administered. Milk of magnesia may be added to the food (leaving out the lime water), or a gluten suppository may be used.

The change from milk sugar to malt sugar has helped many infants; while the giving of orange juice (after six months) is very beneficial in many cases. A small amount of sweet oil may be injected into the rectum which will lubricate the hard lumps and therefore favor comfortable evacuation. The periodicity of the bowel movement (at definite times each day) is a matter of great importance. Immediately after a meal, if the child is old enough, he should be placed on the toilet chair. A bit of cotton, well anointed with Vaseline and inserted into the rectum just before meals, will often aid in producing a bowel movement shortly after the meal has been taken.

Abdominal massage should be administered in all instances of constipation, beginning with light movements and gradually increasing, with well-oiled hands.

Diarrhea

Diarrhea usually accompanies acute intestinal indigestion and is so often associated with the common disorders of infancy that we refer the reader to the chapter "Common Disorders of Infancy." Dark stools should always be saved for the physician to observe, as they frequently contain blood. Stools full of air bubbles with pungent sour odor show fermentation; in which cases the starches should be reduced, if not entirely taken away from the food mixtures. Green stools mean putrefaction from filth-germs; a thorough cleansing of the bowel should be immediately followed by a reduction in the strength of the food and the boiling of the milk.

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Regulation of the Stools

At a certain time each day the napkin should be removed and the child should be held out over a small jar. It is surprising to note how quickly and readily the little fellow cooperates. Diaper experiences may be limited to much less than a year if the mother has patience enough and the baby has the normal intelligence to enter into this regulation regime. We recall one caretaker who complained bitterly because the child under her care constantly wet his diaper; so the caretaker was instructed to keep a daily schedule of the baby's actions for five days; and, to her surprise, she discovered that the baby urinated about the same time each day. A regularity was also noted concerning the bowel movements.

The variations in the time of the urinations were only fifteen or twenty minutes, so nearly did the kidneys act at the same time each day. The caretaker was instructed to remove the diaper and hold the baby out at the earliest occurrence on the daily schedule, and, to the astonishment of the entire family, no further accidents occurred, and the child soon acquired the habit of letting them understand when he was about to wet his diaper. Bowel movements may be regulated more easily than the urination. After the child is about a year old, very few accidents should occur.

Mixed Feeding

In many instances, and particularly if the infant is under six months of age, and where he has had to have additional feeding from the bottle - under such circumstances the breast milk may be continued as "partial feeding," at least until the baby has reached his ninth or tenth month, at which time it may be wholly discontinued.

At each nursing time the baby empties both breasts, and the amount he draws may readily be estimated by carefully weighing him before and after each nursing. By referring to the directions in a previous chapter, the quantity of food needed for his size and age may be determined; while the deficit is made up from a bottle of milk containing properly modified cow's milk.

If the mother's health admits, or if the breasts continue to secrete a partial meal for the babe, mixed feeding should be continued until after the ninth or tenth month, when it can gradually be reduced from four or five times each day to once or twice a day, until it is finally omitted altogether. In the meantime, the baby is gradually getting stronger food and at eleven or twelve months the little fellow is able to subsist and thrive upon whole milk.

Infant Feeding Puzzles

It is very difficult to explain how some babies thrive on some certain food while others grow thin and speedily go into a decline on the same régime. The hereditary tendencies and predispositions undoubtedly have a great deal to do with such puzzling cases.

Again, sometimes a slight variation in techniques or some other trifling error in connection with the preparation of the baby's food, may be more or less responsible for the variation in the results obtained. No two mothers will prepare food exactly alike even when both are following the same printed directions and these slight discrepancies are enough to upset some delicately balanced baby.

On the other hand, some babies are born with such strong digestive powers and such a powerful constitution that they are easily able to survive almost any and all blunders as regards artificial feeding, while at the same time they also manifest the ability to surmount a score of other obstacles

which the combined ignorance and carelessness of their parents or caretakers unknowingly place in the pathway of early life which these little folks must tread.

The fact that so many babies do so well on such unscientific feeding only serves to demonstrate the old law of "the survival of the fittest" - they are born in the world with an enormous endowment of "survival qualities" - and in many cases the little fellows thrive and grow no matter how atrociously they are fed.

There may be other factors in the explanation of why some babies do so well on such poor care, but heredity is the chief explanation, while adaptation is the other. If the little fellows can survive for a few weeks or a few months, the human machine possesses marvelous powers of adaptation, and we find here the explanation why many a neglected baby pulls through.

Infant Foods

Rickets and scurvy have so often followed the prolonged use of the so-called "infant foods" which have flooded the market for the past decade, that intelligent physicians unanimously agree that they are injurious and quite unfit for continued use in the feeding of infants. If they are prescribed to replace milk during an acute illness, or at other times when the fats and proteins should be withheld for a short period, both the physician and the mother should be in the possession of definite and exact knowledge as to just what they do and do not contain. To provide such knowledge, we present the analysis (Holt) of some of the more commonly used infant foods.

1. *The Milk Foods.* Nestle's Food is perhaps the most widely known. The others closely resembling it in composition are the Anglo-Swiss, the Franco-Swiss, the American-Swiss, and Gerber's Food. These foods are essentially sweetened, condensed milk evaporated to dryness, with the addition of some form of flour which has been dextrinized; they all contain a large proportion of unchanged starch.

2. *The Liebig or Malted Foods.* Mellin's Food may be taken as a type of the class. Others which resemble it more or less closely are Liebig's, Horlick's Food, Hawley's Food, malted milk, and cereal milk. Mellin's food is composed principally (eighty percent) of soluble carbohydrates. They are derived from malted wheat and barley flour, and are composed chiefly of a mixture of dextrin, dextrose, and maltose.

3. *The Farinaceous Foods.* These are Imperial Granum, Ridge's Food, Hubbell's Prepared Wheat, and Robinson's Patent Barley. The first consists of wheat flour previously prepared by baking, by which a small proportion of the starch - from one to six percent - has been converted into sugar.

In chemical composition these four foods are very similar to each other, consisting mainly of unchanged starch which forms from seventy-five to eighty percent of their solid constituents.

4. *Miscellaneous Foods.* Under this head may be mentioned Carrick's Soluble Food and Eskay's Food.