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Q. C. Thomas
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FEEDING

AND



CARE OF BABY

In every work the beginning is the most important part, especially in dealing with anything young and tender.—SOCRATES.

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Pure Air and Sunshine.

God lent His creatures light and air,
And waters open to the skies,
Man locks him in a stifling lair,
And wonders why his brother dies.

DR. OLIVER WENDELL HOLMES.

BABIES pine and die because they are irregularly and wrongly fed, and kept indoors in warm, stuffy rooms instead of living outside in the open air and sunlight by day, and in pure, cool, fresh, free-flowing air at night. Keep baby out of the direct line of draught, but don't be frightened of the air being cold. Pure cold air is invigorating, and prevents "catching cold." Warm, stuffy air is poisonous and devitalising, and makes babies liable to "catch cold" when taken out into the open. There is no danger, but actual safety, in free-flowing night air.

The new-born babe needs special care and attention. For the first few days it is as well to have a fire in the bedroom in cold weather; but, unless for special reasons, this is not advisable after a week or ten days. Even when there is a fire, the room must not be allowed to warm up much, but must have a very free flow of pure open air through it day and night. See that the baby is sufficiently covered with light, open, fluffy or porous woollen materials, and, if necessary, use a hot bottle as well. Make the bed as shown in illustrations, page 160.

N. B. —A BABY MUST NEVER SLEEP IN BED WITH ITS MOTHER.



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FEEDING AND CARE OF BABY

BY

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OF WOMEN & CHILDREN*

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1923

Dr. TRUBY KING's methods as described in this book are followed at The Mothercraft Training Society (Babes of the Empire), 29 Trebovir Road, Earl's Court, London, S.W.5.

Chairman of Executive—Sir ALEXANDER ROGER.

Secretary—Miss AGATHA HAVARD.

Telephone : Western 2658.

***Note to Australians and to Inhabitants of
Warm Climates generally.***

THE special attention of those who live in hot countries is directed to the section in the Appendix dealing with Motherhood in Hot Climates.

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TORONTO

What Every Baby Needs

(Whether WELL or ILL).

I.—AIR.

Abundance of pure cool outside air flowing fresh and free day and night. **Ventilation** means a current across a room, which cannot be got by a mere open window. Keep baby out of direct draught. See pages 64-73.

II.—WATER.

Must be boiled. Bathing water should be boiled also if of doubtful purity.

III.—FOOD.

Suitable food, proper intervals, nothing between the regular feedings.

Best food—Mother's milk. **Best substitute**—Modified milk. No other food for first 9 months. Shun Patent Foods, Condensed Milk, and "Pieces."

In sickness, may need to stop, dilute, modify, or change food.

IV.—CLOTHING.

Must be non-irritating, non-constrictive, light, but sufficiently warm. See page 73.

V.—BATHING.

Cosy corner. Bath and dress very quickly—no dawdling. See pp. 67 and 80.

If baby ill or very delicate, forego bath for day or so, and substitute wiping rapidly with a cloth wrung out of warm water.

VI.—MUSCULAR EXERCISE and SENSORY STIMULATION.

When a baby is ill for some time the tone and activity of the muscles and other tissues and organs can usually be fairly sustained by good nursing, judicious handling, changing position in cot, massage, etc. As the baby improves, airing of skin, bathing, and plenty of outing in sunlight are essential.

VII.—WARMTH.

Warmed air and surroundings are essential for prematures, and may be needed for a week or more when getting coddled babies into healthier habits.

Diarrhoea and colds are often due to cold feet and legs, and may be cured by attention to this and other essentials. Babies, like adults, benefit enormously by being kept in pure cool air if properly clad. See page 84.

VIII.—REGULARITY OF ALL HABITS.

Regularity of feeding, with proper intervals and no food between meals. Regularity of exercise, sleep, etc. Regularity of action of the bowels.

N.B.—Don't let 10 o'clock in the morning pass without making baby's bowels move, if they have not moved in the previous 24 hours.

(See "Bowels," "Constipation," and "Enema," pages 62, 110, 112.)

IX.—CLEANLINESS.

Cleanliness in everything, especially with regard to food and feeding utensils.

Remove soiled napkins from room at once, and place in water. Hands which have come in contact with soiled napkins must be well washed before again handling baby or his food.

X.—MOTHERING.

Proper "mothering" and "handling" of a baby are essential for the best growth and development. No woman is a perfect "born-mother"—she has to learn how (see page 102).

XI.—MANAGEMENT.

Fond and foolish over-indulgence, mismanagement, and "spoiling" may be as harmful to an infant as callous neglect or intentional cruelty.

The "can't-be-so-cruel" mother or nurse, who won't bring herself to wake the baby a few times, if needed, in order to establish once for all regular feeding habits; or who weakly gratifies every whim of herself and the child, rather than allow either to suffer temporary discomfort for the sake of permanent health and happiness—such a woman is really cruel, not kind. To save a lusty, honest cry she will pacify an infant with a "comforter," or with food given at wrong times, and may thus ruin the child in the first month of life, making him a delicate, fretful, irritable, nervous, dyspeptic little tyrant who will yell and scream, day or night, if not soothed and cuddled without delay (see page 149).

XII.—REST and SLEEP.

These depend mainly on the above. Remember to turn baby in his cot, and remove wet napkins, cold bottles, etc.

Extras when Ill.

When Ill, what may a Baby need in addition to the above "12 Essentials," which he MUST have whether WELL or ILL?

For **BROKEN LEG**, splints, dressings, etc.

For **BURNS**, soothing and protective dressings, etc.

For **CHEST COMPLAINTS**, *e.g.* Coughs, Colds, Consumption, Heart Disease, Pleurisy, Pneumonia, Whooping Cough, etc.

Drugs, etc., will be ordered by doctor, if needed.

For **ABDOMINAL COMPLAINTS**, *e.g.* Colic, Diarrhœa, Dyspepsia:—

DETAILS FOR DIARRHŒA:—

- (1) Prompt evacuation of microbes and fermenting and poisonous materials from the bowels, *e.g.* by enema, and use of castor oil, if needed.
- (2) Arrest of further growth of microbes by temporarily stopping food supplies and giving only boiled water.

Drugs, etc., will be ordered by doctor, if needed.

For further details as to Diarrhœa, and for information regarding Colic, Convulsions, etc., see "Ailments and Precautions," pages 107 to 121.

For **FEVERS AND OTHER DISEASES** the above principles apply throughout.

N.B.—The rational treatment of every form of ill-health, from broken bones to fevers, is to take extra care to provide as perfectly as possible all the simple essentials for health—Pure Air, Pure Water, Suitable Food, Suitable Clothing, Cleanliness, Exercise, Rest, and Regularity of all Habits.

Though Drugs are rarely essential for the cure of Disease in Babies, there are times when the saving of life may depend on their timely and proper use—a question which can be decided only by a Doctor.

If Baby is ill a Doctor should always be called in, if possible.

Never resort to Soothing Powders or Patent Medicines!

Natural Feeding.

Accuse not Nature, she hath done her part:
Do thou but thine.—MILTON.

A woman's milk is not her own. It is created for the baby, and the first duty of the mother is to ensure, by foresight, a proper supply of the only perfect food—the baby's birthright.

There is a special and intimate relationship between the milk of the mother and the digestive and nutritive needs of her own offspring. If two women interchange thriving babies, of the same age, both infants are liable to suffer from Indigestion. Hence every mother should, if possible, fulfil her maternal duties.

Effect on Mothers.

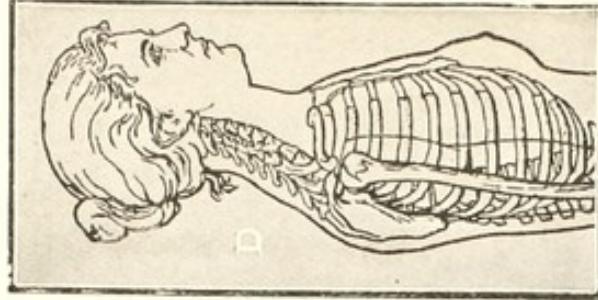
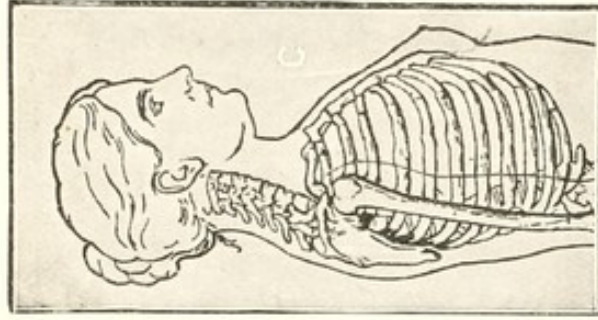
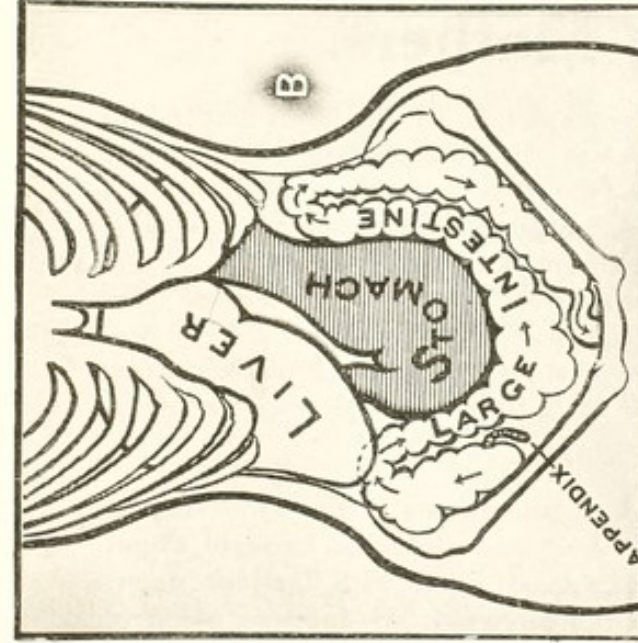
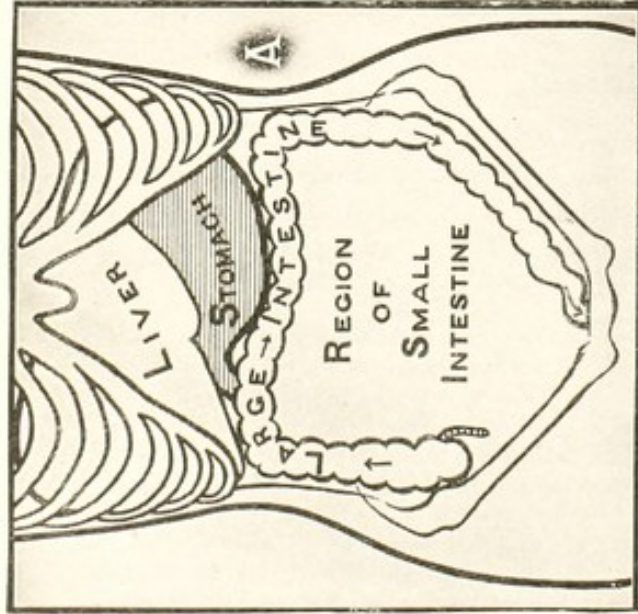
The suckling of the baby is almost as important for the future health and well-being of the mother as it is for the infant. Not only does nursing foster the highest development of maternal love and devotion, but it also tends to ensure a rapid shrinkage of the enormously congested womb to its natural size and weight. After the baby is born, the main blood current, which has been circulating through the mother's pelvic organs, should be diverted to the breasts. By thwarting this natural transfer, failure to suckle the baby causes more or less persistent pelvic congestion, and thus gives rise to the distortions, displacements, and other disabilities of married women, which so often undermine the health and call for operation later on.

N.B.—The other leading cause of displacements is the hindering of free movement, and the pressure on chest and abdomen, brought about by wearing corsets from girlhood onwards. This, with lack of open-air exercise, is the main factor in the ill-health of modern women, whether married or single.

The Corset.

For over a quarter of a century Sir Frederick Treves and other leading English surgeons and physicians have been inveighing against the wearing of corsets, and have shown conclusively the disastrous train of evils that women impose on themselves and their progeny by this means. The following are condensed extracts from the highest English, foreign, and American authorities:—

"Are stays a necessity?" Many women assert they derive great comfort from stays, that they support the body admirably, and that without them the wearer feels inclined to "drop to pieces." Do they mean for one moment to assert that the human body is so ill-constructed and so badly adapted for its purpose in life that it has to depend for its integrity upon the productions of a corset-maker? Such an assumption is simply outrageous, the true explanation being that by the persistent use of stays the muscles of the back have become so enfeebled (from prolonged disuse) that they are no longer able to support the spine. Under no circumstances does a young girl require stays of any kind, and in the majority of young women they are equally needless and almost equally injurious. One sometimes hears the remark that a young girl who is growing rapidly requires some support for her back, and it



Reproduced from Coleman's "Hygienic Philosophy," by permission of the Macmillan Company.

(A) Diagram of normal woman not deformed by corsets. Specially note position and outline of Large Intestine and normal course of contents shown by arrows.

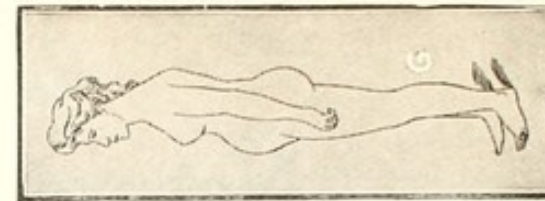
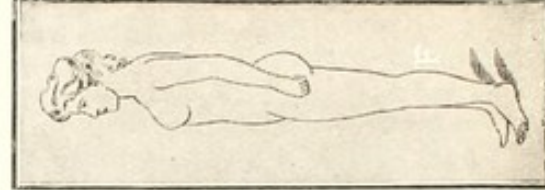
(B) Composite diagram derived mainly from radiographs of over 100 corset-wearing women photographed by Dr. Pancoast of Philadelphia. Note compression of chest, displacement of liver, stomach, and bowels, and dilatation and distortion of stomach and large intestine. Compare with A.

One of the latest "advances" in surgery is an operation for the removal of the large intestine when it has become so distorted, kinked, overloaded, distended, and sacculated as to be unable to perform its functions. In these cases there is not only obstinate constipation, but the whole system becomes poisoned by the foul stagnating contents of the bowel, which can never be really emptied. It does not need much imagination to picture the fate of the womb and ovaries, situated at the bottom of the abdominal cavity. The whole weight and pressure from above falls on these organs, producing, in a greater or lesser degree, the distortions and "displacements" characteristic of the average modern woman. CORSET-WEARING is thus the leading cause of sterility, miscarriages, premature delivery, difficult labour, stunting of offspring, inability to nurse, and chronic ill-health; the other principal factor being lack of open-air exercise, which results mainly from two causes, viz. (1) Failure to establish in girlhood, as a duty, the life habit of taking daily a sufficiency of outdoor exercise, (2) the discomfort in walking due to cramped feet.

(C, E, F) Normal Profiles. The dotted line in E shows normal expansion in breathing. This is impeded where corsets are worn, however slack they may be; also by heavy and restricting clothing.

(D) Flat chest, round shoulders, and emaciation due to corsets, etc.

(G) Flabby stoutness and protuberant abdomen, which corsets no longer suffice to conceal, or which become manifest directly the corsets are taken off. On the other hand, where the abdominal muscles are allowed to grow, by not restricting them with corsets and heavy clothing, and where they are further developed by reasonable exercise, a woman's figure will remain good and shapely in advancing years, notwithstanding repeated childbearing.



Reproduced from Ashton's "Gynecology," by kind permission of W. B. Saunders & Co.

naturally follows that that support is supplied in the form of stays. No delusion can be more complete than this. The weakness that is usually experienced in the back of a young girl is **muscular weakness**. **If the muscles that support the spine need strengthening, let them be strengthened in the only way that nature provides, viz. — by exercise.** To wear stays is actually to increase the evil, and would only be equalled in folly by the action of a man who, finding the muscles of his arm weak from disuse, would proceed to bandage them up and exercise the limb still less.

Sir Frederick Treves.

The corset is the greatest and most serious menace to the health of the female sex. The main results are constricted chest, pressure on all the abdominal organs, and displacement of liver, stomach, intestines, kidneys, womb, etc. Following on these we have dilatation of the stomach and bowels, anaemia, poor development, and nervous symptoms of all kinds. The earlier the corset is worn, and the more the shape of the chest is removed from the normal, the graver will be the injuries.

In order to get along without a corset, a girl's body should be strengthened by good nourishment, plenty of fresh air, and particularly by outdoor exercise (walking, running, games, gymnastics, etc.), so that the muscles may be strong enough to furnish sufficient support without artificial aid. Instead of corsets girls ought to wear underwaists with buttons to which the skirts and drawers can be fastened, thus dividing the weight of the clothes between the hips and shoulders.

Dr. B. Bendix, Berlin.

A woman's clothes are the despair of the hygienist. The dictates of fashion pay slight attention to the physiological demands of clothing. Tight collars, tight corsets, heavy skirts supported by the hips and waist, shoes too small and badly shaped, and a total disregard of the use of clothing in the maintenance of body temperature, characterise the dress of the so-called "well-dressed" woman. With such standards before her, the difficulties of adapting the dress of the pubescent girl to her hygienic needs are well-nigh insurmountable. Rebellion at first against the corset is strong, but she accepts it, adapts her feelings to it, and finally defends it. In a thousand measurements of women and girls showing a constriction of the waist varying from one to five inches and more, not one single woman in the series could be brought to acknowledge that her corset felt too tight!!!

Professor Howard Kelly, M.D., LL.D., New York.

Constipation in patients with visceroptosis (sagging of the abdominal organs) **is due in the majority of cases to weak abdominal muscles, rendering the emptying of the bowels inefficient**—proved by the relief effected by strengthening the muscles by means of exercises and massage. (Dr. Hertz regards the kinking as a secondary result.)

Monograph on Constipation by Dr. Hertz, Guy's Hospital, London.

Women must be brought to clearly understand the disastrous results of corsets, because misleading statements, in defence of the corset, have recently been given wide publicity.

No doubt certain adults have brought themselves to a condition in which some abdominal support is needed, especially some middle-aged women with feeble muscles and protuberant abdomens. But this only renders it the more imperative that no girl of the rising generation should be allowed to thus distort and spoil her bodily mechanism. **Support of any kind for back or abdomen would practically never become necessary if girls were habituated to take daily a sufficiency of outdoor exercise, and if they were reasonably dressed and prevented from forming the "corset habit."**

Pressure on the breasts by corset or clothing greatly impairs fitness for maternity. Thus it is a main cause of the **flat, imperfectly developed nipples** so common nowadays. Professor Marfan of Paris, in his great book *The Milk-feeding of Babies*, says: "Compression by the corset is certainly one of the chief causes of malformations of the breast." Professor Hoffa and Dr. Lilienfeld, in their essay on *Preventive Measures with a View to avoiding the Need for Surgery*, say:—

We must point out the danger of corsets, which are a cause of **cancer of the breast** and of obstruction in the portal circulation—the latter predisposing to gall-stones which are present in from 80 to 90 per cent of cases of cancer of the gall-bladder.

Foresight.

Hygiene during Pregnancy and Nursing.

Diet in pregnancy should be good, simple, digestible, nutritious—no need for any special food preparations, or for taking appreciably more than would be taken at other times. The common counsel to “eat for two” is absurd, because the weight of a mother and her unborn babe scarcely exceeds her ordinary weight. Women bring on indigestion by taking excess of food, especially of soft, sloppy foods.

The special need of the expectant mother is **plenty of open-air exercise and exposure to the elements, and a sufficiency of rest and sleep.** This, with freedom from undue worry and excitements—a pleasant, active country life, with no suggestion or trace of invalidism—is the ideal condition; but the town mother can maintain good health if she will pay attention to the laws and needs of life. Regularity of habits is all-important, and avoidance of the bodily and social trammels to which women subject themselves—from constriction of the waist and feet to the ties and inconveniences of excessive “calling” and being called on.

“Neuralgia is the Prayer of the Nerves for Healthy Blood.”—If the expectant mother is sedentary and constipated, and suffers from headache or neuralgia due to an impure blood stream poisoning her brain cells, how can she expect her unborn babe to be healthy? The tiny, delicate cells of the baby's brain and body, soaked in and fed from the same poisoned stream, are more vulnerable than the mature cells of the mother. Impurity of the mother's blood means poisoning of the baby's cells, and impairment of growth and development—in other words, there will be a stunting of future potentialities as regards both body and mind.

N.B.—At this stage it is important for the Mother to read “Error I.,” page 99.

THE BREASTS.—During the last few months of pregnancy the nipples should be gently rolled or rubbed morning and evening between thumb and fingers, so as to form, develop, and toughen them, thus aiding suckling and preventing tenderness or cracking. If the nipples are flat or sunken, there may be some trouble in getting hold of them, and they may have to be gradually expanded, stretched, and coaxed out by the aid of careful daily suction with a breast pump. Bathing the breasts morning and evening with warm water, and then with cold, is highly beneficial if followed by brisk and thorough drying. Spirit-and-water or Boric Lotion is often used, but the real essentials are cleansing and drying. It is better not to use soap to the nipples. The breasts should be entirely free from pressure by clothing.

THE NURSING MOTHER should keep the nipples scrupulously clean. Before and after each suckling cleanse with boiled water. If this is done, and the nipples are dried carefully, there will be no risk of germ-infection, sore nipples, or abscess. Two small detachable patches of soft, clean linen or cotton, or of sterile “surgical gauze,” should be pinned inside the garment covering the nipples, so as to prevent soiling with milk. Fouled clothing may cause poisoning of baby and severe diarrhœa, besides poisoning the nipples.

SUCKLING.—During the first week baby should have both breasts at each nursing, sucking each breast at first for under two minutes, the second day for three minutes, and so on. Prolonged suckling, at first, is apt to cause tenderness and cracking of nipples. Mothers are generally told that after the first week baby must have only one breast at each nursing—the breasts being used alternately. This is right where the mother has plenty and baby gets all he needs from one breast. But where this is not the case—where the supply falls short of what is needed, and one breast does not furnish enough for one feeding—baby should certainly be put to both sides at each suckling, the right

breast being used first at one feeding-time, and the left first at the next. This is the best means of stimulating the secretion of milk, from eight to ten minutes being allowed for each breast. In any case the breast first suckled should be emptied, but with an increasing supply less and less time should be allowed in regard to the second breast, and if the supply becomes ample, only the one breast should be used at each nursing.

As soon as the stress of labour is over (say from 6 to 12 hours after birth), the baby should be put to the breast to stimulate the secretion of milk. Failure of milk-supply is often due to the nurse not putting the baby to the breast soon enough, and not persevering.

If, owing to flat nipples or baby's lack of sucking power, milk cannot be secured for a time in the natural way, a nurse with slightly oiled fingers may stroke, press, and manipulate nipple and breast in such a way as to gently coax and squeeze the milk into the baby's mouth. In addition a "Breast-shield" or a "Breast-pump" may be carefully used (see Appendix). Such daily drawing off of milk, and expanding and developing of the nipples by suction and "forming" with the fingers, may soon enable the mother to suckle her child in the normal way—indeed there are few cases that cannot be set right by patience and perseverance.

N.B.—At this stage study "Feeding Details, etc.," page 30.

EXERCISE, OUTING, AND REST.

There are a few cases of special debility where artificial feeding has to be resorted to in the interests of both mother and child, but in nine cases out of ten insufficiency or disagreement of breast-milk is due to the fact that the mother has led, and is probably continuing to lead, too sedentary a life, and is not careful as to her other habits. **No mother who fails to take daily sufficient open-air exercise (say a walk of two miles a day) gives herself or her baby a fair chance: further, the more they are out in sunshine the better, and the windows should be wide open, day and night.** Pure air and sunshine have almost as much effect on the health and strength of both mother and child as good food, and no woman can be in her best form as a mother who neglects to take regular open-air exercise throughout pregnancy and afterwards.

SPECIAL EXERCISES.—A most important adjunct to outdoor exercise for women is to do regularly for five or ten minutes every morning and evening, half a dozen simple exercises specially designed for promoting the growth and strength of the abdominal muscles and toning up the internal organs. This tends to ensure an easy, natural labour, and good digestion and regularity of bowels, both before and after childbirth.

The best forms of exercise are such as ensure slow, systematic bending movements of the trunk, backwards and forwards and from side to side, and systematic deep breathing. The mother should gradually get herself into proper form and training, and should not attempt too much at first. Suitable exercises are best learned from the Plunket Nurses or other competent teachers. The little trouble involved will be repaid a hundred-fold to the mother in her own health, safety, and comfort, while the baby will reap equal benefit. (See Illustrations, page 82.)

REST.—Nothing is worse for the expectant mother than a state of lazy inactivity. Busy, working housewives have far better confinements than less active women. However, overstrain and fatigue are injurious. As much time as can be spared should be spent out of doors—good, active walking (not mere sauntering or dawdling) being followed by a rest, sitting or reclining in the open air, pleasantly interested or occupied, not fretting or worrying. Especially as pregnancy advances, the mother should recline on a couch with the feet up after each meal; also after walking and whenever tired. An hour of such rest morning and afternoon is one of the best preventives of varicose veins, "white swelling" of legs, piles, and constipation.

Diet.

The commonest mistake of the first few days after childbirth is "stuffing" the mother, especially overloading her stomach with milk to promote the flow of breast-milk—whereas, it tends to retard the natural flow, by causing indigestion, constipation, headache, and loss of appetite.

While the mother is confined to bed, what is called "light milk diet" is best, but this should not exclude some dry food such as crisp toast, besides bread-and-butter, fruit and vegetables. Gradually increase these day by day. By the third day a little light fish may be given; next day a small grilled chop, and so on. Though no milk is secreted for a day or so, there is often marked thirst: this may be relieved by drinking water fairly freely.

The nursing mother needs a simple, nutritious diet, including fruit, vegetables, plenty of fluid, and no alcohol.—In many cases too much rich, fatty, overcooked, highly spiced, or otherwise indigestible food is eaten. Some women take too much meat, and are not careful enough about plain, wholesome, good cooking. Milk, eggs, porridge, oatcake, and bread or toast, with fish and meat in moderation, form a sound basis. Pastry, new bread, hot buttered toast, rich cakes, the fatty dried outside of fried or baked meat, twice-cooked meats, etc., should be avoided.

The taking of some cows' milk tends to increase the supply of mother's milk, but don't overdo this. Women often bring on indigestion and constipation by taking too much milk, either as such or in the form of milk-puddings or gruels. Many nursing mothers would have better digestion, and would secrete better food for their babies, if they did not drink more than a pint of milk in the twenty-four hours. They should take a fair quantity of dry food, such as crisp toast, oatcake, etc., a sufficiency of wholesome vegetables (see next page) and some ripe fresh fruit daily. The more thorough the mastication, and the more hearty the enjoyment of food, the better for mother and child.

The nursing mother must have plenty of fluid—an average of between $1\frac{1}{2}$ and 2 pints more fluid than she would take when not nursing.—Plain water may be taken—say, a glass on rising, another at bedtime, and a glass between meals. This is the ideal, but many mothers claim the indulgence of converting one or more of these drinks into cocoa, weak tea, etc. Up to a certain point, increase in the fluid taken tends to improve the flow of milk, so the effect of drinking a little more may be tried if the flow is deficient.

Food taken only three times a day—the main quantity of fluid being drunk just after each meal and as a part of it—and no food between meals, is best. Things found to upset mother or child must be avoided; but the nursing mother should have food varied and to her liking, and no wide departure should be made from the diet to which she has been accustomed. Condiments, such as pepper and mustard, may be used in moderation, but pickles and curries should be avoided.

If the mother's bowels have not moved, a dose of castor oil may be given towards end of second day after childbirth. If this fails use enema.

Defective supply and poor quality of mother's milk are generally due more to indigestion and constipation, resulting from insufficient exercise and lack of fresh air, than to careless feeding, though diet is generally at fault also. Constipated mother means constipated baby.

Regimen for Health

WITH ROUTINE FOR CONSTIPATION.

I. Regular Solicitation of Bowels.—Try to get the bowels evacuated absolutely regularly at the same hour every day, regardless of whether there is any natural tendency or inclination for a motion at the appointed time or not. Patience and perseverance in making the daily effort should bring a regular normal motion at the same hour every day, if due care is also exercised to promote activity by the measures mentioned below.

II. Suitable Food.—Take good, simple food, and let some of the following be included every day, viz. : whole-meal bread, oatcake, porridge, spinach, boiled lettuce, boiled celery, leeks, young turnips, cauliflower, young peas, young French beans, baked apples, well-cooked prunes, figs, etc. They must be thoroughly masticated. Malt-extract, cream, olive or cod-liver oil and fat meat, all tend to lessen constipation, but excess of fat interferes with and retards digestion. If thoroughly masticated, uncooked ripe fruit, especially raw apple, is even better than cooked fruit.

III. Bathing, Exercise, and Water-drinking.—Take cold bath on rising in the morning. Dry thoroughly with a rough towel, and dress very quickly. Sip a tumbler of water while dressing. For chilly subjects hot water is preferable—otherwise cold water is a better tonic.

If delicate, or if there are no conveniences for bathing, sponging all over may be substituted.

If not used to cold bathing, or in the case of delicate people, the way to the cold bath may be paved by standing with the feet in warm water at first, using for sponging or douching water with the chill just off, say 70° Fahr. This can be reduced a degree or more every day until cold is reached.

Take twenty minutes' really active exercise as soon as dressed—a brisk walk in the open air is best. Don't let rain or wind stop you! Every woman should have sound boots and a light waterproof.

Cold bathing, or at least sponging with cold water every morning, followed at once by vigorous friction and active exercise, is the best means of firming and toning up the whole system and ensuring good digestion, regularity of the bowels, and robust health.

IV. Medicinal Laxatives.—If the above measures do not induce regular action of bowels, take at night 10 minims of the best Liquid Extract of Cascara. Should this prove insufficient, take 15 minims, increasing to 20 minims if needed. If this is not effective, take also a level teaspoonful of Carlsbad or Epsom Salts dissolved in water, before sipping the glass of water in early morning; if this does not suffice, twice the quantity may be taken.

As the need for laxatives becomes less, leave off the Salts first, then gradually diminish the Cascara, until the exact quantity needed to bring about regularity is reached. In most cases it can be left off altogether in the course of a few weeks, but may need to be continued. Larger doses of the above, or purgatives of any kind, should be avoided. Cascara is the best medicinal tonic laxative for the nursing mother.

V. Other General and Special Hygienics.—Sleep with wide-open windows. The best means for ensuring a current of air across the room is to keep the window of a room with a fireplace wide open. If there is no chimney, open windows and doors will do.

Besides the morning walk take some further open-air exercise daily if possible. The more time a pregnant or nursing woman spends out of doors, resting and taking exercise, the better for both mother and child.

The special physical exercises mentioned on page 7 as conducive to the growth and toning up of the abdominal muscles (thus facilitating labour) exert also a very beneficial influence over indigestion and constipation.

N.B.—Bathing, Exercise, and Water-drinking should be continued indefinitely—should, indeed, be made life habits.

Constipation almost always yields to the foregoing simple regimen, and a great improvement in the general health is brought about as well; but in obstinate cases other means may be adopted under medical direction, such as systematic massage of the abdomen, an occasional enema, etc.

Worries and Excitements.

Not only should food be heartily enjoyed, but every means should be taken to avoid undue excitements, worries, and sources of annoyance, because the emotions have so much to do with determining the composition and quantity of the milk, and affecting in other ways the health of both mother and offspring. The following passage from Charles Reade's *The Cloister and the Hearth* is most suggestive and entirely true:—

“The child is poisoned.”

“Poisoned! By whom?”

“By you. You have been fretting!”

“Nay, indeed, mother. How can I help fretting?”

“Don't tell me, Margaret. A nursing mother has no business to fret. She must turn her mind away from her grief to the comfort that lies in her lap. Know you not that the child pines if the mother vexes herself?”

Ideal Baby-Feeding.

The true ideal is suckling. For details as to how to proceed, from birth onwards, see “Feeding Details,” page 30.

A healthy mother with good digestion, and taking regularly suitable exercise and the right quantity and quality of food, should have available for her baby just what he needs. Put to the breast during the early months for about a quarter of an hour every three hours in the daytime, baby should secure just what is essential for perfect health, growth, and development. **He must be waked if asleep when feeding time comes round.** The regularly repeated act of sucking gives the nerve mechanism regulating the secretion and flow of milk the stimulus needed for ensuring the proper quantity and quality of milk for each stage in the first nine months of life. The supply should accord with the normal demands of the baby, and this may be expected if the mother's health and habits are as near as possible what they should be. Further, the exercise involved in regular, active sucking should ensure baby sound sleep, from which he tends to wake up refreshed and hungry or thirsty after three or four hours, according to age. See page 36.

“Under these natural and thrice blessed conditions the undisturbed quiet of the house, the rosy colour of the child, its lively and vigorous condition when awake, its looking round and active kicking, the firmness of its flesh, and

its regular gain in weight, are certain evidences that we are on the right road to a thriving growth. With judicious directions by the doctor and their fulfilment by the mother (a result often achieved only after a conflict with the various influences ruling in the nursery) all goes well, and the dangers of overfeeding are overcome."

Overfeeding.

"Maternal instinct" does not tell the human mother how long or how often she should suckle her baby. Yet prevention of overfeeding on the one hand, and underfeeding on the other, is supremely important.

The baby should have nothing but its mother's milk for nine months if possible. Give no biscuits or scraps, and before supplementing at all, even with properly adjusted humanised milk, make quite certain that the baby needs additional nourishment. This can be ascertained by weighing regularly. If baby is well and gaining weight normally (see pages 55-57) you may be sure he is getting sufficient: by giving anything additional you would upset him and might cause infinite trouble.

In many cases, even when mother's milk only is given, the baby does not thrive as he should, because he is being overfed—either by being fed too frequently, or getting too much at a feeding, or both. In these circumstances the intervals should be lengthened. Thus, if the mother has been feeding baby every two hours, a custom which, unfortunately for both mother and child, is still prevalent, she should lengthen the interval and feed every three hours, allowing the baby to suck for a quarter of an hour (see Feeding Table, page 34). The intervals should be the same whether he is fed naturally or artificially. If baby be still disturbed, the mother should hold the nipple and prevent his getting so much, and the intervals can be further lengthened up to four hours if necessary.

If baby is obviously not thriving, the best thing is to weigh him immediately before and immediately after suckling. By this simple means it may be found that a baby is receiving on the one hand double as much food as he needs, or on the other hand not half enough. Needless to say, this weighing must be done with accurate scales, such as are used by grocers, and not with an ordinary spring balance. If asked, the Plunket Nurse will arrange to properly weigh any baby. If it be found that he gets too much, the intervals should be lengthened, etc. If he gets too little, the quantity should be made up by properly adjusted humanised milk. The mother should suckle the baby as usual, supplementing at each feeding, and try in every way to increase and improve her milk-supply. See page 7.

Mixed Feeding.

Babies are almost invariably overfed when the natural supply is being supplemented by artificial food. The mother should never forget to allow fully for what she herself supplies. At the first sign of overtaking—*e.g.* putting up of food, indigestion, etc.—the quantity per feeding should be reduced, or longer intervals should be allowed between feedings.

Alcohol.

The expectant or nursing mother should be given no alcohol.

Alcohol taken by the mother flows as a poison in her blood. The tender, growing cells of the baby, directly nourished by this poisoned stream, or fed with milk derived from it, don't grow or develop properly; they tend to become stunted and degenerate. Therefore, a nursing mother should take no beer or stout, however strongly such drinks may be recommended by well-meaning friends or nurses.

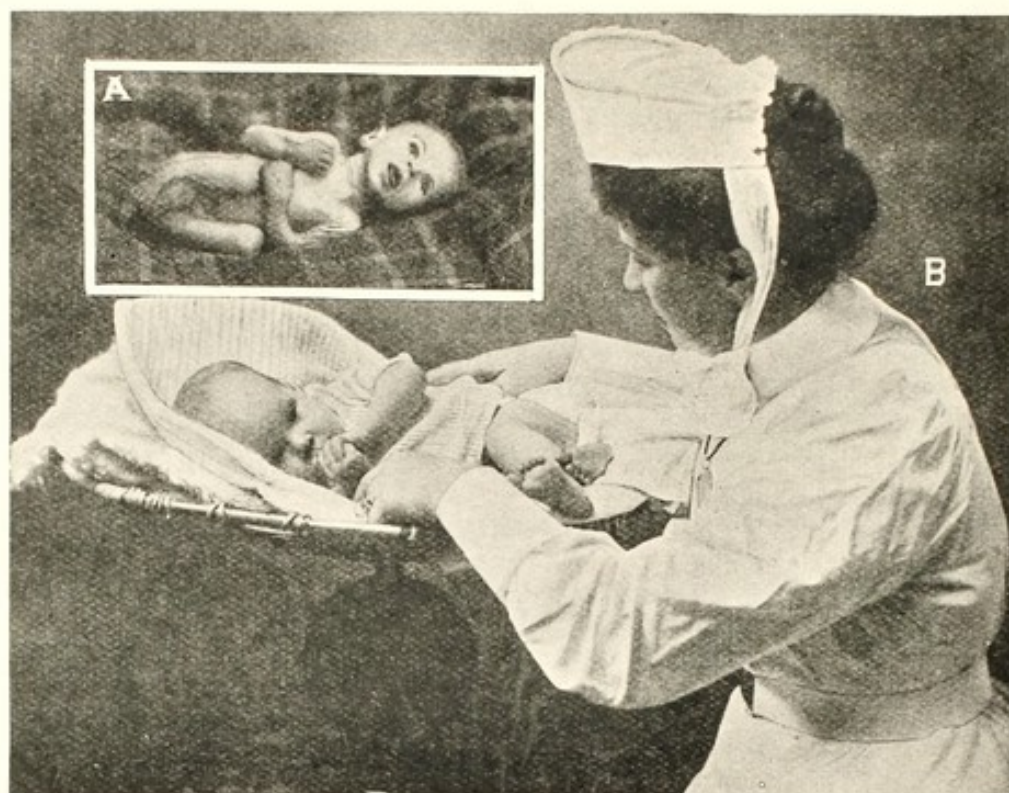
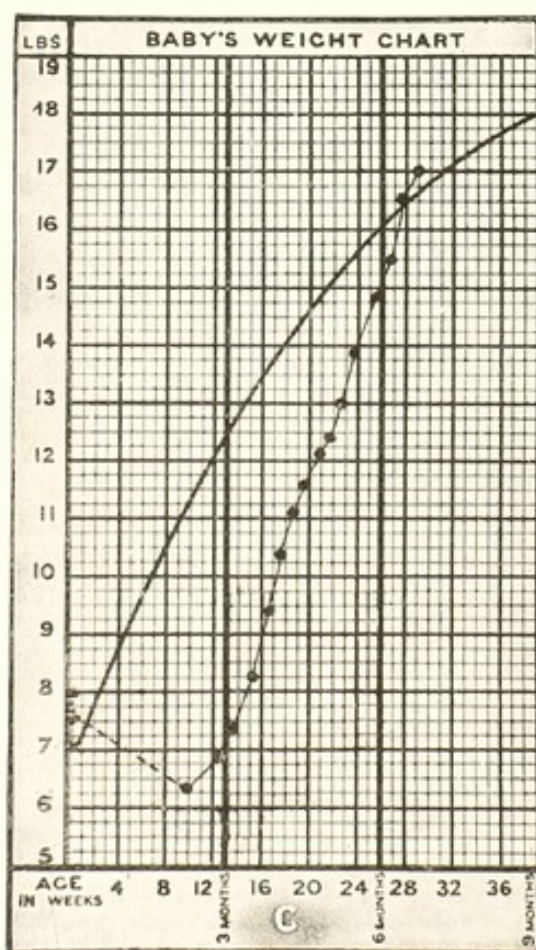


FIG. 2.

Six Months' Adventures in Baby-land.



(A) Baby ten weeks old, on admission to Karitane Harris Baby Hospital. The infant was extremely wasted and debilitated. Weighed 6½ lb.

(B) Plunket Nurse with same baby 12 weeks later, weight then 12½ lb.

(C) Chart of above baby. Note, first, loss of weight due to insufficient and improper feeding, then sudden and sustained improvement due to proper feeding, etc.

Weight at birth	. . .	8 lb.
" 10 weeks	. . .	6½ "
" 6½ months	. . .	16½ "

The average weight-curve for a healthy baby is shown by the continuous black line, starting at 7½ lb. and then (after the usual loss of about ½ lb. in the first few days of life) rising steadily to 18 lb. at nine months. Contrast this with the weight-curve of the above baby, which started at 8 lbs. and fell in the course of ten weeks to 6½ lb., when it ought to have been rising to 11½ lb. The dots show the weighings made every week or so by the Plunket Nurse, from the time the baby came under her care.

Note how at 6½ months the curve passed that of the average baby—the four months' growth with proper feeding having been actually over a pound a month quicker than the average for healthy babies in the same period—a convincing proof of the suitability of the food, etc.

(For details see description on next page.)

ILLUSTRATIVE CASE.

What careful weighing and being accurate may mean to the baby.

The following are additional particulars concerning the case illustrated on the previous page:—

A mother with a tiny baby in her arms called by chance at the Karitane Harris Baby Hospital. Her infant, then ten weeks old, had been going down hill since birth in spite of all she could do—in spite of following the directions she had received as to treatment. She wandered into the hospital grounds, as she has since said, on a mere passing impulse, rather out of curiosity than because she really expected that anything helpful could be done for her child. The baby, which had dwindled to a mere skeleton (see Fig. 2, A), had made no stand for life, do what the mother could. She felt that there must be something radically wrong, something beyond human skill, to make a well-cared-for infant, which had weighed 8 lb. at birth, go down to 6½ lb. in the course of 10 weeks, without apparent illness. She had been advised that her supply of milk was probably inadequate, but she had no suspicion that it was seriously deficient. The Matron of the Hospital weighed the baby before and after three sucklings, and found that the average quantity imbibed each time was about 1½ ounces. The quantity needed for proper nutrition was over 4 ounces per feeding! The supplementary feeding hitherto recommended and adopted had not supplied the equivalent of half an ounce of milk per feeding, so that the baby had been receiving only about a third of the proper quantity of food—in other words, was suffering from ordinary **Starvation**.

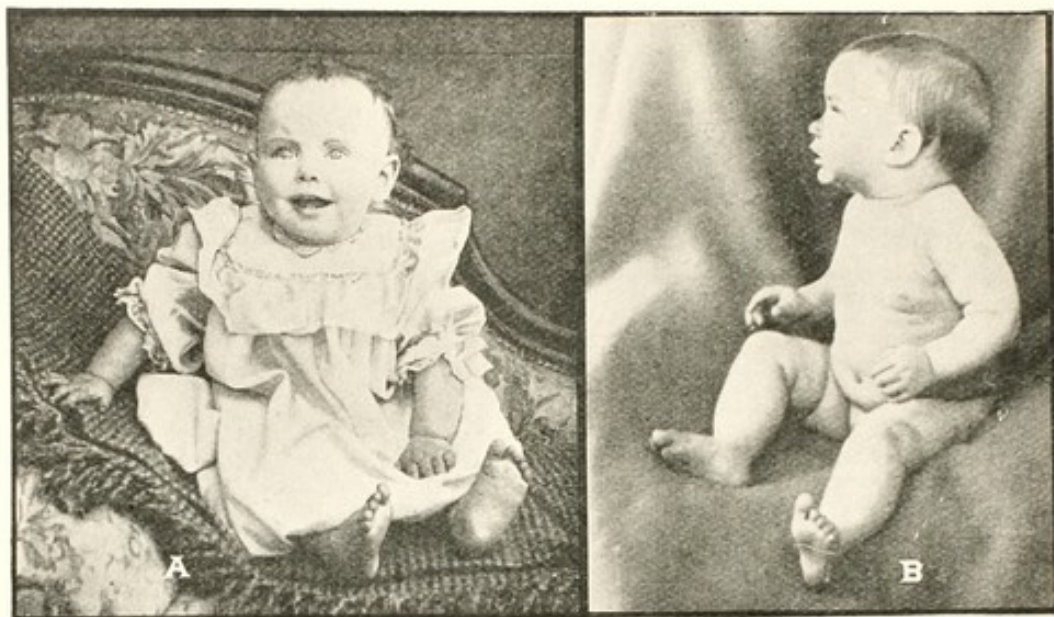
As the mother was already giving all she could furnish, the Society's nurse advised that the baby should receive by bottle at each feeding what was needed to make the meal up to the standard requirement, allowing for what was being received from the breast. To effect this, she directed that the baby's food should be cautiously supplemented at each feeding by a carefully regulated supply of properly graded humanised milk, care having to be exercised, as in all cases of starvation, to go slow, and to beware of overstepping the mark in respect to either the strength or the quantity of the food.

In spite of all that could be done, the mother's supply soon gave out, but week by week, without a single intermission, the baby, fed on humanised milk alone and treated on the simple lines advocated by the Society, gained steadily in weight (see chart), strength, and vitality, and was soon the picture of robust health. **In four months, this child, who had been losing steadily until it weighed 5 lb. under the normal, had passed the average weight for her age and gained over 10 lb.—a steady increase of 2½ lb. per month.**

It may seem to some persons that the mother should have **known** her baby was being starved, but except by the use of a weighing machine, how was she, or any one else, to do aught but **guess** what was wrong?—and mere guesses are apt to lead people very far astray, as they did in this case. The late Professor Budin, of Paris, whose experience in this connection was the most extensive in the world, said over and over again, that in doubtful cases no man could tell, without resorting to accurate weighing, the sufficiency or otherwise of a suckling's diet. He frequently found that babies had been starved or overfed merely because this simple and conclusive test had not been applied, and, speaking of underfeeding, he says, **"If the real situation be not recognised, the infant, through want of food, soon dies."**

In the case cited above, the mother was entirely blameless. She sought what aid was available. She was not to blame for being ignorant of what no women are taught. The fault lay elsewhere.

It cannot be too strongly insisted upon that all babies should be weighed regularly, and that a weight chart should be kept. Further, if a suckled baby is not thriving, it should invariably be weighed before and after several successive feedings, in order to find out whether it is being underfed or overfed, both faults frequently arising under the prevailing conditions of modern life, and both capable of gravely affecting the baby's welfare. Such weighings must be done with good grocer's scales, weighing accurately to within half an ounce, not by means of a spring balance. A common spring balance, costing about a shilling, suffices for ordinary weekly weighings and the keeping of a sufficiently accurate "Baby's Weight Chart" (see "Weighing the Baby," page 55).



Breast-Fed Babies.

FIG. 3.

(A) **Bright, active, firm-fleshed, sturdy girl, 11 months old.** The mother had influenza a few weeks after confinement, and was ordered to wean the baby. However, she had sometimes had bad colds when nursing previously, and experience had shown her that a baby at the breast could continue to thrive in spite of the illness of the mother. She therefore did what any sick mother in Nature, from a mouse to an elephant, would do—she went on suckling her progeny. The baby thrived exceedingly, and when photographed at 11 months of age was still at the breast and weighed $21\frac{1}{2}$ lb., being more than a pound over the average for her age. **How would young animals fare if suckling were given up whenever their mothers got out of sorts!**

(B) **This baby was under 10 months of age and still at the breast when the above photograph was taken. She then weighed 22 lb., being three pounds over the average—a firm, sturdy, muscular, active child.** When first seen she was two weeks old. She had been entirely weaned three or four days before, and was having cows' milk and water. The grandmother then sought advice, because the bottle-feeding had upset the baby, and she was suffering from colic, etc. The mother was very young, small, pale, anæmic, and delicate. One breast was hard; there was still a trace of milk in the other. The mother was advised with regard to food, fresh air, exercise, and regularity of habits. Breasts were massaged, and mother advised to put baby to breast every three hours—supplementing with humanised milk of proper strength (1 ounce after each suckling). In five days the flow of milk more than sufficed, and bottle-feeding was stopped altogether. Later the hard breast gathered, and suckling had to be temporarily abandoned on that side. It was again necessary to supplement with humanised milk for about ten days; then the gathered breast healed and the full flow of milk returned. Members of the Society systematically supervised the hygiene of mother and child, and both were soon in radiant health. Breast-feeding proved almost as beneficial to the mother as it was to the child, exemplifying the fallacy of the common idea that a delicate woman conserves her strength by denying her offspring its natural rights. In reality, quite the reverse is the case. **With proper attention to regularity, food, exercise, etc., delicate women tend to gain in strength and condition while nursing.**

The initial features and surroundings of the above case were such as almost to preclude the idea that a return to breast-feeding—which had been deliberately given up on advice, because of the assumed unfitness of the mother—would be good either for parent or offspring. The house—a single, small lean-to room, occupied by the family of four—rendered it impossible to have anything approaching freshness of air, without keeping the window and door wide open. But this fact made the demonstration all the more striking, as showing what could be effected with a very small air space. A better object-lesson in the benefits of cold, free-flowing outdoor air, obtained under the most adverse housing conditions, could not be cited.

Weaning.

In general, the best time for weaning a baby under the conditions of modern civilisation is between the 9th and 12th months. The younger the baby the more risks attend the process; the mother should therefore do all in her power to ensure a good supply of healthy breast-milk, and should continue nursing for the full period unless there are decided reasons to the contrary.

French authorities advocate partial breast-feeding up to 15 or 18 months, but opinion in England, Germany, and America is against this—the drain on the mother being held to be too great, and the child being said not to thrive so well as if weaned by the 10th or 12th month. Oriental races (Chinese, Japanese, etc.) still continue their immemorial custom of partial suckling up to 18 months or longer. The French view is thus expressed by Professor Marfan, the leading authority in Paris:—

As far as possible weaning ought not to be completed till between the 10th and the 18th months. Too early weaning often gives rise to digestive troubles because one is depriving the infant of Nature's ideal baby-food. If feasible, it is well to continue putting the baby to the breast until the 15th month. A great advantage of this prolonged suckling is the fact that if baby becomes upset in any way we have the extremely precious resource of mother's milk to fall back on. But weaning should be completed before the eighteenth month, because, apart from the fact that the necessities of modern life make it extremely inconvenient to continue suckling any longer, it becomes a much more difficult matter to break the habit of breast-feeding if suckling is unduly prolonged.

In spite of the above we say, unhesitatingly, **wean on the average between 9 and 12 months.** There are practically no dangers to be feared in weaning at this time, provided the mother follows the simple principles and practice of modifying cows' milk so as to adjust it to the requirements of a baby (see the remark in black type on p. 43 as to the simplicity of weaning when humanised milk is used).

Whether a baby is weaned at the 9th month or still suckled, some dry solid food, such as crust of bread or dry crisp toast, should be introduced into his dietary about this time, so as to train early the powers of munching and chewing, and thus induce without delay a proper flow of saliva. The solid food should form part of the meal, and should be commenced about 10 minutes before any milk is given, otherwise he tends not to keep hard at work. The munching of bones, which should have been begun some months earlier (see p. 38), should, of course, be continued. **All these activities lead to increased flow of blood to the region of the mouth, and cause thereby increased growth and development of jaws, teeth, roof of mouth, and airway of nose—preventing adenoids.**

Every effort should be made not to wean during the warmest months of the year, especially during the latter part of summer, as that time is particularly fatal to artificially fed babies.

It is of the utmost importance that babies should be suckled. In nine cases out of ten where the ordinary custom is to promptly wean the baby, complete or partial nursing could be continued if the mother were well advised, and if she would take more open-air exercise, besides paying strict attention to the other measures needed for ensuring her health. (See "Regimen for Health," p. 9.)

Apart from consumption, there is hardly any illness of the mother which really necessitates weaning, though it may be necessary to take the baby off the breast for a time, and to draw off the milk by manipulation

and breast-pump, feeding the baby with properly graded humanised milk until the mother's health is sufficiently restored. In ordinary cases of cold, influenza, etc., there is no need to give up suckling, even temporarily.

Where there is inflammation or abscess of one breast, suckling should generally be continued with the other, though the contrary advice is usually given. (See Fig. 3, B.)

When weaning time approaches, a little boiled water, slightly sweetened if necessary with sugar of milk, may be given (once a day, between breast-feedings) by means of a bottle. There is a decided advantage in thus gradually accustoming the baby to sucking from a bottle, because otherwise there is sometimes considerable difficulty in inducing a child to give up the breast.

Weaning should be gradual. When it has been decided that the time has come for weaning, give first one, then two bottle-feedings each day, and so on. The change from breast-feeding to bottle-feeding can be carried out so gradually and insensibly as to cause no trouble or upset.

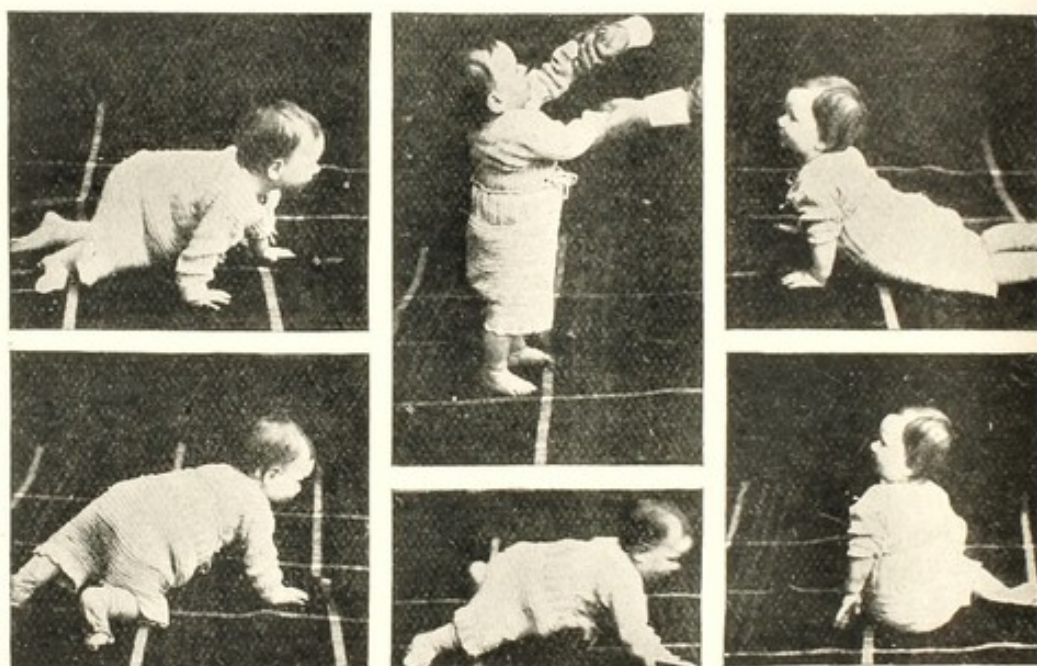


FIG. 4.

Breast-fed baby, weaned at nine months, then fed on Humanised Milk, No. 2, etc. Photos taken at 11 months. Note varied activities—sitting erect, crawling, standing with assistance. A few weeks later he walked alone. On his first birthday he weighed over 25 lb., being 4 lb. over the average—very bright and happy, full of life. (See "Milestones," p. 93.)

Is it safe to wean a breast-fed baby and put it straight on to ordinary full-strength Humanised Milk?

Certainly not. See pp. 30-32. The first rule in baby-feeding is not to make sudden changes of any kind. (An exception to this rule is the sudden and marked weakening of food, or if necessary the change to mere boiled water, on account of severe indigestion or diarrhoea.) When a marked change must be made in the food

or manner of feeding the new food should be easily digestible, and should be given decidedly weak at first. Strengthen gradually as the baby's digestive organs become used to the new food and new way of feeding. Changing from the breast to hand-feeding always puts a strain on the baby. Mothers know that ordinary weaning is a perilous time for infants, but it can be made safe by care and forethought. Early weaning is the most troublesome; weaning after nine months causes no upset if properly conducted.

If weaning is done as early as the eighth or ninth month, it is better to give the bottle; if at the eleventh or twelfth month, the infant should be taught to take food first from a spoon and then from a cup.

Babies' Rights.

Regular habits for the baby are of the first importance. A baby cannot be expected to thrive if its mother is not regular and punctual in the matter of bathing, feeding, and putting her infant to rest, etc.

Before describing artificial feeding, it is desirable to state emphatically that no system of bottle-feeding can ever give to either mother or child the advantages which both derive from suckling. Human milk cannot be made outside the human body. We can approach it in composition by carefully modifying the milk of some other mammal, but the imitation cannot be made identical with the original, and must always be inferior to it. Nothing can rival milk drawn direct from the breast into the baby's stomach—pure, fresh, living, blood-warm, and uncontaminated by germs. Modified milk is superior to any other form of artificial food, but it is not human milk; and the best glass and india-rubber feeding-bottle is a troublesome, unclean, clumsy contrivance compared with the living breast.

Every infant who cannot be suckled in the natural way is entitled to receive properly Modified Milk. Cows' milk merely diluted with water and sweetened with cane sugar is far from an ideal artificial food for babies; pure cows' milk is still more objectionable.

Cows' Milk contains nearly three times as much proteid as Human Milk, the excess being crude curd, suited to the calf, but quite unsuited to the baby. This curd overtaxes the Digestive Organs and Kidneys. Indigestion and Diarrhœa are the most obvious results, the overtaxing and weakening of the Kidneys escaping immediate attention. We are given Kidneys for the purpose of getting rid of the waste products of proteid taken in the food. The Mother does not realise that one cannot impose on a baby's Kidneys two or three times as much work as Nature has designed them to do, without damaging them. What is sown in infancy may be reaped in middle life.

***Patent Foods or unmodified sweetened Condensed Milk is even more unsatisfactory.** Babies may seem to flourish for a time on such food, but though fat they tend to be flabby, and the child is fortunate if it escapes serious diarrhœa, or rickets. Imperfectly-fed children are not only more liable to contract illness of any kind, but they have also little power of throwing off disease, and succumb readily.

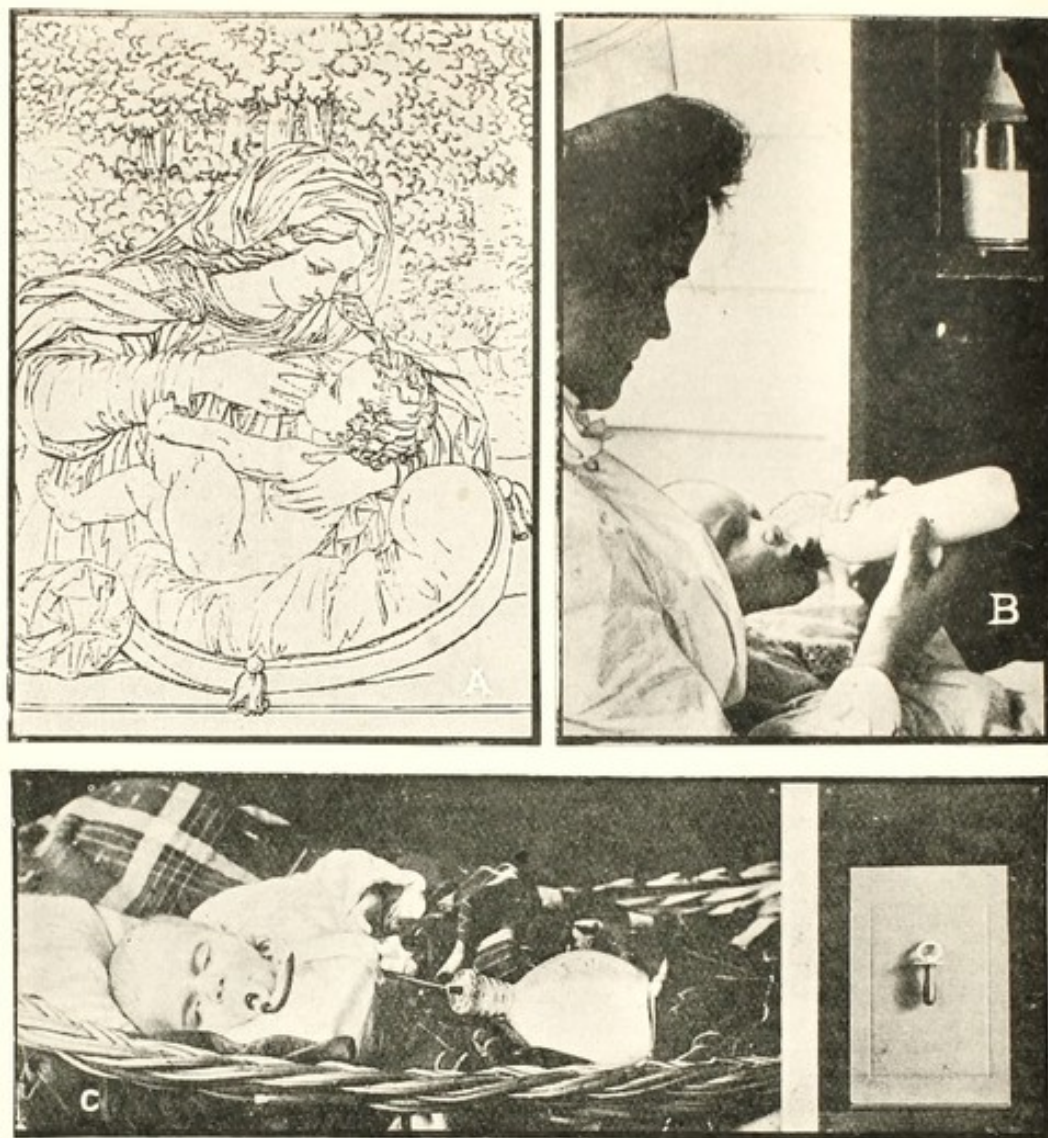


FIG. 5.

FIG. 5.—This shows at a glance the rights and wrongs of baby feeding. First, the oldest, and infinitely the best for both mother and child, comes suckling by a healthy mother.

(A) *Salario's Madonna in the Louvre, called "The Nursing of Jesus,"* or "The Madonna of the Green Cushion." The comfort and benefit to both mother and child of having a cushion or pillow on the lap was apparently better known to the Old Masters than to modern women. It saves the mother's back, and makes stooping unnecessary. Another point, and one of extreme importance, seen in this picture is the muscular activity of the suckled child—the kind of alertness which we notice in all healthy young animals at the breast, and which can scarcely escape attention in the happy rapid tail-wagging of puppies, lambs, foals, calves, etc. Even when the nursling has settled down to calm steady sucking the whole system is still in a state of great activity, as shown by the sustained quickening of the pulse, the rise in the blood pressure, and the universal increase of nervous and muscular tone—in fact, the stimulus of natural suckling is radiated to the whole system, and causes a quickened life in every organ and tissue to the uttermost parts of the body. Contrast this with (C), where the baby, half-asleep, lazily and passively imbibes its milk through a Long-tube Feeder, which offers no resistance to tug at, and gives the baby no chance of opening wide its mouth and exercising its jaws as it does when munching the mother's breast. Natural suckling is not confined to the nipple; the baby's jaws work up on to the breast itself as it nuzzles in and pushes and tugs at the organ.

(B) "Hygeia Feeder" shown in the right-hand top corner. This affords the nearest approach to Nature, the human breast being closely imitated. If the "Hygeia Feeder" is not obtainable, the best substitute is a **simple feeding bottle**, as shown in the nurse's hand. It is essential that this should be held by the nurse, and that the teat should be moved about in the mouth and pulled forward so as to ensure as close an imitation as possible of normal sucking. Note activity expressed by lips and cheeks. Nurse feels the baby tugging at the teat, and she sustains a slight tension which keeps the nipple forward in the mouth.

(C) The Long-tube Feeder and the Dummy shown side by side, as they are partners in bringing about some of the worst evils of modern babyhood—indigestion, diarrhoea, deformed jaws, defective projecting teeth, mouth breathing, sore throat, adenoids, etc. We hope that their use will soon be rendered illegal in the Dominion—as the long-tube feeder already is in many countries. In the meantime, **let every humane and sensible woman do her best to abolish both these abominations from our homes.** This would save many lives and much future debility. For further particulars see "Feeders, and how to use and keep them."

Artificial Feeding

It is wiser to put up a fence at the top of a precipice
than to maintain an ambulance at the bottom.

If it is impossible to breast feed a baby, no pains should be spared to provide the best substitute for the mother's milk.

In ordinary times fresh cow's milk can easily be adapted for infant feeding by reducing the indigestible curd to less than a half and adding sugar of milk—the latter being short in cow's milk. Milk modified in this way, so as to make it approach in composition as closely as possible to mother's milk, is known as "Humanised milk"; and the same term is applicable to any preparation in which a reasonably close approximation is made to human milk.

Owing to the War, not only has it been difficult to obtain good, clean, fresh cow's milk, but the natural "Sugar-of-milk" became very scarce and dear, and this will continue for some time to come, so that mothers will have to resort largely to the use of Cane-sugar for artificial feeding in the meantime. I am giving two simple formulæ, one for "humanising" fresh cow's milk, and the other for humanising condensed and dried milks by using an Emulsion of Fats and Oils, instead of "Top-milk" and Sugar-of-milk.

Cow's milk is right for the calf but not for the baby, unless the milk is specially modified so as to fit it for the young human being. The same applies to all forms of condensed or dried milk. If used for feeding a baby in the first year, they should be specially modified for the purpose, and should not be given as supplied in tins—no matter how strongly they may be advocated or under what names they may be sold.

The two new recipes are given on pages 25 and 26, after the formulæ for the original preparations. All four are of practically the same strength, being slightly weaker than human milk, this being desirable for artificial feeding.

Any one of the four recipes can be used, and they can be interchanged, to meet varying circumstances. Not only does the "Table for Feeding" apply equally to all the formulæ, but also the remarks and table under the heading "Feeding Details" (pages 30 and 31). Before starting to make the new preparations the whole of pages 22 to 34 should be carefully read over, because the general principles and precautions, and the instructions as to heating and rapidly cooling milk and keeping it protected, clean and cool, etc., apply throughout.

Best Method of Bottle-Feeding.

The feeding-bottle should be simple and easily cleansed, and the nipple should be readily turned inside out. There should be **no long tube**. The smaller the hole in the nipple the better, provided that the baby can be induced to take a sufficiency of food in from 12 to 20 minutes. This can only be done by holding the feeding-bottle and maintaining a certain pull on it, so that the teat is kept towards the front of the mouth. By this means,

and by moving the teat in the mouth, the baby is brought to suck much more actively, and the whole of the body is stimulated and thrown into action. Observe what takes place if you pull and move about the feeding-bottle of a baby who has gone to sleep with the bottle propped up on a pillow. In a moment there tends to be vigorous and widespread action even though the baby should not wake up. If the mother cannot hold the bottle all the time, she should do so for the first five or ten minutes of each feeding. By this means a good start is ensured, and the whole body is brought into action. The period of main vigour of sucking and associated general exercise is the first five minutes or so of each feeding. Therefore we should secure this at least at its best. It is, however, much better to continue holding the bottle until the end of the feeding.

Cleanliness.

All utensils for milk and milk preparations must be kept scrupulously clean. This can be effected by washing immediately after use with cold water and then with boiling water and soda, scouring with a brush kept specially for the purpose. Hot water should never be used first, because it coagulates the albumen of milk and prevents proper cleansing. Milk bottles should be turned upside down to drain, and may be left thus or covered to prevent the accumulation of dust or particles floating in the air. Rinse again with boiled water immediately before use, and on no account follow this rinsing by wiping out with any form of cloth or towel, since, however clean this might be, it would probably contaminate the vessel with microbes. Feeding-bottles should be thoroughly cleansed immediately after use, and should then be baked or boiled. See pages 86-90.

Ingredients, Etc.

I.—MILK.

No effort should be spared to get this as soon after milking as possible. Any milk that has been standing for twelve hours without having been rapidly cooled down, covered to keep out falling particles, and kept below 60 deg. Fahrenheit, is unfit for feeding infants. Where such is the only milk obtainable, it should be heated at once to 155 deg. Fahrenheit and kept at that temperature for five or ten minutes to prevent further growth of fermentative organisms. It should then be covered, cooled rapidly by placing the jug or jar in cold water for half an hour, and kept in a cool, clean outdoor safe. Heating carried above 155 deg. F. impairs the nutritive qualities of the milk, more or less. The milk of a herd of cows is more reliable as regards equality of composition than the milk of a single cow. In winter, the evening milk of a given herd contains more fat than the morning milk; and in autumn, milk contains more fat than in spring.

The morning milk is easily cooled, because early in the day water is generally available which has not been subjected to sunshine or warm air. A shallow pan of water can be cooled by placing it in the open air at sunset, with a clear sky

above it, and out of reach of the early morning sun. On very warm days no mere safe is cool enough to prevent the risk of an injurious fermentative growth taking place in the course of the day. At such times the mother would naturally avail herself of ice, or cool well-water if at hand.

II.—“TOP MILK.”

“Top Milk” is not cream. The strongest recommended herein is only about three times as rich in fat as the cow’s milk. It is got by removing the upper fourth or upper third (according to the particular recipe used) from a **tall, narrow jug or jar** of milk, which has been left standing in a cool safe for 5 hours.¹ **However small the quantity of milk set, the column of fluid should be at least 5 or 6 inches high. Don’t use a basin or cup.** The last few ounces dipped off are practically skim milk, but the blend gives the right strength. A quart (40 ounces) yields 10 oz. or 13 oz. of “Top Milk,” according to the recipe used (see pages 23 and 25). If Jersey milk is used the quantity set for “Top Milk” should never exceed the quantity of humanised milk to be prepared—thus 30 oz. or less would provide the “Top Milk” for making 30 oz. of humanised milk.

On very warm days, if there is no means of keeping the milk below 60 deg., the safest plan is to restrict the setting for “Top Milk” to four hours or even less. The proportion of fat in the “Top Milk” is diminished, but this is safer for the baby when the weather is unusually warm.

HOW TO REMOVE “TOP MILK.”

This can be done by combining skimming with a spoon and pouring, but a 2½-oz. conical dipper is much better.

METHOD OF USING DIPPER.

Gently lower the dipper until the “Top Milk” flows over the edge as shown in the diagram. Keep the dipper fairly level and move it deftly round towards the sides of the jar so as to get the “Top Milk” to come equally from all directions. To prevent cream from being pushed down into the skim milk it is advisable to wet and warm the dipper by plunging it into boiling water before lowering it into the jar for the first dipperful.

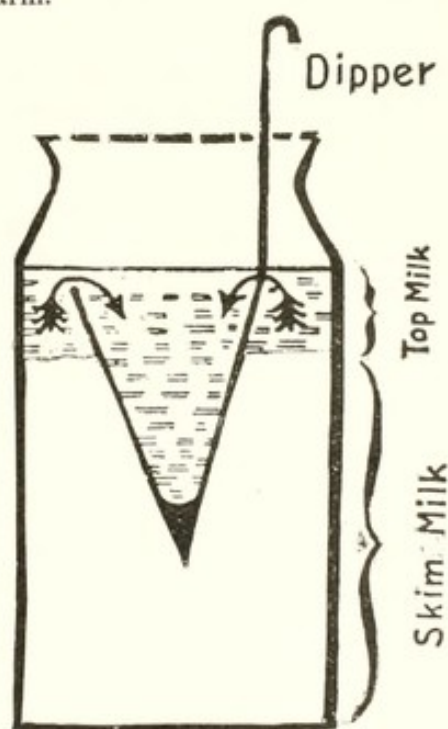


FIG. 6.

III.—MILK SUGAR.

This is the natural sugar extracted from milk in the form of a white powder. It is easily digested, resists injurious fermentation, and tends to check putre-

¹ N.B.—In the first month, or for a time with very delicate babies, Humanised Milk sometimes agrees better if the milk has been set less than 5 hours. Thus we may start with setting for “Top Milk” for only 3 hours, and gradually come to the full 5 hours at the end of some weeks.

faction in the contents of the intestine. Where cane sugar is substituted the risks of fermentation, indigestion, and diarrhoea are greater, especially if it is used for long and in undue proportions—as in the case of sweetened condensed milk. When a baby is ill the use of some malt sugar is sometimes a temporary advantage, but this is a medical question. Natural sugar of milk is best for the normal baby.

SUGAR MEASURE.

A standard measure is made to hold $\frac{1}{2}$ oz. of milk sugar. It is dipped into the sugar and lifted out slightly heaped up, then the portion standing above the level of the rim is removed by passing the back of a knife across it. As the bulk of a given weight of milk sugar will vary considerably with the degree of pressure to which it has been subjected in packing, the accuracy of measuring should be checked from time to time by seeing whether a given weight of milk sugar measures out properly. There should, of course, be 32 measurefuls in a pound of sugar. If at all lumpy the sugar should be powdered before measuring. A level tablespoonful of sugar of milk is about half an ounce, if the sugar is pressed down with the flat of a knife and then smoothed off so as to stand quite level with the rim of the spoon.

IV.—APPLIANCES.

The only special appliances needed are a conical half-pint glass measure graduated in ounces, and a dairy-thermometer, costing a few shillings. In addition it is a great advantage to have a $2\frac{1}{2}$ -oz. conical dipper. A tested tablespoon will do instead of a special sugar measure. Generally, tablespoons are made of very uniform size, but teaspoons differ widely.

Recipes.

WHEY.

N.B.—Always keep jugs containing milk, whey, or other food for babies, loosely covered to exclude falling particles, flies, etc., but not to prevent access of air: a piece of clean white paper, through which the thermometer can be thrust, serves the purpose.

To make 12 ounces of whey.—Put 18 ounces of milk in a jug. Keep a dairy-thermometer standing in the milk, and heat to 105 deg. F. by placing the jug in a saucepan of hot water. Stir in thoroughly a teaspoonful of best rennet extract; allow to stand for three minutes, when a firm curd should have formed. Break up thoroughly with a perfectly clean fork. Replace jug in saucepan; heat up to 155 deg. F., reading the thermometer when the bulb is about the middle of the whey—not in the curd or near the top. Draw the saucepan aside so that the temperature may remain about 155 deg. for ten minutes. Now pour off the whey from the curd (which should have sunk in a lump to the bottom of the jug), straining it through a scrupulously clean boiled strainer.

Complete clearing of the whey is sometimes desired when a baby is ill. This may be promoted by carefully cutting the curd into blocks with a sharp dinner-knife after it has set very firmly, instead of breaking it up with a fork. Extreme clearing renders whey less nutritious, and therefore should not be resorted to except temporarily for some special reason.

"Food Value" of Whey.

Whey made from new milk contains about a third of the fat of the milk: whey made from skim milk contains little fat: if from "separated" milk, almost no fat.

The thinnest, clearest, most transparent Skim-milk-whey has fully a third of the "food value" of New Milk, and contains four times as much food per pint as Beef-tea. The weakest Whey may therefore be of great practical importance in tiding a sick or delicate baby over a critical period—a period when it happens to be necessary to exclude almost completely both Fat and Casein, giving for the time being a solution of Sugar of Milk and Soluble Albumen—in other words, "Skim-milk-whey." The mother is apt to regard such a diet as nearly valueless, whereas it is "as strong as" thick Oat Jelly, and contains seven times as much food as Barley Water. Moreover, the solids of Whey are specially adapted to the digestive capacity of the young infant, while the solid in Barley Jelly, etc., is almost pure starch—a substance not present in the natural food of any young mammal. However, Whey is not a complete food for continued use.

Though Whey tends to be laxative, it often agrees well in the early stages of convalescence from Diarrhœa, especially if milk boiled for ten minutes be added to it step by step, say, at the rate of an ounce a day, up to three ounces per pint. Then a gradual return may be made to Humanised Milk.

HUMANISED MILK No. 1.

"Top Milk"	9 oz.
Whey (must have been heated to 155° F.)	10 oz.
Lime Water	1½ oz.
Sugar of Milk (if not procurable, use Cane Sugar)	1½ oz.
Boiled Water	9½ oz.

N.B.—Heat the Whey to 155 deg. F., to kill the rennet, before mixing the Whey with the other ingredients; otherwise the Humanised Milk will curdle.

Before beginning to prepare Humanised Milk read carefully the paragraphs on Milk, "Top Milk," and Whey. Pages 20 and 22.

For one and a half pints of Humanised Milk set one quart of New Milk for 5 hours. Then dip off the top 10 ounces into a perfectly cleansed jug and take 18 ounces of the remainder for making the Whey. Now prepare the Whey. While the Whey is heating up to 155 deg. F. dissolve the Sugar of Milk in a small tea-cup with boiling water; when slightly cooled pour it into the measure and make up to 6½ ounces with boiled water, add 1½ ounces Lime Water and pour the whole into the jug containing the "Top Milk." When the Whey is ready, measure off 10 ounces and mix it with the other ingredients. The mixture is Humanised Milk.

Put the jug of Humanised Milk, loosely covered, into a saucepan of hot water, and heat until a dairy-thermometer placed in the jug registers 155 deg. F. Keep about that temperature for ten minutes, then cool down rapidly by standing the jug in cold water (preferably running water) until quite cold, say for half an hour or more. Remove to a cool safe. In warm weather, after 12 hours, heat the unused remainder to 155 deg., cool down quickly and keep cool.

Warnings.

Never set more than the exact quantity of milk recommended, because nothing is more liable to give a baby indigestion and diarrhœa than too much fat.

At every stage the milk must be properly mixed, otherwise what is prepared will be too rich or too poor in fat, and the baby will suffer. The same care is needed after the Humanised Milk is prepared. Mothers often make their babies ill by carelessly pouring off the undisturbed top layer into the feeding-bottle, thus giving a meal perhaps twice as rich in fat as it should be.

Variations in the Proportions of Fat in Humanised Milk, occurring accidentally, or purposely made to suit Sick or Delicate Babies.

If baby is not thriving send by post to a dairy factory for analysis an ounce-bottle of a thoroughly well-mixed average sample of the Humanised Milk prepared. Three or four drops of formalin should be added to the specimen to prevent it going bad on the journey. The mother can thus easily ascertain whether what she is giving her baby is right or not. The standard proportion of Fat is between 3 and 4 per cent. A baby should never have more than 4 per cent of Fat, and there are some who cannot tolerate more than 2 per cent, especially in the earlier months. The shorter the time one stands the milk for dipping off "Top Milk," the less will be the proportion of Fat in the Humanised Milk made with such "Top Milk." Indeed, if it is desired to greatly lower the proportion of Fat in the baby's milk (which is sometimes desirable when there is persistent vomiting or diarrhoea), plain cows' milk may be temporarily used instead of "Top Milk" in the above Recipes. This reduces the Fat in the Humanised Milk to $1\frac{1}{2}$ per cent. To gradually get back to the full percentage of Fat in the course of a week by regular gradations, all that is needed is to set for "Top Milk" as follows:—On the second day, $\frac{1}{2}$ hour; third day, $\frac{3}{4}$ hour; fourth day, 1; fifth day, $1\frac{1}{2}$; sixth day, 3; seventh day 4 or 5 hours.

By thus reducing the Fat more or less, and also boiling the "Top Milk" or Milk used in preparing such modified Humanised Milk, we may readily arrive at a simple food which, if given diluted at first, suits the great majority of sick babies, and promotes convalescence from Diarrhoea, after plain boiled water has been used for 12 hours or so. Where this modified Humanised Milk does not agree, try Whey and Boiled Milk as described under heading "Food Value of Whey," p. 23.

Fat can be practically cut out of the above Recipes altogether, without altering the other constituents, by merely substituting Skim Milk, or "Separator Milk," for "Top Milk" in any of the recipes for Humanised Milk. There are occasional cases of extreme temporary intolerance of Fat where only "fat-free food" agrees.



FIG. 7.

The first three babies treated in the Karitane Hospital. They gained a total of 23 lb. in from four to five months. From emaciated weaklings they became plump, robust, and full of life. They were fed with properly modified cow's milk.

Never keep baby's bottle warm from one feeding till the next. Though often done, especially when travelling, this is a most dangerous practice. Microbes flourish exceedingly when the temperature is between 70 deg. and 100 deg. F. Therefore keep the milk as cool as possible, and heat only the quantity required for a feeding. The means for heating can readily be obtained almost anywhere nowadays.

HUMANISED MILK No. II.

"Top Milk"	12 oz.
Lime Water	2 oz.
Sugar of Milk (if not procurable, use Cane Sugar)	1½ oz.
Boiled Water	15 oz.

For 1½ pints of Humanised Milk No. II., set 40 ounces of New Milk for five hours. Then dip off the top 12 ounces, instead of 9 ounces. Dissolve the Sugar of Milk and mix the ingredients. Heat to 155 deg. F., cool rapidly, and keep cool as described in detail under the previous Recipe.

TABLE I.—For preparing various quantities of Humanised Milk.

N.B.—However little Milk is set, put it in a tall, narrow jug or jar giving a column 5 or 6 inches high—never in a cup or basin.

Ounces of Humanised Milk needed	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.
	5	10	15	20	25	30	35	40
Ounces of New Milk to be set	7	13	20	27	33	40	47	54

RECIPES FOR HUMANISED MILK No. I.								
Top Milk	1½	3	4½	6	7½	9	10½	12
Whey (which must have been heated to 155 deg. F.)	1½	3½	5	6½	8½	10	11½	13½
Lime Water	¼	½	¾	1	1½	1½	1¾	2
Sugar of Milk	½	1	1½	2	2½	3	3½	4
Boiled Water up to Total	5	10	15	20	25	30	35	40

RECIPES FOR HUMANISED MILK No. II.								
Top Milk	2	4	6	8	10	12	14	16
Lime Water	¼	½	¾	1	1½	1½	1¾	2
Sugar of Milk	¼	½	¾	1	1½	1½	1¾	2
Boiled Water up to Total	5	10	15	20	25	30	35	40

HUMANISED MILK No. III.

Fresh Milk	12 oz.
Lime Water	2 oz.
Milk Sugar	1½ oz. (3 level tablespoonfuls).

(If ordinary Cane Sugar is used instead of Milk Sugar the allowance should be only two level tablespoonfuls.)

Dextri-Glucose Emulsion *	1½ oz. (2 level tablespoonfuls).
Cold Boiled Water to make a total of	30 oz.

* Start with only a teaspoonful of Emulsion a day; increase gradually if it agrees. Don't mix with the other ingredients. Either feed separately or add some to each bottle with a teaspoon.

If doubtful as to freshness of milk, bring it to the boil and keep hot for 10 minutes before mixing. Then stir in the cold boiled water, lime water and sugar, and keep the jug, covered loosely with a plate, in cold running water for half an hour. Remove to cool airy place.

WARNING.—Never start using any prepared milk at the full strength, but work up cautiously in the course of a week or ten days. Indeed, several weeks or even a month or more may be needed in the case of a young or delicate baby. (Read page 31.)

HUMANISED MILK No. IV.

Compared with human milk, sweetened condensed milk has a great excess of sugar and is very short of fat: dried milk has great excess of proteid. By combining them and adding suitable fats and oils, as shown below, we arrive at the proper proportions for the baby.

Sweetened Condensed Milk (best brand of full-cream milk)	. 3 oz. (3 level tablespoonfuls)
Dried Milk (best brand of full-cream milk)	$\frac{3}{4}$ oz. (3 tablespoonfuls, pressed down level in spoon)
Dextri-Glucose Emulsion (see below)	. 1 oz. (2 level tablespoonfuls)
Boiled Water to make up to	. 30 oz.

Start with only a teaspoonful of Emulsion a day: increase gradually if it agrees. Don't mix with the other ingredients. Either feed separately or add some to each bottle with teaspoon.

Read the warning given above as to the use of Recipe III.

Beat the Condensed Milk and Dried Milk into a creamy mass in a hot, freshly scalded cup, stirring in enough boiling water to make the whole up to 6 ounces. (An ordinary teacup holds just over 6 ounces.)

If the baby is to have 6 feeds of full strength in the 24 hours, use a sixth of the mass (less than 2 level tablespoonfuls) for each feeding, adding enough hot boiled water to make the feeding up to 5 ounces. If preferred the recipe can be made up to 30 ounces at once.

RECIPE FOR DEXTRI-GLUCOSE EMULSION.

Glucose (Refined Syrup), 80% Sugar	5 oz. by weight	Cod Liver Oil	. 3 oz. by weight
Refined Dextrin	. 3 " "	Peanut Oil	. 8 " "
Fresh Butter (got by heating and skimming butter)	3 " "	Potasse Bicarb.	. 10 grains. "
Beef Dripping or Suet-fat (clarified)	3 " "	Benzoic Acid	. 25 " "
		Essential Oil of Almonds	. 15 m.
		Water to make	35 oz. Emulsion when finished.

Make into an emulsion. The bicarbonate of potash should be first thoroughly beaten with the Cod Oil: the Benzoic Acid should not be added until the whole is thoroughly emulsified. The Oil of Almonds is added just before finishing. Leave out the Benzoic Acid if the Emulsion is not to be kept more than a week or two, and if it can be kept quite cool so as to prevent possible fermentation.

In the absence of a good emulsifying machine some Gum Acacia may be added to the recipe to prevent any tendency to separation.

Fresh fruit juice or vegetable juice, as recommended on page 40, is specially necessary when using condensed or dried milk.

CEREAL DECOCTIONS.

A pint of Jelly strained from boiled Barley, Rice, or Oatmeal contains only a fourth, or at most a third, as much food as a pint of Mother's Milk or Humanised Milk. A tablespoonful of Milk contains as much food as a pint of Barley-water: indeed, **Barley-water is merely water thickened with a trace of starch, and should not be regarded as a food but as a diluent.**

BARLEY JELLY.

(1) Soak four level tablespoonfuls (or 3 ounces measured in a medicine measure) of well-washed pearl barley in a quart of warm water for an hour. Boil, then keep just about the boil for three hours. While hot, strain through muslin or a very fine, perfectly clean, boiled wire-gauze gravy strainer into a scalded jug. Cover loosely, cool rapidly in running water; keep in a cool airy safe. Make fresh every day.

(2) Rub two level tablespoonfuls of Robinson's Barley into a paste with cold water, and make up to $\frac{3}{4}$ pint by stirring in boiling water. Boil gently for half an hour, and make up at the end of that time to $\frac{3}{4}$ pint. (A more accurate method is to measure 2 ounces of Robinson's Barley in a medicine measure and make up to a pint with water.) Treat as above.

N.B.—When using Jelly for the first time (say at nine months) begin with Barley Jelly, because Oat Jelly is more apt to irritate the bowels.

RICE JELLY.

Proceed as for Barley Jelly—using whole rice. Rice Jelly is preferable to Barley Jelly if the bowels are relaxed. Oat Jelly is the most laxative.

Rice-water or Barley-water may be made by using six times as much water as for preparing the jelly; or by adding five parts of boiling water to one of the prepared jelly.

OAT JELLY.

Proceed as for Barley Jelly, using Oatmeal instead of Barley-flour. A simpler way is to take equal parts of boiling water and well-boiled porridge, bring to the boil, stir for a few minutes, then strain, cool, and keep cool as above.

After 15 months of age, if the baby has good digestion, use a coarser strainer, the handiest being the cylindrical flour-dredger in common use. If the boiled oatmeal is placed in this while boiling-hot, a few turns of the handle cause all that is fine enough to go through, and the result is a kind of strained, jelly-like porridge. The dredger can be readily cleansed, and should always be boiled just before use. Thin ordinary gruels can be made by using about half the proportion of meal given in the above recipes.

LIME WATER.

Thoroughly stir one tablespoonful of freshly-slaked lime into half a gallon of boiled water; cover to keep out falling particles. After 12 hours, pour off the water and throw it away, as it contains any impurities present. A thick cream of lime will remain at the bottom of the vessel. Again add $\frac{1}{2}$ gallon of boiled water, stir for three minutes, and allow it to stand, covered as before, for 12 hours. The clear fluid is lime water, and should be carefully poured off and bottled for future use. It will keep if the bottles are filled and well corked. Green glass-stoppered bottles are best, but thoroughly cleansed small beer bottles will do if filled and corked with sound, well-cleansed corks, which have been scalded just before use. Lime water deteriorates in the presence of air; therefore the bottles should not be larger than pints, and the one in use should always be well corked immediately after pouring out. The exact quantity of lime is not important, provided sufficient is used, because water will only dissolve a certain quantity.

How to Keep Milk.

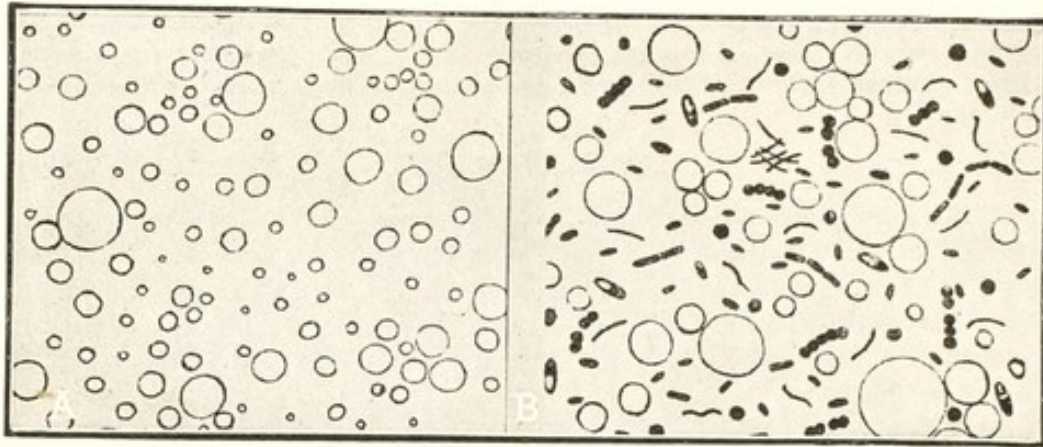


FIG. 8.

- (A) **Pure milk as seen under the microscope.** The circles are the fat globules.
 (B) **Milk left standing in an uncovered jug and not kept sufficiently cool.**

If milk is allowed to cool slowly, by merely placing it in a safe, ten times more microbes may develop in the course of a few hours than would be present if it were chilled quickly by placing the jug for half an hour in running water immediately on receipt of the milk. Germs multiply with extreme rapidity in unchilled milk. Several millions per teaspoonful may accumulate before the souring stage is reached, and this is why mothers are so liable to poison their babies and bring on fatal diarrhoea, especially in summer. All milk should be brought below 60 deg. F. by means of cold water or ice, before putting the jug in the safe. Never keep milk in a porous jug—it will not remain sweet.

No ordinary milk is fit for the baby 6 hours after it has been received in the home unless it has been rapidly cooled down at once, and kept cool. This applies also to Humanised Milk. As received ready-prepared from the factory, Humanised Milk has been freed from living microbes and cooled with ice. How is such milk to be kept safe for the next 24 hours?

HOW TO KEEP COOLED MILK COOL.

REMOVE THE CAPS FROM THE BOTTLES AND THUS LET IN AIR, but don't allow any dust or falling particles to gain access. To prevent this, cover with a tilted saucer. (If air is excluded by corking, milk is liable to go bad in quite a different way from natural souring, and may then be highly poisonous—just as tinned meat is liable to go bad and cause fatal poisoning.) Then place the bottles in an ordinary wooden candle-box and surround them with clean chaff or sawdust. Keep the box in an outside safe or other cool, airy place.

By this simple means Humanised Milk delivered cool at the house can be kept cool and safe for a whole day in the hottest weather. To render assurance doubly sure, when the weather is unusually sultry, the mother can scald the last one or two feedings by placing the bottle in warm water in a saucepan and bringing the water in the saucepan to the boil, and keeping it at that for ten minutes. Then cool as rapidly as possible.

People often make the great mistake of placing the bottles of humanised milk received cool from a factory in ordinary tap water, without pausing to reflect that this may be actually warmer, instead of cooler, than the milk. In this way they warm up what has been cooled and kept cool by ice water, whereas if they used chaff or sawdust, as directed, milk received cool would keep practically as well in warm weather as it does in winter, and the greatest risk of summer diarrhoea would be obviated.

MILK PREPARED AT HOME.

In the country the mother may be able to stand the milk in a cool stream under trees, or there may be cool artesian or pump water; on the other hand she may have nothing but tank water to depend on. In the latter case, when the weather is warm, the best plan is to keep a pailful of water in the open night air shaded from the rising sun. In this she can cool the milk which has to be set for cream. The fresher the milk is when set in the cool water the quicker the fat will rise. On the very warmest days standing for cream should not be continued for more than five or six hours, except where there is specially cooled spring water at hand for keeping down the temperature. Remember that cream rises much quicker and better in a bottle or tall narrow jar than it would in a shallow pan or bowl.

If there is any doubt about the baby's milk being cool enough on very warm days, the safest plan is to heat whatever is left over to 155 deg. for 10 minutes before going to bed. If there is no thermometer at hand heat to just short of the boiling point, and keep at that for five minutes, then cool rapidly in the coolest water available, and put in the best place that can be found.

On very hot, dry days, if there is no artesian or other cold water to be had, the best way to keep milk comparatively cool, whether set for "Top Milk" or not, is to pour some water into a soup-plate and stand the milk-jug or bottle in this. Over the bottle place one or two thicknesses of clean open muslin or cheesecloth, which must dip into the water all round. This plan is least effective on still, moist, warm, muggy days, because the cooling effect depends on evaporation, which ceases when the air is saturated with moisture. On this account it is most applicable in dry inland places, or when the wind is blowing from inland. However, it is an excellent standby in summer, even on the coast, since the air is rarely quite still and saturated; there will nearly always be some cooling effected.

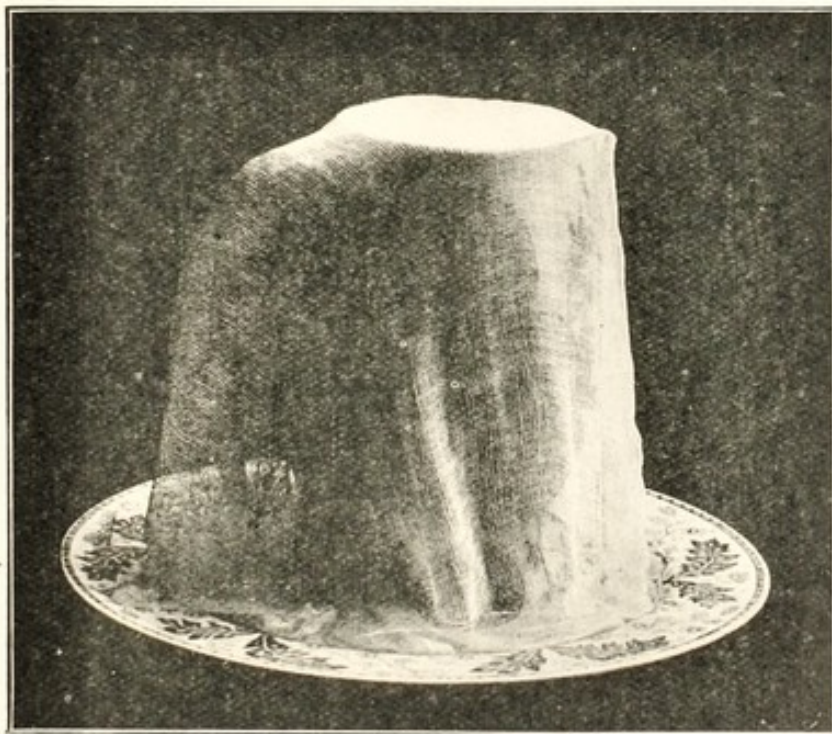


FIG. 2.

The illustration shows how to cool milk by means of the evaporation from wet muslin.

Only one thickness of butter muslin has been used in the picture, but in practice it is better to use two, as one is apt to dry. Further, a shallow pie-dish is preferable to a soup-plate, as the water evaporates rapidly in warm weather.

The dish should not be stood in the house or in a closed cupboard, but in a safe standing in a draughty place in the open air on the shady side of the house, free from dust, and as remote as possible from drain openings, rubbish heaps, or garbage of any kind.

Feeding Details, etc.

First Month.

Before proceeding, read carefully the "Breasts" and "Suckling," pages 6 and 7.

As soon as the mother has settled down comfortably after childbirth, and always within twelve hours of birth, baby should be put to both breasts every four hours in daytime—eight hours' interval being allowed at night.

For a day or so baby usually gets scarcely anything—only a few teaspoonfuls of creamy fluid, but every drop of this is precious.

In a few days, when the breasts begin to get under way in the making of real milk, they tend to swell, throb, and become more or less hot, tender, hard, and knotty. At this stage great relief is afforded by supporting the breasts with ready-made "breast-supports" or with a breast-binder or muslin bandages. Further, if needed, hot fomentations (omitting the nipples) may be used, followed by suitable, gentle manipulations, etc. The bowels should be freely opened.

Now read the practical hints for safeguarding mother and child in the first week or so, given in Appendix, page 159.

If, during the first two days, baby is restless and seems thirsty, a few teaspoonfuls of boiled water, at "blood-heat" (about 100 deg. F.), should be given at intervals of four hours—that is, after each attempted suckling. The allowance of water should be increased gradually up to an ounce four hourly if baby is getting nothing from the breasts by the end of the second day. Don't give up trying to establish at least partial breast-feeding for several weeks, but if the mother's milk is delayed beyond about two and a half days, something more than water must be given. Begin with a mixture of one part of Humanised Milk (see page 23) to three parts of Boiled Water, and proceed as shown in the "Feeding Table" on page 34, giving after each nursing only what may be needed to make up the mother's supply, and ceasing to supplement as soon as her milk seems adequate.

If artificial food has to be continued, strengthen it day by day, so that on the seventh day baby may receive equal parts of Humanised Milk and Water; by the beginning of the third week two parts of Humanised Milk to one of Boiled Water; by the fourth week three to one, and at end of fourth week, four to one. A strong child may be able to start its second month with pure Humanised Milk, but in some cases the advance in strength of food has to be slower. For prematures, use the food weaker.

Bottle-fed babies do not generally grow as quickly, especially in the first few months, as the breast-fed; and, when a baby has fallen behind, it may promote catching-up to replace 2 or 3 ounces of the Humanised Milk ration with pure fresh cow's milk, given unheated. Of course, this can only be done if the milk is fairly fresh and reliable; otherwise, what is added in this way must be scalded before use. No such addition is ordinarily needed or even desirable, but if a baby is behindhand, or not progressing satisfactorily, it may be tried.

It is not advisable to give more than about 3 ounces of pure raw or scalded milk a day in place of the Humanised Milk at any time during the first 9 months.

Researches by Miss Chick at the Lister Institute, London, show that, where fresh fruit is not available, the juice of ordinary swede turnips serves almost as well.

N.B.—A change may be made to Humanised Milk No. II., about the fourth month, to save work. Both milks are of the same strength, but as the first is more easily digested it should be continued longer if No. II. fails to agree, and may be used throughout. On the other hand, Humanised Milk No. II. may be used in the first months, if the standard recipe (page 23) cannot be prepared.

Every artificially-fed baby should receive some fresh fruit juice daily after three or four months of age (see "Fruit Juice," p. 40).

Changing to Humanised Milk.

Humanised Milk is same strength as Human Milk, and should not be diluted or altered unless for some special reason. Some Boiled Water or Sugar of Milk Solution should be added throughout the first month of life, or longer, and the same principle applies when any baby is to be fed with Humanised Milk for the first time.

If baby is over a month old and quite strong he may start with equal parts Humanised Milk and Boiled Water. Gradually increase proportion of Humanised Milk and correspondingly reduce the Boiled Water day by day. At end of a week or ten days Humanised Milk may be given pure.

If baby is delicate, or if he has been fed with Patent Foods or Condensed Milk, begin with one part Humanised Milk to two of Boiled Water.

Say baby is three months old and would need for full sustenance (if of normal weight and development) about 30 ounces ($1\frac{1}{2}$ pints) of Mother's Milk or of Humanised Milk, we might begin with 10 ounces Humanised Milk and 20 ounces Boiled Water, allowing of this mixture six feedings of 5 ounces each in 24 hours. This gives only a third of the proper allowance of food for sustaining normal growth. However, the main point at first is to get the digestive organs into working order. Consult Table below.

Table showing how (beginning with one part of Humanised Milk and two parts Boiled Water) full strength Humanised Milk may be arrived at one, two, or three weeks respectively.

Time of Modified Feeding.	I. Full Strength in a week.		II. Full Strength in a fortnight.		III. Full Strength in three weeks.	
	Humanised Milk. Ounces.	Boiled Water. Ounces.	Humanised Milk. Ounces.	Boiled Water. Ounces.	Humanised Milk. Ounces.	Boiled Water. Ounces.
1st day	10	20	10	20	10	20
2nd "	13	17	13	17	12	18
3rd "	16	14	15	15	14	16
4th "	19	11	15	15	14	16
5th "	22	8	17	13	14	16
6th "	25	5	19	11	16	14
7th "	28	2	20	10	18	12
8th "	30	0	20	10	20	10
9th "	...	...	22	8	20	10
10th "	...	...	24	6	20	10
11th "	...	...	26	4	20	10
12th "	...	...	28	2	22	8
13th "	...	...	28	2	23	7
14th "	...	...	30	0	24	6
15th "	...	...	...	...	25	5
16th "	...	...	...	...	25	5
17th "	...	...	...	...	26	4
19th "	...	...	...	...	28	2
21st "	...	...	...	...	30	0

Schemes II. and III. show fairly quick advances at first, then for a few days no advance (see thick black figures). Why is this?

1. To avoid keeping baby long on very weak food (below half strength).
2. The pause lets one see the effect of the food, thus lessening risk of overstepping digestive power—judging by look and number of motions, discomfort, sleep, etc.

Don't Add Solids.

Where babies have to be fed artificially, Humanised Milk should be the only food needed for nine months, but (see page 30) baby may do better if towards the middle of the period a few ounces of whole milk are gradually added ounce by ounce to the day's allowance—this is always worth trying when the baby has attained sufficient digestive capacity. No "solids" are needed until after nine months. Don't resort to patent foods, or indeed to anything in the way of food beyond what is mentioned above, unless specially ordered by a doctor. Fruit juice is an important adjunct, but can scarcely be regarded as a food. Bones should be munched for exercise, not for the sake of the trace of nutriment the baby may derive from them.

As none of the solids of cows' milk are quite the same as those of human milk, we can't exactly follow Nature in artificial feeding. At first a baby can't digest quite as much fat and proteid in any prepared food as it can if breast-fed; but at the age of a month or six weeks, by following the table, the organs can be trained to do the work needed—in other words, to digest standard Humanised Milk made as nearly as possible identical with human milk.

Don't make Sudden Changes.

There should be no sudden thoughtless changes to new forms of food. The growing digestive organs should be carefully trained and gradually habituated to perform each new function. The natural development of the organs is a delicately adjusted process of orderly growth.

INDIGESTION AND DIARRHŒA.

If motions appear green when passed, or if they contain much undigested food, this indicates, as a rule, that less Humanised Milk and some boiled water should be given. Indeed, it is safer to give boiled water alone for one or more feedings. If the green motions are accompanied by obvious indigestion and diarrhœa, a teaspoonful of castor oil may be given, and an instant change should invariably be made to pure boiled water for several meals, no food whatever of any kind being allowed. Then start with three parts of boiled water to one part of Humanised Milk, made with boiled "Top Milk," the fat of which has been kept down by shortening the time of "setting"—as described on page 24.

Professor Holt says : "While the increase of the food should always be slow and gradual, its reduction, when any marked symptoms of indigestion arise, should be immediate and considerable."

Don't use any unboiled milk for several days after marked diarrhœa. Boil the Humanised Milk; or, better still, boil the "Top Milk" used in preparing the Humanised Milk, and don't boil the Humanised Milk itself. Dilute as shown in the Table on previous page, regulating rate of progress by baby's condition. Watch motions and advance cautiously for fear of bringing on a relapse.

To boil "Top Milk" or Humanised Milk.—Bring to the boil and keep about boiling-point for ten minutes. After a temperature of 155 deg. F. has been reached, keep stirring until the milk boils, to prevent a skin forming. Then if the pan be drawn aside on the hob, and kept close covered for the rest of the time, no perceptible skin will form if well stirred at the end of the ten minutes, immediately the lid is removed.

As the baby improves a smaller and smaller proportion of the milk need be boiled, until the boiling is given up altogether. Restriction to Boiled Milk beyond a few weeks tends to be injurious; use of Boiled Milk should therefore not be unduly protracted in any case.

N.B.—For further instructions regarding Diarrhœa see page 108.

Feeding :

Natural or Artificial.

We must, if we wish an individual to grow up healthily, most carefully regulate the **Environment** (in other words, the great factors of life and health—air, water, food, etc.—see page 1) of babyhood; for a slight neglect here may leave an effect which the greatest after-care cannot amend. We cannot, indeed, exaggerate this influence. It is not too much to say that in civilized countries the vast bulk of the young of man are subject to an improper Environment. The cruelty practised on infants year after year is a blot on our civilization—nay, it is so serious that one is almost tempted to ask: Has such civilization any justification? In civilized countries, tens of thousands of children are tortured slowly to death, while as many grow up crippled for life. [Really a far larger proportion are maimed for life. Sir William Broadbent estimated six maimed to one killed.] **The chief number die of improper feeding.**—By DR. HARRY CAMPBELL, M.D., B.S., London.

Quantities and Intervals.

A series of patient, careful investigations made by leading authorities of late years, with a view to ascertaining precisely how often and for how long a baby should be suckled or fed artificially, throw much light on the subject.

Hitherto the baby has undoubtedly been fed too frequently, and very often he has been allowed to suck too long as well, resulting often in the upsetting of both mother and child, to say nothing of the great strain, inconvenience, and waste of time involved in frequent nursing—indeed this is a common cause of the breast supply falling off and early weaning.

Most babies thrive if fed four-hourly (only 5 times in the 24 hours) from birth; a few are found to do better if fed three-hourly (6 times in the 24 hours) for several months, but very rarely as long as five months.

The following table shows the quantities needed at each feeding by the average baby. Some thrive better with rather less food; while others may be benefited by a little more. A woman should soon recognise the natural cry of mere hunger, but she should always bear in mind that the tendency of mothers and nurses is to give babies too much rather than too little. Overfeeding upsets digestion, retards growth, and is more injurious than slight underfeeding. A baby may be fractious and cry for the bottle merely because it is suffering from the discomfort of indigestion caused by overfeeding, or it may be merely thirsty. If in doubt as to why baby is crying, the mother should turn to page 96, "Cries of the Baby." For thirst the best thing is a drink of pure boiled water. The putting up of a little fluid after feeding is generally due to giving too much food, or to giving it too strong or too frequently, but the food or feeding is not always at fault in such cases. Jogging or jolting after meals, or the habit of rocking the baby, or patting him on the back whenever he cries, frequently gives rise to chronic inability to retain sufficient food, and may establish and keep up obstinate indigestion and wasting, see "Handling the Baby," page 102.

Feed the baby perfectly regularly, with the proper intervals between. Nothing is more irritating to the stomach in the long run than the habit of giving the baby the bottle at any odd time simply to stop crying. Another bad habit is the use of a so-called "comforter."

TABLE FOR ARTIFICIAL FEEDING.

Average Weight of Baby.	Age of Baby.	No. of Feedings.	Ounces at each Feeding.	Total oz. in 24 hours.	Composition of Food.		Intervals in Hours.	Hours of Feeding.
					Ounces Humanised Milk.	Ounces of Boiled Water.		
Average weight of baby at birth is 7½ lb., but it loses about ½ lb. in first three days.	7 lb.	6	1	6	1½	4½	3	6, 9, 12 noon, 3, 6, 10 p.m.
		6	1½	9	3	6	3	do
		6	2	12	5	7	3	do
		6	2½	15	7½	7½	3	do
		6	3	18	11	7	3	do
	10th day	6	3½	21	14	7	3	do
	Beginning of 3rd week	6	4	24	18	6	3	do
	Beginning of 4th week	6	4½	25½	21½	4	3	do
	Beginning of 2nd month	6	4½	25½	25½	...	3	do
	Middle of 2nd month	6	4½	27	27	...	3	do
Average weight of baby at birth is 7½ lb., but it loses about ½ lb. in first three days.	Beginning of 3rd month	5	5½	27½	27½	...	4	6, 10 a.m., 2, 6, 10 p.m.
	Middle of 3rd month	5	6	30	30	...	4	do
	Beginning of 4th month	5	6½	32½	32½	...	4	do
	Beginning of 5th month	5	7	35	35	...	4	do
	Beginning of 6th month	5	7½	37½	37½	...	4	do
	Beginning of 7th month	5	8	40	40	...	4	do
	8th and 9th months	5						

N.B.—Four-hourly feeding suits most babies from the start; a few do better with three-hourly feeding for the first few months, and occasionally this may be the case up to five months.

No Feeding Table can be an absolute guide as to the quantity and strength of food best suited for a given baby. For a time (especially in the early months) infants with a tendency to weak digestion generally thrive better if the food specified in the Table is lessened by one or more teaspoonfuls per feeding, boiled water being added to dilute and make up quantity. Occasionally a young or delicate baby cannot take or retain enough diluted Humanised Milk, yet will do well if a smaller allowance be given of full strength. In such cases a little boiled water may be given between feedings to make up fluid. For very young or delicate babies we sometimes shorten the period of "setting" for Top Milk (see footnote, page 21).

When a baby, who has previously been fed otherwise, is put on to Humanised Milk, the food must be diluted more than shown above, for a week or longer (see page 31).

Prematures should begin with food more diluted than for those at full term, and the advance must be cautious.

All the recipes for Humanised Milk have been purposely made from a fifteenth to a twelfth below the strength of average mothers' milk; therefore, if the baby is allowed 40 ozs. (as shown in the Table, for use at 9 months), this is equivalent to about 37 ozs. of Human Milk—or more correctly only about 35 or 36 ozs., because at least an ounce or two may be deducted for loss in the feeding-bottle, etc., and for the fact that mothers' milk is more perfectly and completely absorbed and used up in the system than any artificial preparation. A breast-fed baby rarely needs more than 35 of his mother's milk at 9 months, and he may thrive best with several ounces less.



FIG. 10.

N.B.—The word "EXERCISE" used in the lower clock face means mainly artless prattle and baby-play, but includes also set periods for more active kicking-exercise, etc. (see "Exercise," page 82).

Feeding by the Clock.

The importance of establishing and practising perfect regularity in the feeding-times for babies is so great, and the prejudice against waking an infant if he happens to be asleep when feeding-time comes round is so widespread, that it is necessary to specially insist on the point. There is no doubt whatever as to the duty of mother and nurse in this matter.

The leading authorities of the day—English, Foreign, and American—all agree that the first thing to establish in life is **regularity of habits**. The mother who “can’t be so cruel” as to wake her sleeping baby if he happens to be asleep at the appointed feeding-time, fails to realise that a few such wakings would be all she would ever have to resort to.

At the dawn of life, a day or two of regular feeding with proper intervals (practically speaking no baby needs to be fed more often than every three hours) suffices to establish clock-like regularity of the rhythm of alternate sleeping and feeding. The new-born babe should sleep nine-tenths of his time. At perfectly regular intervals the infant should wake, feed, and drop off to sleep again—indeed, he is often half asleep for the last few minutes of his feeding. Babies regularly and properly fed tend to sleep like dormice, digest their food well, and are infinitely more contented and happy than those whose mothers are irregular and unsystematic.

In making out a time-table, the mother should be guided by the “Table for Feeding” and the “Clock Faces,” pp. 34, 35. Having put down on paper the hours at which her baby should be fed and the quantity to be given at each feeding, the mother should adhere to this until the time comes for making a change, when she should write out another time-table. It is amazing how much time mothers waste, and how much trouble and nervous irritation they give themselves and their babies under the mistaken notion that feeding should take place every two or two and a half hours. The most reliable modern experience and research shows that even during the first month feeding every 4 hours suits most babies, and no normal baby needs feeding more often than 3-hourly.

No “Night-feeding.”

Nothing in the history of modern baby-feeding is more strange than the way in which humanity seems to have jumped to the conclusion that a young infant needs “night-feeding,” without ever pausing to consider whether the procedure is really a natural and proper one—ignoring the fact that darkest night is the appointed period for the most profound rest and the deepest sleep, and that it is not customary for the young of other mammals to be suckled at this time.

The baby should be fed only six times in 24 hours (say at 6 a.m., 9 a.m., 12 noon, 3 p.m., 6 p.m., and 10 p.m.). This ensures an undisturbed night’s rest to the mother, and establishes the baby in its proper rhythm from the start, saving it from the period of irritability, disturbed rest, and slackening of growth incidental to the breaking of a bad habit a few months later.

Recreation, Sleep, Insomnia.

Romanes has said, “RECREATION IS PARTIAL SLEEP, AND SLEEP IS UNIVERSAL RECREATION (RE-CREATION).” Why, then, should the young of man,

whose nervous system is the most complex, delicate, sensitively-balanced, and vulnerable of all created tissues, be denied the perfect fulfilment, at the appointed time, of this most beneficent provision of Nature—especially throughout the early months, when sleep is the predominant feature of normal life?

Why break in on the night's rest? Why import any tendency to insomnia at the start of life? Happy the baby who sleeps all night from the dawn of existence—who never loses this priceless gift, never becomes the victim of insomnia? It would be a great advance if parents could be brought to realise that the harvest of the seeds of insomnia, constipation, disobedience, and other such faulty habits, thoughtlessly sown in infancy, are commonly reaped in adult life.

If the restless irritability and lack of control of an ill-regulated babyhood, leading oftentimes to convulsions, is a common precursor of Hysteria, Epilepsy, and other grave nervous disorders of the adult; if Hysterical and Epileptic convulsions are commonly INFANTILE CONVULSIONS COME BACK, and Imbecility is often not INBORN, but ACQUIRED DURING INFANCY; if our physical, mental, and moral destiny are half-determined in the first year of life (see pages 149-152);—if these things are really so, then, indeed, is the future of the children, for good or evil, in the hands of the mothers.

It is scarcely possible to overestimate the far-reaching benefits which would follow on a general recognition of the principle that there should be fewer day feedings and no night feeding. On the other hand, if the presence of a young baby is regarded as necessitating 10 feedings in the 24 hours, and broken rest for all concerned, parenthood is made to entail much more strain and sacrifice than under the natural and healthful regimen indicated. It cannot be doubted that wrong procedure in this connection has been one important factor in the declining birth-rate.

ILLUSTRATIVE CASE.

This baby ceased to thrive at a month old, suffering successively from severe indigestion, diarrhoea, wasting, and symptoms of severe nervous irritation, which caused the gravest anxiety. He was losing weight rapidly, in spite of every attention lavished on him in an excellent home by keenly anxious and devoted parents. In despair they sent him to the Karitane Baby Hospital, where in six weeks he was restored to good health and condition. On his return home his parents adhered strictly in all respects to the simple hygienic regimen advocated by the Society—especially pure, cool, free-flowing air day and night, the use of humanised milk and fruit juice, proper intervals, perfect regularity of habits, and plenty of exercise and outing.

He weighed, at 11 months, when photographed, 22½ lb., being 2 lb. over the average, and by this time he had cut 10 teeth, none of them having given him the slightest trouble. Now, at 22 months, he is the picture of health, and his parents say that from the time he left the Hospital he has gone straight ahead and never given them a moment's anxiety.

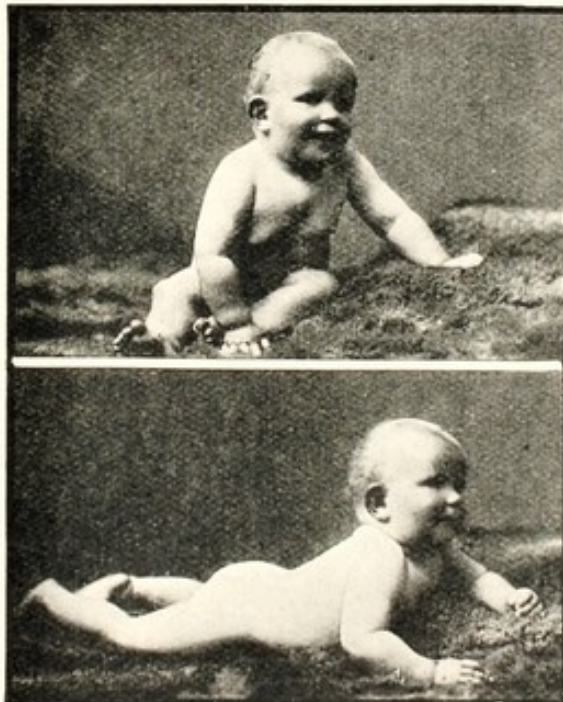


FIG. 11.

Give Baby a Bone.

At six months of age a chicken-bone or chop-bone (from which all but a trace of meat has been removed) may be given to the baby at meal-times, as the munching of this tends to promote a free flow of blood to the developing teeth, which should be rapidly growing and pushing their way up under the gums, see pages 146-149. Fruit juice should also be given, see page 40.

Feeding After Nine Months.

After the ninth month introduce in succession barley-jelly, oat-jelly, cows' milk, tough crusts, crisp toast and bread. Up to at least 15 months, part of the baby's milk should be "humanised," to prevent giving too much proteid. More "solids" should be taken each month. The fluid food needed will vary accordingly—the following being a fair average:—

Month.	Humanised Milk.	New Milk.	Oat-Jelly (or Barley-Jelly).	Number of Feedings.
	Oz.	Oz.	Oz.	
Tenth	35	5	3	5
Eleventh	30	10	5	5
Twelfth	20	15	7	5
Thirteenth	15	15	10	5
Fifteenth	10	15	10	5
Eighteenth	0	20	10	4

The allowances of milk shown in the Table, while rather less than is usually recommended, are rather more than is needed or desirable, if the baby has been thoroughly trained from 6 months onwards to tackle bones and make full use of the growing powers and needs of his mouth, jaws, teeth and salivary glands. The more such work he gets the better. The mother should induce ample mouth exercise by giving more and more crisp dry food (such as dried, crisped or toasted bread, plain unsweetened rusks, etc.) or tough, resistive foods, such as ordinary crusts, etc.

The gradual introduction of raw ripe apple, to be thoroughly chewed and masticated, may be commenced at any time after the baby is a year old.

Throughout the second year the baby should be gradually trained to take more and more of "the things that mother takes," in so far as they are suitable, but he should never be allowed to have anything in the family dietary that would be unsuitable or damaging to a young child. Nothing is worse than mere careless, thoughtless "giving what's going" and spoiling during early life.

N.B.—The common advice is to give $1\frac{1}{2}$ pints of milk up to two years of age. However, it is better for the child's nutrition and growth not to let him depend so much on milk, but to train him to take in succession a sufficiency of other foods, such as crusts, toast, raw apple, oat-cake, etc., which afford healthy stimulation and active work for jaws, teeth, and salivary glands.

To prepare the supply for 24 hours mix the above ingredients in a clean, scalded jug; heat to 155 deg. F., and keep at that temperature for five or ten minutes; cover loosely, cool rapidly in water, and then transfer the jug to a cool outdoor safe. In cold weather this suffices, but if the weather is at all warm it is safer to re-heat and re-cool the residue at the end of 12 hours. Instead of mixing the whole of the day's allowance of oat-jelly with the milk, it is a good plan to spoon-feed with two ounces given plain just before two of the feedings at which no bread is given. Some babies much prefer this little variation.

After nine months gradually introduce so-called solid food into the baby's dietary as part of his meal—not between meals. He may be given a dry crust to munch at, or he may nibble crisp toast. Crust, or properly prepared toast, is easier to digest, and more suitable for babies than the soft “crumb” of bread. Make the toast with bread cut very thin (say $\frac{1}{4}$ inch); place it on edge (not lying flat) in an oven with the door ajar and dry until crisp, but not browned; or the thin bread may be partly dried in the oven and then lightly toasted until crisp and slightly browned. **Bread only one day old makes much better toast than stale bread.**

“**Pulled-bread,**” slowly crisped in the oven, is another excellent food for babies, and indeed for adults. Small “twist loaves” are best for this purpose. The fragments should be kept in an oven with the door ajar until they are dry and crisp right through. This should take about an hour, by which time the upturned white surfaces should have become slightly browned or buffed, but the original crust surfaces should be unchanged in colour—not dark brown or blackened.

The munching of such materials as the above is specially beneficial on account of the exercise it affords to muscles, jaws, teeth, and salivary glands; indeed, it is much better to get the baby into the habit of taking such dry-food as its first introduction to the use of “solids,” rather than to start it with the customary bread and milk or other forms of mush. At nine months a baby will eagerly nibble dry food, especially if he has been habituated for some months previously to munching bones as recommended on page 38. Week by week he can be induced to take more food in this way.

During the tenth and eleventh months baby should be **learning to eat** rather than **eating** dry solid food. Until he is at least a year old the essential food is properly prepared milk, and he really needs nothing else so far as growth and nutrition is concerned. One cannot too strongly enforce this point, because mothers begin stuffing their babies with mush at ten months, instead of patiently training them to eat more suitable food. They do this because of the mistaken notion that infants really need a good deal of “solid” soon after weaning.

If towards the end of the first year the baby is not taking enough in the way of dry food he may be given some bread with a scrape of butter, or his meal may be completed with a little bread-and-milk or toast-and-milk. However, the dry food should be given first, and if he takes enough of this there will be no need for using “mush” at all. Once habituate a baby to “pap feeding” and he will become too lazy to make his jaws work for a living, at least it will be very difficult to break him of the vice. As far as possible healthy life habits should be built into the organism and firmly established in early infancy.

Rusks and Biscuits.

These are not to be recommended for babies. No doubt either could be made suitable, but in view of the uncertainty as to the ingredients, and also seeing that they possess no advantages over bread, and are more expensive, and give little work for the jaws, the use of bread in the form of toast, crust, etc., is advocated in preference. Rusks are almost without exception sweet, and usually made with more or less fat. This accords not only with “Cookery Book” recipes, but also with the meaning attached to the word “rusk” by the public, and assigned to it in dictionaries.

Of course the baby should never be left to take its food alone on account of the risk of choking. Special care should be taken with crusts lest too large a piece should become detached.

Summary of Artificial Feeding from birth to one year.

1. For one or two days—Boiled Water.
2. For one month—Sugar of Milk Solution and Humanised Milk.
3. Second to third or fourth month—Humanised Milk.
4. Third or fourth month to nine months—Humanised Milk or Humanised Milk No. II. with a few ounces of whole milk.
5. Tenth month to twelfth month—Humanised Milk No. II.; Cows' Milk, Barley-Jelly, Oat-Jelly, Crusts, and dry Crisp Toast (made as described at foot of page 38).

Fruit Juice.

In all cases of artificial feeding give a little fresh fruit juice daily to infants from three or four months old onwards, to compensate for the something that may be wanting in any prepared food. Orange juice is best, but the juice of lemons, apples or grapes may be used. Make sure that no part of the fruit is decomposed, prepare the juice immediately before use, and carefully strain so that none of the solid may be included. It is best given about midway between meals, when baby is awake, and should be diluted with twice its volume of water which has been boiled and allowed to cool. If very sour, as in the case of lemon juice, a little ordinary sugar may be added. The use of fruit juice may be begun at any time after the first month, starting with 10 drops daily, increasing at first by a drop or two a day, and later by half a teaspoonful to a teaspoonful or more a month.

At a year old a child may have a small tablespoonful twice a day. It would not be wise to use the juice of very sour fruits, such as lemon, in large quantities or continuously. Where the daily use of fruit juice is not convenient, it may be given once or twice a week with advantage. Where fruit is not obtainable, the juice of raw carrot or potato may be used. They should not be peeled but should be properly cleansed and kept in boiling water for a few seconds before expressing the juice, so as to prevent giving the baby any living germs from the soil. They may be grated and squeezed through muslin or may be cut up and pressed in a lemon-squeezer. The juice should be strained carefully before use and diluted as in the case of fruit juice.



FIG. 12.

ILLUSTRATIVE CASE.

When three months old this child was ailing and going downhill on an expensive patent food. The mother was then shown how to prepare Humanised Milk, and advised as to general hygiene. The boy at once began to thrive. At 2½ years, when the photograph was taken, he weighed 34 lb. At 5 years he weighed 43 lb., being 3 lb. over the average—a sturdy, robust, active boy, with good teeth.

The patent food on which this child had been fed was the same as the mother was using for the baby shown on page 59. In that case the patent food was given up while the baby was still apparently well—before it had had time to do appreciable harm. **How few mothers are sensible enough to give up a wrong food so long as it APPEARS to be agreeing with the child! They go on until the system breaks down.**

ILLUSTRATIVE
CASE.

Baby admitted to Karitane Harris Hospital, aged 3½ months, weight 5 lb. 12 oz.

History received from mother: baby born in Australia, and pronounced by doctor to be then strong and healthy. Fed with condensed milk. Then brought to New Zealand, and at the age of 7 weeks placed in a licensed home, weight then 6 lb. Fed with patent food, arrow-root, biscuits, and cows' milk and water (1 in 3). Loss of weight continued, and looked very miserable. Food changed to full strength Humanised Milk; large curds appeared in motions and baby vomited. (This was a perfectly natural result of going straight on to full strength instead of grading the Humanised Milk, as is always directed by the Society and its nurses.) Food changed again to cows' milk and water.

On admission to Karitane Baby Hospital only boiled water was allowed for 12 hours: then Humanised Milk, graded steadily and cautiously day by day, up to full strength, was given on the lines shown on page 30.

Progress was steady and uninterrupted; the gain in weight being 4 lb. in 2½ months. See illustration and weekly weights recorded on weight chart, page 60.

(A) Photo on admission to Karitane Hospital, age 3½ months, weight 5½ lb.

(B and C) Same child 2½ months later, weight 9½ lb.

On admission, this baby was like an extreme "Indian Famine" case; but worse than a mere starved skeleton, he appeared to be a misshapen, degenerate weed. (Note the hatchet face, weak, narrow, pointed jaw, and the seemingly dislocated ankle.) A high and responsible authority in the Dominion, visiting the hospital some weeks later, expressed the emphatic opinion that as such a being could never become normal, there was no kindness in keeping him alive—that on the contrary, the Society was doing a grave wrong to the community in struggling against the obvious intention of Nature. This was said in spite of warm appreciation of what the Society was doing in general. The matron said confidently that as she had seen plenty of similar babies thrive and become apparently normal, she had no doubts in this case—in fact that he was already on the high road to health. Where are the hatchet face, pointed chin, and dislocated ankle in the lower photographs? In the three months since the last photo was taken, the baby has further increased in weight at just double the average for ordinary healthy babies of his age. He has been making up for lost time, putting on two pounds instead of the average of one pound per month for lost time, putting on two pounds instead of the average of one pound per month from the sixth to the tenth month. He gained over half a pound the week he left the hospital, and is now restored to his parents—a flourishing, normal child.

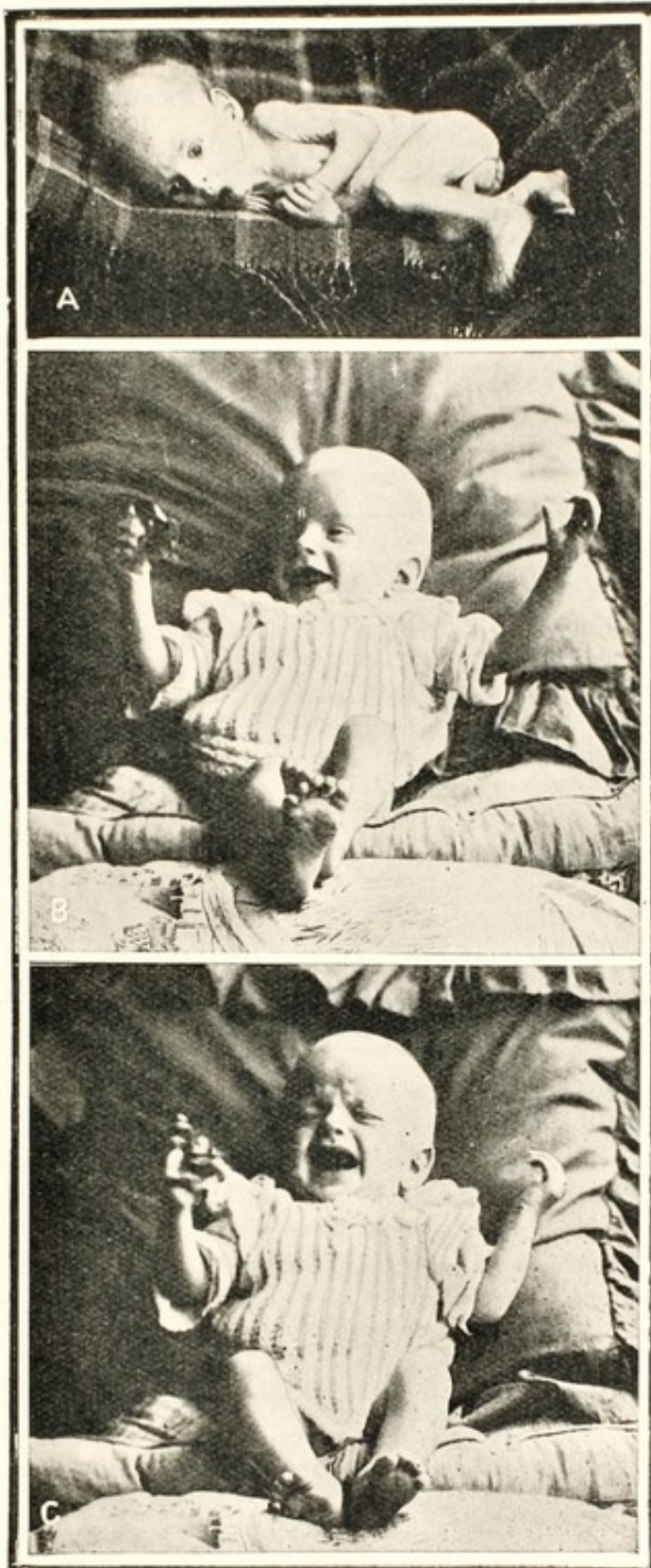


FIG. 13.

How Babies Flourish if given a Fair Chance.

The above illustrative case (Fig. 13) is typical, not exceptional. What strikes every doctor and nurse who visits the Karitane Baby Hospital and studies the records is the remarkable uniformity of the results. From time to time weight-tables have been made out and published, showing how all the babies have fared during a given period. The following is a copy of the weekly weighings of all the babies who had been in the Hospital for a month or more at the date of issue:—

WEIGHT TABLE OF BABIES AT KARITANE BABY HOSPITAL.
Weekly Weighings during Two Months.

Age at start of period.	Oct. 2. lb. oz.	9th. lb. oz.	16th. lb. oz.	23rd. lb. oz.	30th. lb. oz.	Nov. 6. lb. oz.	13th. lb. oz.	20th. lb. oz.	30th. lb. oz.	Dec. 2. lb. oz.
6 months	12.2	12.10	13.0	13.8	13.9	13.14	14.5	out	..	..
6 months	12.8	12.13	13.3	13.11	14.0	14.1	14.7	14.15	15.3	15.7
9½ months	10.1	10.10	11.5	11.10	11.6	11.10	11.14	out	..	..
6 months	10.3	10.15	11.6	11.14	12.6	12.13	13.6	13.8	13.15	14.8
5 months	9.14	10.5	10.12	11.5	11.13	out	..	..	..	..
3¾ months	10.1	10.9	11.2	11.8	11.15	12.7	12.11	13.0	13.6	13.14
4¾ months	6.6	6.8	7.1	7.2	7.7	7.13	7.8	8.2	8.9	8.14
3¾ months	9.0	9.1	8.14	8.9	8.9	8.11	8.15	9.5	9.10	9.13
2 weeks*	4.11	4.14	5.3	5.9	5.15	6.3	6.9	6.13	7.1	7.4
3½ months	..	8.3	8.2	8.5	8.8	8.11	8.15	9.5	9.8	10.0
3 months	..	9.6	9.6	9.10	9.3	9.10	out	..	..	..
4 months	..	..	7.2	7.4	7.4	7.5	7.5	7.11	8.1	8.7

* Two months premature.

The average increase in weight of the above dozen babies works out at slightly under $1\frac{1}{2}$ lb. per month, but if we exclude the eighth baby on the list (who only commenced to gain in the second month) it will be found that the average gain of the rest was just over $1\frac{1}{2}$ lb. per month. It must be remembered that these were "hospital babies," sent in, almost without exception, because they were gravely ill or had been doing very badly. The worst of them naturally kept down the average, because some of the feeblest took several weeks to get rid of their indigestion, diarrhoea, etc., and to get into their "proper stride" as regards nutrition and growth. The three best of the above gained just 2 lb. per month. The average gain of healthy babies at the same age is only $1\frac{1}{4}$ lb. to $1\frac{1}{2}$ lb. per month.

This shows how quickly infants get rid of their troubles and do their best to make up for lost time, when they are given simply pure air, suitable food and clothing, plenty of exercise and outing, due attention and perfect regularity of habits. Indeed, in the few instances where for special reasons babies have been allowed to remain in the Karitane Hospital beyond a couple of months, it has been remarkable how such infants, who had previously been doing badly, continued to put on their $1\frac{1}{2}$ lb. to 2 lb. a month once they had been set on the right track. This rapid growth soon brings them up to or near the normal weight for their age, in spite of previous handicaps.

The following extracts from a paper by Dr. Ernest Williams give an account of the work done at the Home during the year 1908:

Report by Dr. Ernest Williams.

Since I was appointed to attend the Karitane Hospital in January 1908, we have admitted about 100 babies. Of these, four died—all within a week of admission, and they were fatally ill when they came to the Hospital. The great majority of babies were admitted for more or less grave malnutrition, representing all stages of digestive derangement and emaciation. Some were acutely ill, and some had rickets, etc.

I have calculated the average gain per week per baby for the last sixty-two cases admitted to the Hospital, and find that it is about 1½ lb. per calendar month. . . . It must be remembered that the average I have stated is over a number of babies, the large majority of whom came in suffering from different forms of indigestion, diarrhoea, and malnutrition, or required weaning. Such cases frequently remain at a standstill so far as weight is concerned for a week or more. Another point that must be allowed for is that we cannot keep babies in the Hospital for a long period on account of the demand for admission for really ill babies. We therefore endeavour to discharge them just as soon as they are on the rails, as it were; that is to say, when they have lost their indigestion and are beginning to gain weight on Humanised Milk. They are then in a fit state to be attended to in their own homes, when, with reasonable care, they put on weight rapidly.

Reviewing the year's work, I am satisfied that dealing as we have had to do with large numbers of weaklings suffering from a wide range of disabilities, **such uniformly good results as we have attained could not have been arrived at by any other means than percentage feeding. . . . If Humanised Milk is so satisfactory for babies who are ill, how much more so must it be for normal infants!** And it is a fact that it is so. Most starchy or malted foods are known to produce large babies, but they are as a rule pale, flabby, and over-fat, whereas those fed on modified milk tend to conform rather to what one is accustomed to in breast-fed babies, being firm, bright, and, what is very noticeable, having a clear skin and fresh complexion; in fact, they do not appreciably fall short of those fed by the natural method. And while one is strongly opposed on all grounds to artificial feeding, one must admit that when the food is physiologically adjusted the nutrition of bottle-fed babies can be satisfactorily carried out. We physicians do not look upon large, flabby, fat people as good subjects for life insurance, nor as able to withstand illness with much success; why, therefore, should mothers be encouraged to rear their babies to look like prize stock that are fattened on oil cake, as if the only object was to ensure the distinction at a baby show, which they not infrequently achieve. We all know the poor fight such babies make against disease. The mere excess of fat and deficiency of muscle is, of course, one of the least harmful results. The almost universal use of patent foods has come to be recognised as a prime factor in the indigestion, malnutrition, rickets, etc., which may show themselves in spite of otherwise ideal hygienic surroundings.

At the Karitane Hospital a very important feature is, of course, the **abundance of fresh air and sunshine**, and the nursing and attention which the infants receive. With regard to the diet, it must be remembered that we are dealing with sick babies, suffering from various disorders requiring correction before progress can be made, while with ordinary healthy babies there is practically never any difficulty in feeding them with modified milk. . . . **One special feature of percentage feeding is the ease and safety with which weaning can be carried out by prescribing a suitable grade of Humanised Milk, and gradually lessening the number of breast-feeds and increasing those of modified milk.**

The above was regarded as a unique hospital record when Dr. Williams read his paper, but later results have been even more satisfactory. This we attribute to the more complete observance of the simple hygienic measures advocated in this book, especially to the thorough carrying out of certain practices initiated or extended during the past three or four years, viz.:—

1. **Lengthening of the intervals between feedings to 3 or 4 hours, and no "night-feeding."**
2. **Insistence on holding baby's bottle throughout feeding.**
3. **More systematic "mothering" (individual, personal attention and handling), and ensuring ample exercise, by placing the babies in "kicking pens" for set periods daily.**
4. **Proper system in bed-making, described on page 85.**

What has been achieved by the Society on a relatively small scale at the Karitane Hospital is reflected enormously magnified in the district work. The reports of the Plunket nurses on thousands of infants reared under their care show that, with proper attention to the simple needs of baby life, there should be very few deaths indeed, and very little sickness or debility among nurslings. Seeing that this is so with the typical babies for whom the aid of the Plunket nurse is most often invoked—babies enfeebled and wasted through improper feeding—it is clear that disease would rarely arise in babyhood if mothers had proper guidance from the start instead of seeking it in desperation when they have brought their infants to the verge of death. In general, **babies don't die—they are killed.**

Feeding in Second Year.

Mastication.

Tooth-brush and mouth-washes are quite inadequate to prevent the ruinous results of the dietetic system forced on children. Hardly has a child cut its temporary teeth before it is RESTRICTED to soft fermentable foods, which stultify the natural self-cleansing processes of the mouth. Young children are almost entirely limited to milk, bread soaked in milk, milk puddings, and porridge (all fermentable foods, which are non-detergent in their effects), and by the time these children have their temporary dentition complete (say at two and a half years), the teeth are so tender from lack of use, they naturally refuse to nibble even a crust.

J. SIM WALLACE, M.D., D.Sc., L.D.S.

Extract from address at Annual Congress British Dental Association, 1909.

Infants may grind their teeth when not provided with anything to chew. This inclination to use the jaws is perfectly natural, and should be encouraged [e.g. by chicken bone or tough crust given at meal times. This promotes proper growth of teeth and jaws.] The "comforter" tends to deform the palate and interfere with normal development of the teeth. The earlier the habit of Mastication is formed the more enduring will it be. It promotes development of jaws, teeth [tongue], roof of mouth, and nasal cavities, thus tending to prevent growth of ADENOIDS: it divides the food finely and thus assists digestion; it prevents rapid feeding or bolting of food; it promotes good digestion through psychical influences associated with taste and smell.

ERIC PRITCHARD, M.A., M.D.

Condensed extract from *Physiological Feeding of Infants*, London, 1909

The special feature of the second year of normal life, as contrasted with the first year, is the progressive development of the power of mastication. This is a matter of the utmost importance, because upon it depends the future digestive power, health and strength of the individual. Fortunate indeed is the baby who during the first year of existence obtains his food by energetic suction (from the breast, if possible, and failing this, by means of a properly held bottle with a small-holed nipple), and who, towards the close of the first year and throughout the second year, is made to do a proper amount of work on his food by active, vigorous munching and chewing. These are the simple means by which we can aid the intention of Nature to provide the growing child with a masticatory apparatus which shall not prematurely atrophy and decay, but shall last sound and good to the end of life. The amount of blood supplied to the jaws and adjacent parts depends on the daily amount of work they are called on to do. Embedded deep under the gums at the time of birth are the two embryo sets of teeth (the temporary and the permanent), and their structure, growth, proper setting and eruption depend on the supply of an abundant stream of rich, healthy blood throughout the period of most active growth. One might say: "Take care of the first two years, and the rest will take care of themselves." This is true not only of structure, but of function also. Proper feeding habits practised throughout the first two years will tend to last for life. Dr. Harry Campbell says:—"Those who are accustomed to bolt their food often swallow large lumps totally unmasticated, but (as Van Someren has pointed out) once the habit of efficient mastication has been acquired, the swallowing of such masses is effectually prevented by a pharyngeal reflex (*i.e.* the instinct becomes so strong

that a large unchewed lump cannot be swallowed). It is therefore of the utmost importance that children should learn to masticate thoroughly as soon as they have the teeth to do it."

The advantages of chewing some more or less dry, hard or tough food are threefold, viz. :—

1. Salivary glands are stimulated to grow and secrete actively; indeed, this applies more or less to all the digestive organs.
2. Normal formation, growth and development of teeth, jaws and the muscles concerned in mastication are promoted.
3. The increased blood supply to adjacent areas, especially to throat, nose, and pharynx, tend to properly nourish and tone up these parts, and thus to prevent colds, sore throats, swollen tonsils, adenoids, bronchitis, consumption, etc.

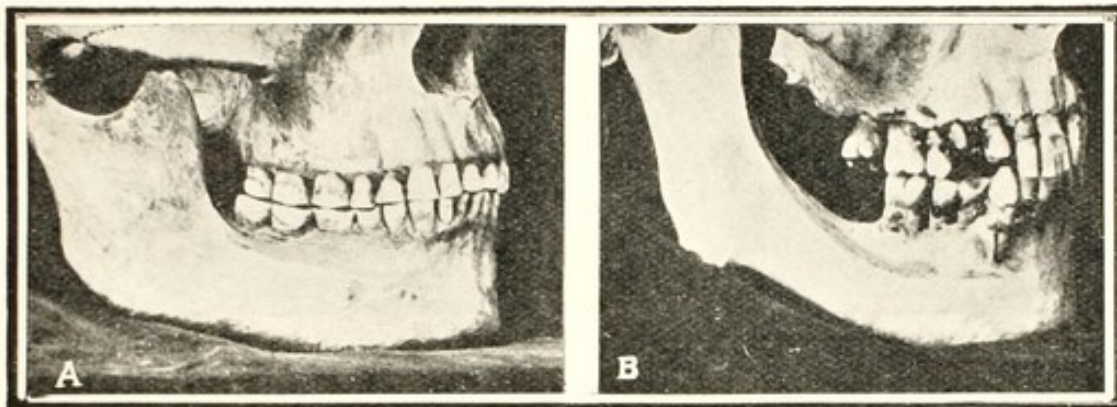


FIG. 14.

(A) **Jaws of Elderly Maori.** Note massive jaws and well-worn, perfect teeth.

(B) **Degenerate European Jaws.** Note feeble jaw and long, unworn, decayed teeth.

To us white intruders the above contrast ought to appeal as "**the writing on the wall.**" No race or family can remain great, or even perpetuate itself, if it fails to properly develop and give exercise to jaws and teeth. The whole organism, and every function of body and mind, is ultimately dependent not only on what the mouth delivers to the stomach, but on the complete grinding and mixing with saliva of every morsel of food before it is swallowed.

We Europeans have become content to merely chop our food, by moving the jaws up and down, hence the crowns are not worn—the teeth do no really hard work—they do no grinding. Our predecessor, the old-time Maori, on the other hand, chewed and ground tough fern-root between his molars, as millstones grind corn, until his jaws were tired with the healthy exertion—an excellent check on over-eating. He reaped the reward of honest work; he developed perfect jaws and teeth, which turn us almost green with envy as we see them in museums, side by side with the jaws of our own race—the jaws of physical idleness. Look at the above illustration, count the thirty-two well-worn teeth, perfect in advanced age, without a speck or sign of decay, set in their perfectly arched jaws, and contrast these with the feeble remains of teeth which jostle one another in the shrunken jaw of the degenerate European. This contrast does not represent inevitable destiny, so far as concerns our children that are to be. The choice and decision lie with ourselves. Nature is kinder than we are. Starting with the unborn babe—making the mother healthy and letting her understand how and why it is that the jaws and teeth of our own race have been failing to grow properly—starting with this simple knowledge, parents, prepared to do justice to their children, need have no anxiety that Nature will fail them. "Accuse not Nature; she will do her part, do thou but thine."

By adopting our vices—corsets, heavy constricting clothing, tight boots, living indoors, lack of daily exercise, irregular habits, the use of alcohol, soft foods for themselves and bottle-feeding for their babies, many Maori mothers of the present generation have already brought the jaws and teeth of their progeny nearly down to the level of those of the average European (see recent reports of Dentists as to the prevalence of decay among the rising generation of Maoris).

Describing the Maori and his food half a century ago, Colenso wrote:—"Teeth beautifully regular and white. . . . The common fern-root was generally used as food. It had to be repeatedly beaten with a small club—its use was tiresome both to the eater and the beater, to the master and the slave."

Our children need not eat fern-root, but they must be trained and habituated to feed from birth onwards in such a way and on such foods as will ensure thorough exercise and proper development of the mouth, jaws, and teeth. Self-interest and patriotism both lie this way.

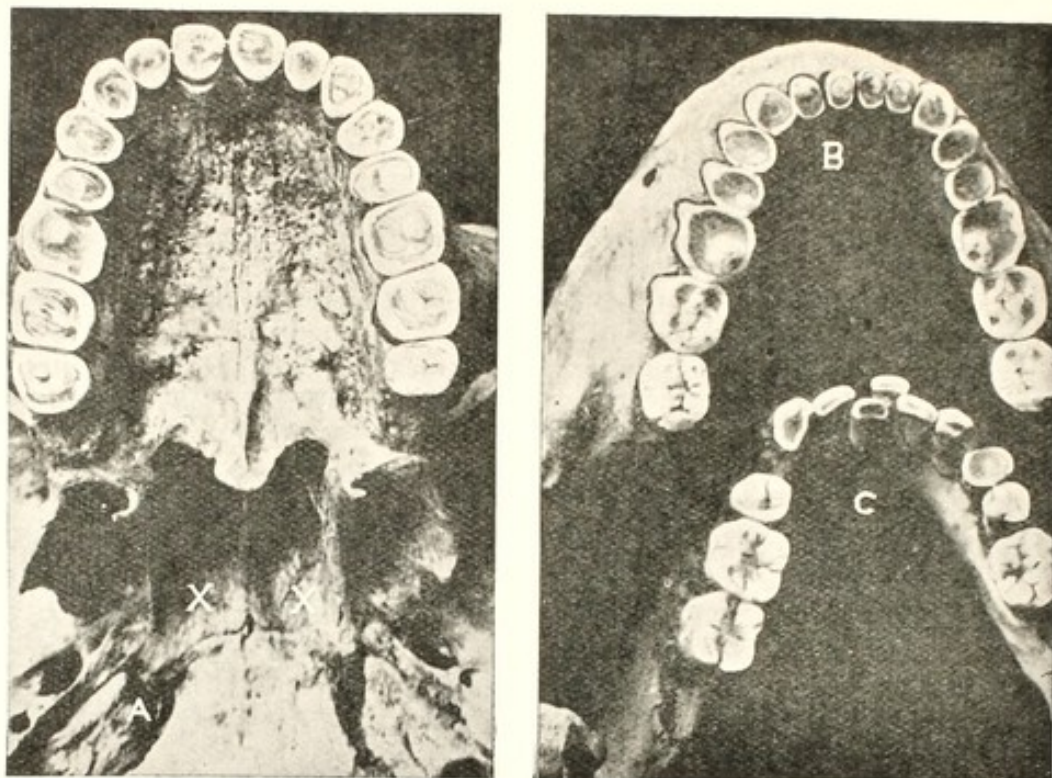


FIG. 15.

- (A) **Upper Jaw of Aged Maori** White crosses show where adenoids arise in Europeans.
 (B) **Lower Jaw of Aged Maori.**
 (C) **Degenerate European Lower Jaw.** Note narrow shrunken arch and crowded feeble teeth. Three out of six molars entirely gone.

Dangers of Second Year.

Death exacts a heavy toll among infants during the second year of life, the main cause being ignorant and careless feeding. Indeed, carelessness reaches its climax the second year.

For the earlier part of the first 12 months most mothers can show at least some pretence of method and system, though the system is almost invariably wrong. Thus, when feeding artificially, women measure out so many teaspoonfuls or eggcupfuls, etc., of milk, cane sugar and water in accordance with some recipe in common use, and if the baby is strong and resistive it may come through the ordeal fairly well. During the second year, on the other hand, the mother commonly abandons all pretence of care and system, and delivers her offspring over to the special torture known as

"TAKING WHAT'S GOING."

Most babies do come through this ordeal alive, but not one escapes unharmed. The internal organs have not reached a stage enabling them to cope properly with many articles of food which may be suitable enough for men and women; much less can the baby be expected to withstand the injurious effects of the indigestible dishes commonly favoured by adults for the stimulation of their own jaded appetites. To any one who realises the harm done by "giving the baby what's going," there is something peculiarly aggravating in witnessing the positive pride with which parents regard the fact that the baby has reached a stage at which it can stow away almost anything that they take

themselves. Our babies are fed on fried potatoes, made dishes, scraps and sweets at an age when the babies of Japan are still at their mothers' breasts. Between two extremes, what is the reasonable course to pursue?

Essentials in Second Year.

1. Milk continues to be an important component of the baby's food throughout the second year, but the daily allowance should gradually diminish (see Table, page 38) as the child takes more and more solid food—especially food such as crusts, dry crisp toast (see footnote, page 38), raw ripe apple, etc., which necessitate proper work and exercise for tongue, jaws, teeth, salivary glands, etc.

2. Fruit and vegetables should be given, but proper care should be exercised in selection and preparation. During the first year, as we have seen, it is generally safest to give only the juice of sound ripe fruit, such as oranges, but later the baby may have baked apple pulp, grape pulp, etc. Potato and gravy or broth may come to form part of the midday meal, but only a small part; select a piece of floury old potato, and remove any excess of fat from the gravy.

3. Meat is not a necessity during the second year of life, but chicken or mutton bones should be given for the baby to gnaw at, any time from the sixth month onwards. This helps to develop teeth, jaws and the muscles which serve them. By fifteenth month a little chicken, light fish, or under-done beef or mutton may be given occasionally. Then the baby should be gradually and cautiously trained to suck and bruise off and masticate some raw ripe apple (see "Apple Rule," page 143). When the baby is 18 months old, two or three eggs may be given in the course of the week, if they agree. Between 18 months and 2 years baby may be trained to thoroughly masticate plain oat-cake, etc. The mother has to use her intelligence in feeling her way step by step. No hard and fast rules can be given.

During the earlier half of the second year five meals at four-hour intervals may be given, but four meals may suit better after 15 months. The bottle should be dispensed with, and the food should be taken from a spoon first and then from a cup. If the bottle is not taken from a child early, it may be extremely difficult to break it off the bottle habit.

Four meals a day will generally suffice after 18 months, but many children of that age thrive perfectly well with only three meals a day. A safe average standard is to give four meals a day from 18 months to two years of age, and then to reduce to three meals.

The following remarks by a prominent professor of children's diseases in an American University are worth quoting:

"During the second year of life as much care is required as during the first. The fear of the second summer would largely be overcome if the child were not allowed to eat food unsuited to its digestion. Most of the illnesses and many of the deaths throughout childhood are traceable to improper diet."

The following lists sum up what actual practical experience, extending over a wide range of cases in various parts of the world, has shown to give the best results. The information is based on conclusions arrived at by the leading authorities in America, the Old World, and our Colonies.

Year to Fifteen Months.

(Refer to Feeding Table on page 38.)

First Meal (6 to 7 a.m.).

Give on waking about 8 ounces of prepared milk, composed of equal parts of new milk and Humanised Milk No. II. A pint and a half or more of this mixture may be made up every day to last the 24 hours, and should be heated to 155 deg. F., then cooled rapidly and kept cool. Note that it is preferable to give 2 ounces of cereal jelly with this meal, and to correspondingly reduce the milk, but this is sometimes regarded as inconvenient in summer, because exposed gruel does not keep well in warm weather, and the mother prefers to make after breakfast what she needs for the day. However, jelly will keep quite safely through a summer's night if the remainder of what has been made in the morning is brought to the boil in the evening, then covered, cooled rapidly in water, and kept in a cool safe as directed for milk. Barley-jelly is the most readily digested, and is therefore to be preferred where there is a distinct tendency to digestive disturbances. On the other hand, oat-jelly is rather more nutritious, and is preferable where there is any tendency to constipation. If there is any tendency to diarrhoea, rice-jelly is better than either barley- or oat-jelly.

If the baby has been properly taught to nibble and chew (as every normal baby should be for a month or so before the first birthday), he may be given some bread-crust or crisp dry toast at each meal.

Second Meal (10 to 11 a.m.).

Dry crust or toast. Prepared milk, 6 ounces to 7 ounces; barley- or oat-jelly, 2 ounces.

Third Meal (1.30 to 2.30 p.m.).

As development advances the baby should be encouraged to take crust (dry or preferably with a little butter), crisp toast, or bread in gradually increasing quantity. **This dry food should be given at the beginning of the meal, before the infant's appetite has been partially satisfied with liquid or pap-food (see "Mastication," page 44).** Then give five or six ounces of broth (made from chicken, mutton, or beef) thickened with a little well-boiled ground rice or semolina, and four or five ounces of the prepared milk with or without jelly. A part or the whole of the milk may be mixed with the broth. Instead of giving the rice or semolina in the broth it may be given in the form of well-cooked milk pudding.

A small quantity of baked apple (begin with a level teaspoonful) very slightly sweetened and with the addition of a little cream may be given occasionally at this meal.

Fourth Meal (5 to 6 p.m.) and Fifth Meal (9 to 10 p.m.).

Same as second meal.

One or two tablespoonfuls of strained fresh orange juice should be given an hour before the second meal. This promotes nutrition, and tends to regulate the bowels. It should be omitted if at any time there is a tendency to undue looseness.

Professor Holt puts the question, "**Cannot most children take plain milk before they are 15 months old?**" and he gives his opinion as follows: "Many can, but many cannot, or at least they do much better when the milk is modified." In the writer's opinion, it is often wiser to continue the use of some Humanised Milk No. II. up to 18 months.

To sum up, the average fluid food needed for the period of between a year and 15 months will be :

Humanised Milk No. II	$\frac{1}{2}$ pint
New Milk	$\frac{3}{4}$ "
Cereal Jelly	$\frac{1}{2}$ "

Give less than a breakfast cupful of this mixture for the first, second, fourth and fifth meals, and about a quarter of a pint at the third meal. The tendency of mothers is to overfeed. So long as the baby is growing well, so long as it is increasing in weight about half a pound a month at this time there need be no anxiety.

Oatmeal jelly should be regarded as the fundamental standard gruel for ordinary babies, but in all cases variety is beneficial, and occasionally it would be well to make the jelly with barley or rice.

The midday meal lends itself specially well to the introduction of the variations previously described.

Orange juice or baked apple should be given unless there is some special reason to the contrary.

No Scraps between Meals.

If the baby is thirsty between meals it can be given a drink of plain boiled water. On no account allow it to have food of any kind, whether fluid or solid, between meals; and specially forbid the giving of cake, biscuits or any sort of sweets. Professor Rotch, of Harvard, says: "The infant should never be given cake or candy even to taste."

Exercise for Jaws, Teeth, and Glands.

N.B.—The larger the proportion of dry, hard, or tough food a baby can be induced to masticate in his second year and onwards the better. If he takes an abundance of solid food, less milk and more water than we have specified as the average requirement will be needed. Never stuff a child with all he can be made to drink or swallow, but stop short of complete satiety at each meal. By pressing a child with liquid, mushy, or specially tempting food, it is easy to induce him to take more than is good for him. In her anxiety to increase her child's strength or make him grow more quickly, the mother often irritates the digestive organs and thus causes enfeeblement and stunting.

Fifteen to Eighteen Months.

Similar to previous period, except that more toast, bread, etc., may be given. The second meal may consist of one or two tablespoonfuls of porridge made from oatmeal (or other cereals). The porridge should be made with a pinch of salt, and may be cooked for three or four hours. It should be strained at first (see Oat-Jelly, page 27) and given along with from six to eight ounces of milk, and about a tablespoonful of thin cream or a dessertspoonful of thick cream. Don't add sugar.

During this period of babyhood some variation of food every day or so becomes more distinctly appreciated and beneficial. At the third meal the baby may now receive sometimes some boiled rice (cooked for three hours) or a little light fish, chicken, or underdone beef or mutton, or half a soft-boiled egg with bread-crumbs, or a level tablespoonful of boiled floury potato with gravy. As a change from baked apple the pulp of well-boiled prunes, from which all skin has been excluded, may be allowed. **Further, baby may now be trained, very gradually, to the daily use of some raw, ripe apple (see "Apple Rule," page 143). If egg**

is used, it should not be really boiled, but put into a saucepan of boiling water, which should then be drawn aside, so that the egg may cook for six minutes at a temperature just below boiling-point; it then becomes soft and creamy throughout. Eggs often disagree with babies, and it is better not to give as much as a whole one until the age of 18 months or two years is reached.

After Eighteen Months.

After 18 months four meals a day should suffice. Whatever the frequency, perfect regularity of meal-times should be strictly adhered to. Nothing acts more prejudicially on digestion, nutrition, and growth than irregularity of intervals and the giving of food between meals. It is hard to persuade the mother that once the milk-and-gruel stage is passed a considerable time (from three to five hours) is needed for gastric digestion, and that if any additional food is introduced before the proper time has elapsed the digestive processes become disturbed. If a child is led to expect scraps ("pieces") between meals it will, of course, look for them, and be fretful if they are withheld, but if properly trained it will be perfectly contented with three or four meals from 18 months onwards.

Feeding Older Children.

Meals should be simple and regular, with no "pieces" in between. After two years a child does best if given only three meals a day. **MUCH SOFT, MUSHY FOOD SHOULD NOT BE USED.** Pap food for young and old is the most universal dietetic curse of the present day. Continue to encourage the eating of dry food, such as crisp toast; tough food, such as crusts of bread; and firm, solid food, such as raw, ripe apples. Continue to give bones to gnaw, and make the child eat slowly, and chew his food thoroughly. If a child has been properly trained in this way, oat-cake, nuts, etc., may be eaten with benefit when he is about two years old. Without proper preliminary training, such foods will be bolted, and indigestion may be expected. A small allowance of plain oat-cake, made with little or no fat and well-chewed, is more healthful than a plateful of porridge bolted without effort; the same principle applies to the use of raw as well as cooked fruits, but parents must make sure that their children do really masticate thoroughly. Nuts are indigestible only when swallowed unmasticated. If properly chewed, they are converted in the mouth into a highly nutritious cream, and the child derives great benefit from the hard work done by jaws and teeth. Slops, such as beef-tea, are almost valueless as food, and do not strengthen or stimulate the system, as mothers foolishly suppose. There is more food—more nutrient material—in an ounce of oat-cake than in a quart of beef-tea; and there is still more in an ounce of nuts.

It is difficult to give precise dietaries for children over two years of age, because individual needs are affected by so many circumstances, and available foods vary so much with locality and social position. However, if no drinking is allowed until the end of the meal; if the food given is plain, good, and not unduly sweetened; and if a large proportion is dry or tough, there is not much risk of a child over-eating, provided that no "pieces" are allowed between meals. Properly speaking, when he has had enough a child's jaws ought to be tired, his flow of saliva ought to be running short, and his appetite failing. None of these

things may take place to guide the capricious, enfeebled child whose food is merely soft and mushy. He may take double as much as he needs without being satisfied, or he may feel satisfied with what does not contain enough nutriment.

Fluids are best taken at the end of and not during meals. Good fresh fruit may be taken freely at meals. Sweets and cakes should be avoided as far as possible, and never given just before going to bed. Always brush the teeth (using a soft brush) and rinse the mouth at bedtime.

Giving Sweets, etc.

The sin of giving sweets to infants is one concerning which it is difficult to speak too strongly. The following clear statement, adapted from Professor Rotch, should be taken to heart:—

The infant should never be given cake or candy even to taste. It is necessary to state this very decidedly, because it is an erroneous view, which is held by most mothers, that it can do no harm to give occasionally to an infant in its second year of life, or to a young child, a little candy or a little cake. This may be true so far as the immediate effect these articles may have on the digestion is concerned, but it is of far more importance that the infant should not have its taste perverted from those articles of diet which are best for its nutrition. These new articles appeal more strongly to its sense of taste, and allow it to know that there is something which tastes more agreeable than the food which it is accustomed to have. When an infant has acquired a taste for cake or candy it will cease to enjoy the food by which its development will be best perfected. It is, in fact, kinder to the infant never to allow it to taste cake or candy. When these articles are withheld it will continue to have a healthy appetite and taste for necessary and proper articles of food.

There are not many fruits which should be given to the infant in its second year. A baked apple may be given at the morning meal when the infant is 14 to 15 months old; or, for variety, the apple can be made into a simple sauce, never, however, having the sauce made with much sugar. Orange juice is excellent, especially if the infant is inclined to be constipated. Most other fruits should be avoided, as they are not necessary for the infant's nutrition, and at times produce serious trouble.

[MEMO.—We hold that Dr. Rotch does not sufficiently recognise the importance of the juice of uncooked fruits. The juice of almost any sound ripe fruit will do, *e.g.* oranges, apples, grapes, etc. Further, when a baby approaches 18 months, we may commence training him to take some perfectly ripe, raw apple daily (see "Apple Rule," page 143).]

If the infant is constipated some whole-meal bread may be given in place of white bread, but constipation is better overcome by the use of more fruit and vegetables, plenty of fresh air and exercise, training to regular habits as to motions, etc. New bread should never be given. Remember that throughout the first few years of life good new milk should continue to be a main food of the child, the standard allowance being about a pint a day.

However, a healthy child would probably do even better, if allowed less milk from the end of the second year, provided he had been well-trained and used to masticate dry solid food such as would fully exercise and develop his jaws, teeth, and digestive organs; and given also plenty of outdoor exercise. (Refer back to "Feeding Older Children," page 50.)

Articles Forbidden.

The following articles of food are improper for a healthy child under four years of age in all circumstances. Nearly all of them should be prohibited in the case of children under seven years:—

- Of Meats.**—Ham, sausage, pork in all forms, salt fish, corned beef, goose, duck, game, kidney, liver and bacon, meat stews, fried meat, and dressings from roasted meats.
- Of Vegetables.**—Those especially objectionable are raw cucumbers. Nearly as bad are raw onions, and potatoes fried or baked with meat.
- Of Bread and Cake.**—All new bread, or rolls, hot-buttered toast or scones, rich cakes, particularly those which are fatty, and those heavily iced.
- Of Desserts.**—All sweets and dried fruits; tarts, and pastry of every description.
- Of Drinks.**—Tea, coffee, wine, beer, soda-water, and cider.
- Of Fruits.**—All stale fruits, particularly in cities and during the summer. With most fruits it is unripeness, unsoundness, excess in quantity, or the fact of being swallowed without proper chewing, that makes them injurious.

General Rules for Feeding.

Learning to eat proper things in a proper way forms a large part of a child's early education. If careful training in these matters is begun at the outset and continued, the results will well repay the time and effort required. A child who has been trained to eat properly can usually be trained to do anything else that is important.

Whether the child feeds himself, or is fed by the nurse, the following rules should be observed:—

1. Food at regular hours only; nothing between meals.
2. Plenty of time should be taken. On no account should the child bolt his food.
3. The child must be taught to chew his food (see "**Mastication**," p. 44).
4. Children should not be continually urged to eat if they are disinclined to do so at their regular hours of feeding, or if the appetite is habitually poor, and under no circumstances should a child be forced to eat. (N.B.—The tendency is to "stuff" children. They are nearly always overfed. They would be much healthier if feeding were stopped before satiety is reached.)
5. Indigestible food should never be given to tempt the appetite when the ordinary simple food is refused. Food should not be allowed between meals because it is refused at meal-time (or on any other grounds).
6. One serious objection to allowing young children highly seasoned food—entrees, jellies, pastry, sweets, etc.—even in such small amounts as not to upset the digestion, is that children thus indulged soon lose appetite for the simple food which previously was taken with relish.
7. If there is any important article of a simple diet, such as milk, meat, cereals, or vegetables, which a child habitually refuses, this should always be given first at the meal and other food withheld until it is disposed of. Children so readily form habits of eating only certain things and refusing others that such an inclination should be checked early.
8. If an infant refuses its food altogether, or takes less than usual, the food should be examined to see if this is right. Then the mouth should be inspected to see if it is sore. If neither of these things is the cause, the food should be taken away and not offered again until the next feeding time comes.
9. In any acute illness food should be temporarily withdrawn or much reduced in strength and quantity. If there is fever, no solid food should be given. If the child is already upon a milk diet, this should be diluted.
10. In very hot weather the same rules hold—to give less food, particularly less solid food, and more water.

Training Habits.

We cannot agree with Professor Holt's view that all children of necessity masticate their food very imperfectly. Every child ought to be taught to masticate well. Certainly modern children tend to chew imperfectly and to bolt their food, but this is because we suppress the natural tendency of babies to eat hard, dry, or tough solids—we give them "mush" instead. If one thwarts an instinct or refuses to gratify it at the time when it first manifests itself, the tendency of such instinct is to die out, and all effort to resuscitate

it later on may be of little avail. Thus it is with **mastication**. We let the golden opportunity slip by when the baby wants something hard to bite, and we try in vain afterwards to make him take time and masticate his food properly. Children can be taught to masticate at a very early age by giving them materials which need to be chewed, as their first solid food; this habit once ingrained will continue and increase in strength if tactfully fostered by the precept and example of parents. The training of the senses and the creation and building up of healthful habits at the dawn of life, until they become as dominant and compulsive as the **instincts** of the lower animals, are among the most important and interesting duties of the rearing of children. Thus a very young child who has been habituated to appreciate pleasant smells and to dislike and shun foul ones, to appreciate pure, fresh air and to shun foul air, will open a window as if by instinct when placed in a close, stuffy room. Similarly a child trained to remove or reject hard, unsuitable objects from food, such as the seeds of oranges or grapes, will soon come to do so as if by instinct and will not swallow fish-bones if they enter the mouth. If instead of always taking away the seeds it is pointed out from time to time that there is a pip in a particular spoonful of orange-juice, which must be removed from the mouth, the sense of appreciation in this direction will be trained and developed through the sense of sight and the intelligence, and the muscles involved in the act of rejection will be trained also. On the other hand, if the parents do everything themselves to safeguard the child and do not train its own senses and muscles to safeguard itself, there will be no proper automatic or reflex protective development. A child towards the end of the second year can easily be trained to thoroughly masticate raw apple and to eat it slowly, just as it can be trained to gnaw a bone and to chew what it succeeds in tearing or biting off. The effects of such exercise on the jaws, teeth, muscles, etc., are obvious, but there is an equally important effect on the development of primitive intelligence, confidence, and self-dependence.

The fostering of sound, regular, hygienic organic habits and self-reliance at the earliest possible age not only establishes such habits for life, and promotes the growth of the parts immediately concerned, as well as the health of the body generally, but will also manifest its influence on higher planes. Tendencies trained early into the very tissue and structure of the simpler and more primitive vital organs will assert themselves later on in assisting the development and functioning of the most complex and peculiarly human parts of the organism upon which character, control, and conduct to a large extent depend.

Beef-Tea.

Beef-tea contains very little nutriment. There is as much food in a small wineglassful of milk as in a whole pint of beef-tea derived from three-quarters of a pound of the best beef. Beef-tea can be made nourishing by the addition of food-stuffs such as milk, cream, or cereals, but it is a mistake to soak or soften everything, as this deprives the jaws and teeth of natural and necessary work and stimulation.

Barley-Water.

Barley-water contains virtually no nutriment—it is merely water with a trace of starch. “Feeding” on barley-water means feeding on water, and diluting with barley-water means diluting with water. In either case the mother is inclined to attribute to the use of barley what is really due to temporarily withholding “food,” or giving it very weak indeed.

Fuel Values.

Table showing the number of ounces of sugar, fat, and proteid in 100 ounces (five pints) of various fluids commonly given to babies, and showing the fuel value per pint of each.

	Sugar or Starch. Per cent.	Fat. Per cent.	Proteid. Per cent.	"Caloric" or Fuel Value. Per pint.
Water . . . . .	...	...	...	...
Pure Liebig's Extract . . . . .	...	...	...	...
Barley-water	$\frac{3}{4}$	...	...	18
Beef-tea or clear soup . . . . .	...	...	$1\frac{1}{2}$	35
Sugar of milk solution, made by adding an ounce of sugar of milk to a pint of boiling water	5	...	...	116
Condensed milk and water, ordinary strength for babies as recommended on the tin— <i>i.e.</i> 1 to 14 of water	4	$\frac{1}{2}$	$\frac{3}{4}$	137
Skim-milk whey	5	...	1	140
Cows' milk and water (equal parts)	$2\frac{1}{2}$	$1\frac{3}{4}$	2	202
Cows' milk and barley water (equal parts)	3	$1\frac{3}{4}$	2	213
New-milk whey	5	$1\frac{1}{2}$	1	220
Human or humanised milk	7	4	$1\frac{1}{2}$	410

The "**Fuel Values**" shown in the table are not quite the same as "food values," because a **normal baby food** must have the three constituents (sugar, fat, and proteid) in the proportions found in human milk. Hence we cannot truly **feed** a baby on sugar of milk solution alone. Whey contains sugar, fat, and proteid, but the fat is markedly deficient except for use under special circumstances, and then only quite temporarily. However, making this allowance, the table is an excellent guide to the relative values of various food materials.

The last column ("Caloric") shows that barley-water has practically no food value, and beef tea very little; while a perfectly clear liquid, made by adding an ounce of sugar of milk to a pint of water, is seen to be worth 116 units, or seven times the working value of barley-water, and four times that of beef-tea. No one looking at the gelatinous, "milky" barley-water, or at dark-brown beef-tea, would dream for a moment that either had so little "stuff" in it compared with the clear sugar of milk solution.

Further, the last column shows that if a given quantity of barley-water (say 20 gallons) were worth 18d., the same quantity of sugar of milk solution would be worth 116d. as fuel for the baby.

Note also that milk and water is practically equivalent to milk and barley-water.

It is amazing to reflect that while leading farmers are now making use of "percentage feeding," and are consulting tables showing the "**Fuel Values**" of the various farm products out of which to compose rations for the rearing of their pigs and cattle, such care is rarely dreamt of in the rearing of man himself—yet no creature suffers so much as the baby from our ignoring the ascertained "**Laws of Feeding and Nutrition**," and no creature benefits more obviously when the dictates of Nature and Science are conformed to, and method and precision take the place of foolish muddling.

Humanised Milk.

Finally, the table shows human or humanised milk, with a "fuel value" of 410 units—nature's standard—the ideal strength for baby food. In mothers' milk not only is the STRENGTH right, but the NATURE OF EACH CONSTITUENT is right, so that each organ and function of the baby finds what it needs for perfect growth, development and working. By giving the baby enough barley-water (a bucketful a day would be needed), or enough beef tea, or enough sugar, or enough condensed milk, the mother could supply sufficient working power, from the point of view of mere "stoking" or providing fuel, but a TRUE FOOD must have each constituent in the right proportion—in the right percentage. That is just what human or humanised milk supplies, and just what cows' milk and barley-water, condensed milk, or patent foods never do supply.

Weighing the Baby.

The Feeding Table on page 34 shows how much food the average baby needs at various times in the first nine months, but no absolutely fixed allowance will suit all infants under all circumstances; the mother must make such slight alterations as may appear necessary from her child's appetite, condition, and rate of growth. Here comes in the importance of weighing. **Baby should be weighed regularly every week for the first few months, and every month afterwards**, so as to prevent the risk of his failing to gain at the proper rate. Infantile diarrhoea and other maladies are generally preceded by a period of stationary or declining weight, and if this were attended to in time the germs of disease would rarely gain a footing.

During the first few days after birth a baby naturally decreases in weight about half a pound. After this, "bottle-feds" tend to remain stationary for one or two weeks, then there should be a steady gain.

From time to time, even with breast-feeding, and at any age, a baby will fail to increase in weight, and may even lose for a week or more, owing to some slight passing disturbance of digestion. Take extra care at such times.

Steady gain in weight, week by week, is the ideal, but don't worry about slight irregularities in the rate of growth, especially during teething, weaning, or after 12 months of age. When infants begin to take more active exercise they tend to put on weight by fits and starts.

Mothers and nurses should be warned against taking pride in getting a baby to advance over-rapidly in weight; a regular gain at the proper rate is safer and better. Excess of food causes a baby to put on extra weight for a time, but this tends to be followed by indigestion and loss in the long run. Besides, we don't want mere weight. We don't want to fatten babies like prize pigs, but to ensure a steady, normal development of good firm bone and muscle.

From the second week to the fourth month an infant should gain from a quarter to half a pound a week; from the fourth to the sixth month he should gain about $1\frac{1}{2}$ lb. a month, and from the sixth to the twelfth month about a pound a month.

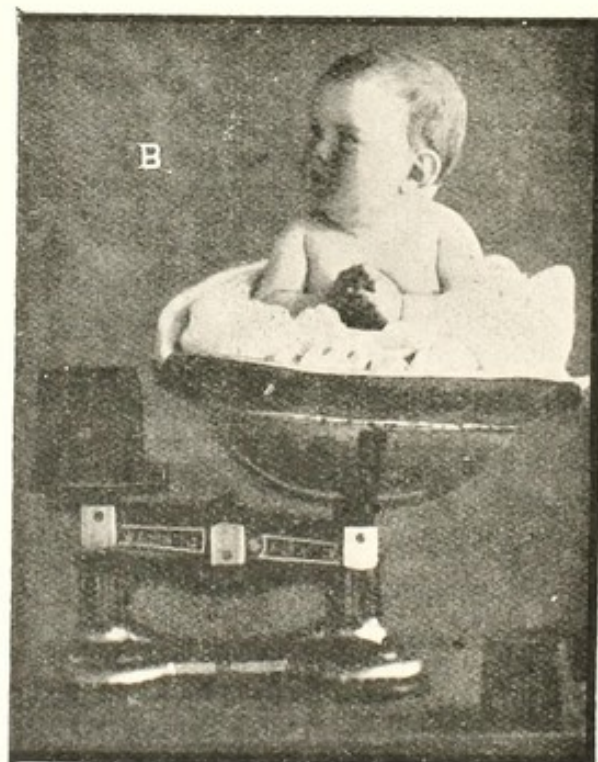
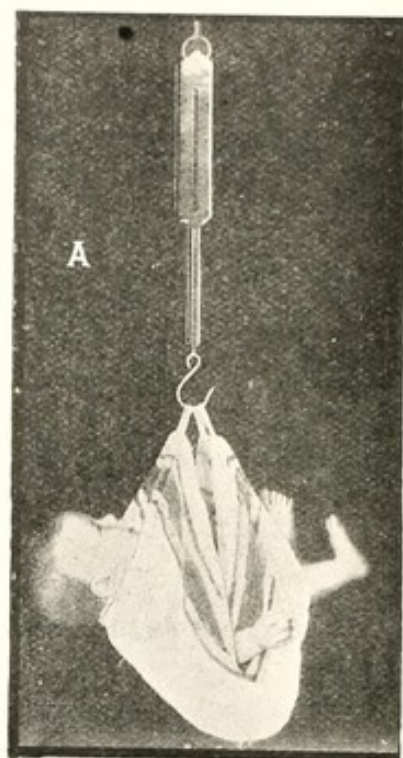


FIG. 16.

(A) How to comfortably suspend baby in towel and weigh approximately with spring balance.

(B) A Karitane Hospital baby being weighed accurately a few months after admission.

An infant at the sixth month should weigh twice its weight at birth, and at the end of the twelfth month a normal infant should weigh about 20 to 21 pounds. These are averages for babies of ordinary weight at birth. A considerable margin on either side is compatible with health, especially in the direction of growing more quickly than the average. As a rule, a child who gains regularly in weight is thriving. An exception must, however, be made in the case of infants fed on condensed milk, patent foods, etc., because though they may be fat and heavy, they tend to be flabby and wanting in stamina.

Weighing Breast-Fed Babies before and after Suckling.

This is done to find out whether a nursling is getting the proper allowance (see Feeding Table, page 34). Baby need not be undressed—weigh him just before and just after successive nursings, noting the difference each time. At the end of the day the mother knows exactly what quantity of milk has been drawn from her breasts. This affords the basis for feeding. She should weigh again within a week, by which time her milk-supply may have decidedly increased, necessitating a diminution in the supplementary allowance to be given by bottle.

The weighing must be done with good grocer's scales, accurate to $\frac{1}{4}$ or $\frac{1}{2}$ ounce. These are rather expensive, but can usually be borrowed on Saturday evening and returned on Monday morning. Weighing at one suckling is not a reliable guide, as proved by the following quantities drawn from the breasts at successive nursings by the baby referred to on next page when $3\frac{1}{2}$ months of age: viz. 6 ounces, 5, 4, $3\frac{1}{2}$, 2, $2\frac{1}{2}$, the first nursing being at 6 A.M. and the last at 10 P.M.

Here was a baby getting 24 ounces a day from the mother (or an average of 4 ounces per nursing) instead of the required 30 ounces a day (or 5 ounces per nursing). All that was needed was to give baby an ounce of humanised milk after each suckling. Had the mother been guided by the evening nursings alone she would have supposed that the breast-supply was 2 ounces per feeding short. On the other hand, had she weighed in the morning only, she would have concluded that a full supply was being drawn from the breasts, and that no supplementary feeding was needed. In such a case as the above a simple adjustment of the feeding would be arrived at by allowing 2 ounces by bottle at each of the three afternoon feedings only, instead of allowing 1 ounce at each of the six feedings.

Weighing affords the only means of ascertaining whether a breast-fed baby is getting the right quantity of food. Of course if health and growth are normal the milk-supply cannot be far wrong; but if there is indigestion, putting up of food, restlessness, disturbed sleep, or any other sign of ill health or discomfort—especially if a baby is not growing properly—the first thing to do is to weigh before and after feeding. **THIS RULE IS ABSOLUTE.** Without such weighing any attempt at treatment is mere guesswork and empiricism. The most enlightened specialists of the day admit their inability to form any idea as to the sufficiency or otherwise of the maternal supply, without resorting to what is obviously the only means of finding out. They insist on weighing.

Cases are constantly coming under the care of the Plunket Nurses where accurate weighing at once enables them to set the baby on the right track, and to do this without any delay or guessing. Sometimes the baby is found to be getting far too much: while in other cases he is being starved. Fig. 2, p. 12, is a case in point, and illustrates the following typical remarks by Professor Kerley of New York—remarks almost identical with those of Professor Budin, of Paris, quoted on page 13.

"I have repeatedly found children, who should have been getting 3 ounces or more at a feeding, who after the fifteen-minute nursings had increased in weight but $\frac{1}{2}$ or 1 ounce, showing that only so much milk had been taken." ("Diseases of Children," by Prof. Charles G. Kerley, New York, 1909.)

Since publishing the foregoing advice in the previous edition we have had a great number of such cases. In many instances a full flow of breast-milk was established in a few weeks; in others, though the breast-supply markedly improved, some artificial feeding had to be continued. **A trial of the simple expedient of weighing the baby before and after suckling, and adjusting the feeding accordingly, proves conclusively that many mothers give up breast-feeding quite unnecessarily. By weighing, any mother can find out for herself just what is needed.** In the vast majority of such cases the breast-supply is merely inadequate, and when the shortage has been ascertained and rectified everything goes well—the sole need being to **make up the deficiency of breast-milk at each feeding**, by giving baby just the proper quantity of humanised milk—neither over-feeding nor under-feeding.

The common practice of giving three or four "breast-feedings" and the rest "bottle-feedings" is a great mistake, because the stimulation of the breasts by suckling, repeated regularly every three hours during the day, is the best means of keeping up the flow. Further, when the supply of mother's milk is short she should use both breasts at each nursing, reversing the order of suckling every time: thus if the right breast is taken first at one suckling the left breast should be taken first at the next. Allow say five or six minutes for emptying each breast, and five minutes or more for the bottle if needed.

ILLUSTRATIVE CASE.

This case shows what can be done by weighing a failing baby before and after each suckling for a day from time to time, and then founding "Mixed Feeding" on the definitely ascertained shortage of mother's milk—no guess-work.



FIG. 17.

Fig. 17. Baby at 7 months of age—the latest arrival of a family of six children. The mother, though anxious to do so, had been unable to breast-feed any of the others. All had been brought up mainly on the usual milk-and-water, condensed milk, and patent foods. One had died and the other four had not thriven, the teeth decaying soon after they appeared, leading to tooth-ache, abscesses, etc. This prevented proper chewing of food and led to impaired growth. **When the present baby was 3 weeks of age, instead of gaining she was losing weight**, and, as the prospects of suckling appeared to be even less than in previous cases, it was proposed to wean her and rear by hand. At this stage baby was in a bad way—a fretful little victim, suffering pain from colic and indigestion, crying on and off day and night, and preventing the whole household from getting proper rest and sleep.

The first step in dealing with such a case is to weigh baby carefully before and after each suckling for a whole day. By this means one readily finds out how much food is being drawn from the breasts (see page 57). In the present case the mother was supplying less than half

a pint—a baby's proper allowance at 3 weeks being over a pint (see Feeding Table, page 34). No wonder the child was more than half a pound lighter than at birth, and was going down hill.

The mother was instructed to cease night-feeding, and to nurse every three hours in the day-time—viz. at 6, 9, noon, 3, 6, and 10 P.M.—giving in addition by bottle after each suckling what was short in the breast-supply. According to the Feeding Table the standard allowance for a three weeks' baby is 4 ounces per feeding. At first the supplementary milk was given only half strength—full strength being reached gradually during the week.

TABLE SHEWING RESULTS OF PROPERLY REGULATED "MIXED FEEDING" ON AILING BABY, WHO WAS $\frac{1}{2}$ lb. LIGHTER THAN AT BIRTH, AND ALTOGETHER IN A BAD WAY WHEN SEEN AT 3 WEEKS OF AGE. (See photo on opposite page.)

Age of Baby.	Weight of Baby. Pounds.	Breast Milk. Ounces.	Humanised Milk. Ounces.
At birth	8		
3 weeks	7 $\frac{1}{2}$	7	6
4 "	8 $\frac{1}{2}$	12	15
5 "	8 $\frac{3}{4}$	15	12
6 "	9 $\frac{1}{2}$	15	12
7 "	9 $\frac{3}{4}$	20	8
12 "	12	24	6

Note how two months of properly-conducted "Mixed Feeding" caused the baby to gain $4\frac{1}{2}$ lb., bringing her up to the normal weight.

By the time baby was $3\frac{1}{2}$ months old the breast-supply had risen to nearly $1\frac{1}{2}$ pints—the average feeding being then made up of nearly 5 ounces of mother's milk, supplemented with only $\frac{3}{4}$ ounce humanised milk. Mixed feeding was continued to end of ninth month. At seven months, when photo was taken, baby weighed 18 lb., being 1 lb. above average.

From the time this child was taken in hand and rationally treated, peace and comfort reigned in the home: indeed, her behaviour and progress were never-ending sources of wonder to her parents, who were always remarking on her "fitness" and happy, contented disposition, in contrast to the trying experiences of the previous children. Not only did she sleep all night and give no trouble by day, but she passed milestone after milestone (holding up her head, laughing aloud, playing with toys, sitting up, standing, etc.) before the average age for these events, and months ahead of the times at which her brothers and sisters had passed theirs (see "Milestones on the Baby's Road," p. 93).

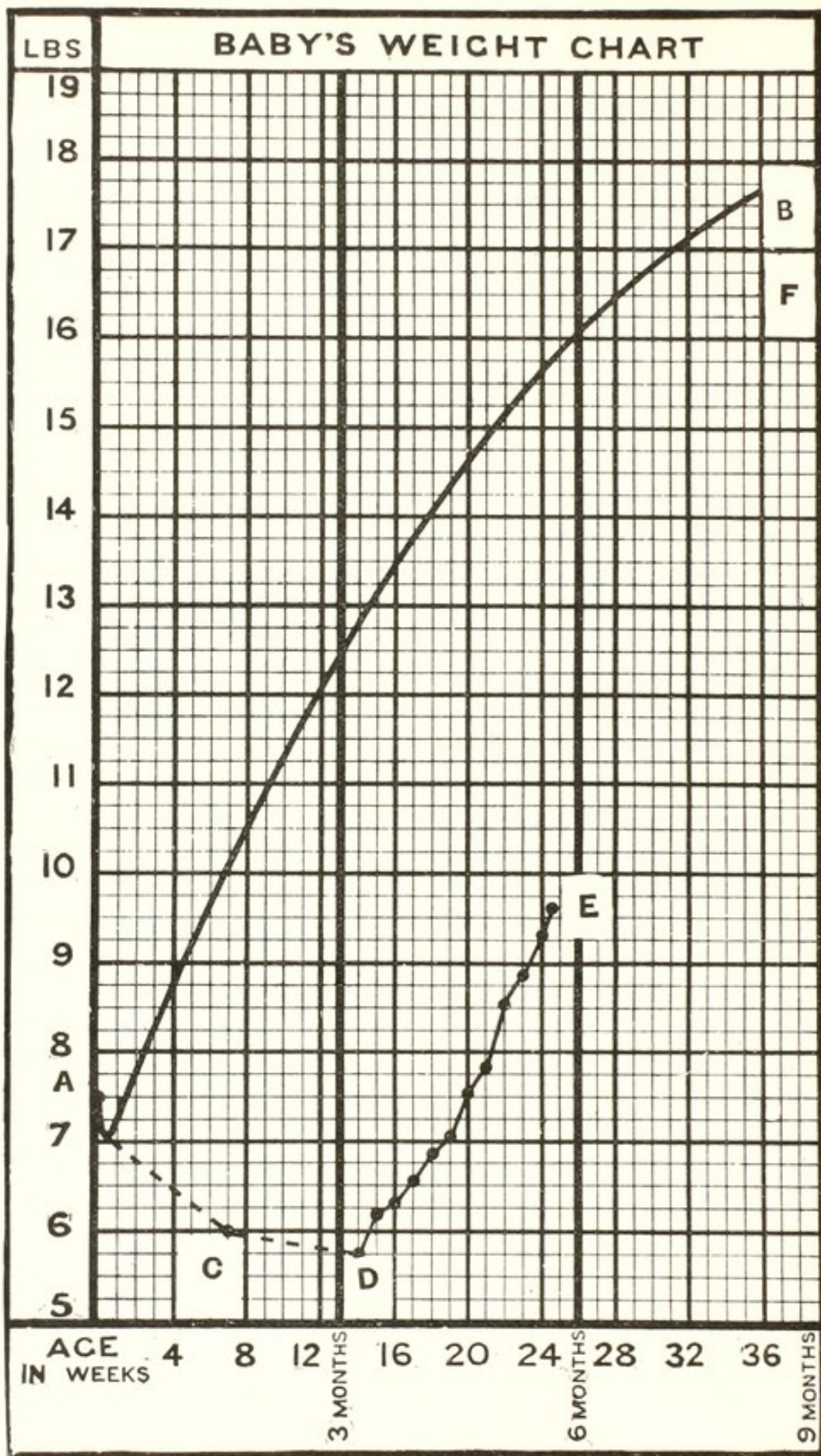
She walked round and round her cot, holding on to the rail, at six months, and stood firmly, as seen in the illustration, at seven months. She was then the picture of a firm, robust, ruddy, well-made infant. She is now in her third year, the life and joy of the home.

The lesson to be learned from the above is, that where women now abandon breast-feeding altogether, they could in most cases partially suckle their babies, often with an increasing flow month after month, if they would only weigh the baby before and after suckling from time to time, and then supplement each breast-feeding with the proper quantity of humanised milk. The thriving and contentment of the baby admits of unbroken rest to the mother, and with improvement of her health and spirits comes an increased flow of breast-milk.



FIG. 18.

Mother had influenza, and the baby was weaned when a few days old. Weaning because of the mother's illness is a mistake. See "Weaning," page 15, and Fig. 3. However, by carefully following the directions given as to preparing his milk properly, and carrying out all the other injunctions outlined on pages 1 and 2, the mother made her baby a strong, active, alert boy weighing 32 lbs. at two years of age when the photo was taken. This shows how care will overcome early mistakes.



Baby's weight should be entered in above chart week by week. Make dot at each weighing, and draw line from dot to dot. The curve will show at a glance how baby is doing.

Line A-B shows how the average healthy baby, weighing $7\frac{1}{2}$ lb. at birth, falls to about 7 lb., then gains 5 lb., $3\frac{1}{2}$ lb., and 2 lb. per quarter, reaching 18 lb. at 9 months. Contrast this with the line A, C, D, E—the curve of a baby described on page 41. Note fall from $7\frac{1}{2}$ lb. to $5\frac{3}{4}$ lb. in three months (instead of rise to $12\frac{1}{2}$ lb.), then a rapid, steady rise to $9\frac{1}{2}$ lb., dating from admission to Karitane Hospital, where he was fed on humanised milk and given the other simple essentials for health. Since preparing chart, baby (no longer in Hospital) has progressed steadily. F shows weight at 9 months.

N.B.—The Plunket nurse will show any mother how to keep this chart properly.

Patent-Food and Condensed-Milk "Bottle-Feds."

However attractive these may appear as babies, they don't develop into the best men and women, and even as children the fact of their having been built out of the wrong stuff shows itself directly they become ill. Such babies "**catch whatever's going,**" and **readily succumb to any illness.** Even where they don't die, they pick up slowly, and tend to make imperfect recoveries. **This is in striking contrast to the baby who is properly fed throughout on the best air and the best food. If such a child does chance to get ill, he "throws off the germs as the bow of an ocean liner throws off the spray—he is pretty well germ-proof."** The reason for this is obvious to any one who will take the trouble to contrast the two sections of young pigs shown below—the one having been fed on what would correspond to its mother's milk, or the closest imitation of it, and the other on sugary or starchy compounds, analogous to the patent foods, etc., which our human mothers are so fond of giving to their babies.



FIG. 19.

- (A) Section of young animal fed experimentally with starchy food not containing sufficient "flesh-forming material." Note excess of fat and lack of bone and muscle.
- (B) Section of young animal properly fed. Note that size and weight are about the same as in (A), but (B) shows a preponderance of bone and muscle.

(The above illustrations are from "The Theory and Practice of Infant Feeding" by H. D. CHAPIN, A.M., M.D.—Wood & Co., New York.)

Dr. Chapin says: "Many people feel that after something that "agrees" and causes gain in weight is found, the problem of successful feeding has been solved, but the future of the infant may be completely wrecked by such a method of feeding." An infant is receiving as much fat and sugar as is found in human milk, but only $\frac{1}{4}$ to $\frac{1}{2}$ as much proteid (flesh-forming material). Baby is fat, gaining weight, and may look healthy, yet probably he will get rickets or succumb to the first serious illness.

Extensive experiments, made on the above lines with little pigs and other young stock, show that **the wrongly-fed animal may grow as fast and look as well from the outside as one which has been properly treated, but when the two are cut across, the body of the one is found to be built principally of fat, while that of the other is mainly good bone and muscle. "A food that causes gain in weight may not be a good food for an infant. The scales alone are not a safe guide."**

Universal Need for Mother and Offspring.

Another point proved by the observation of farm stock is the fact that there can be no good motherhood without plenty of outing and exercise during pregnancy and suckling. This applies equally to horses, cattle, sheep, and pigs. **If the mothers lack free range and ample exercise they and their offspring both suffer, and miscarriages and premature births are frequent, just as in the case of human beings.**

The Bowels.

Don't let 10 o'clock in the morning pass without getting the bowels to move if there has not been a motion in the previous 24 hours.

After the first few days there are usually two or three motions daily. There should be at least one each day after a month old; many infants have two and some more than two, but it is the character of the stools rather than their number which denotes perfect or imperfect digestion.

It is of the utmost importance to insure regularity of the bowels. Try to get them to move at the same time every day just after the morning and afternoon feedings. In a very young baby the disturbance may cause some food to be put up, but usually this tendency soon ceases: the bowels tend to move best just after a meal. If training be begun early, regularity can usually be brought about by the second month.

The best method of training is to place a tiny chamber between the nurse's knees. Hold the baby on this, its back against nurse's chest and its body firmly supported. This should be done twice a day and always at the same hour.

At first it may be necessary to use some local stimulation such as that produced by tickling the anus. This also acts as a suggestion of the purpose for which baby is placed on the chamber; "but in a surprisingly short time the **position** is all that is required. With most infants, after a few weeks the bowels will move as soon as the infant is placed on the chamber."

(Holt.)

If the above mild external stimulation fails, the mother may try passing the tip of a "soft rubber catheter," size XII., into the bowel, or the soft rubber nozzle of a small "bulb-enema," specially made for babies, may be used in the same way. Such an enema should hold only an ounce. If a motion is not brought about by the mere presence of the nozzle, a little water may be injected, say, from a teaspoonful to an ounce, according to what proves necessary. The water should be made slightly saline by adding common salt in the proportion of a bare level teaspoonful to the pint of boiled water, and it should be injected with the chill just off—say at 70 deg. F., not warm. Such a fluid tones up the bowel, but (unlike soapy water) is not irritating and does not cause any tendency to catarrh of the bowel. Soap, whether given by enema or used in the form of "soap-stick," always causes more or less prolonged irritation of the mucous membrane, often leads to slime in the motions and redness of the orifice, and may cause much pain, straining, and even prolapse of the bowel. These results will not be surprising to any one who reflects on the smarting caused by a little soapy water getting into the eyes. However, if used only occasionally, no harm need be done by the use of a "soap-stick." The main points to bear in mind are:—(1) Select a mild superfatted soap, which can be obtained from any chemist; (2) carefully cut and scrape the soap to the form of a conical cartridge or torpedo, a little more than an inch long and about as thick as a lead pencil; (3) soften the surface of the soap with warm water before inserting.

A soap-stick made and used as described is much less irritating than the popular glycerine suppository, and is therefore preferable; but a very small enema of mild saline fluid is better than either. **Large enemas are liable to distend the bowel and cause further lack of tone and sluggishness.** They should therefore be avoided—indeed, the mother should not allow herself to drift into the habit of introducing anything into the bowels, if they can be got to move otherwise; she should spare no pains to bring about normal tone and vigour of the whole system and proper activity of the bowels by natural means as soon as possible.

From 1 to 2 teaspoonfuls of Olive Oil is a good food laxative for a baby.

Where constipation does not yield to simple hygienic measures there should be no delay in consulting a doctor. (See **CONSTIPATION**, pages 110-111.)

If a suckled baby is constipated the mother's bowels must be regulated (see page 9). Constipated mother means constipated baby.

NORMAL MOTIONS.

"If we could keep the motions always normal, we should have few or no delicate children." (Dr. Harry Campbell.)

Carefully observe the consistency, colour, and smell of motions.

For the first few days the natural motions consist of "Meconium," a dark, tarry, viscid, odourless substance, which may be passed from three to six times a day.

Stools should gradually change to yellow, varying from pale buff to orange—the intenser shades being seen in the breast-fed.

In early stages of artificial feeding, when the food is much diluted, motions are usually pale; when normal strength of food is approached the shade tends to deepen, this being specially affected by increase in proportion of fat. The consistency of motions should be soft, smooth, homogeneous, resembling thin mustard or raw yolk of egg. The odour should be faint and inoffensive.

When cereals, such as oat jelly, are introduced into the food a brown shade in the motions is noticeable, and this increases as food becomes more varied. At same time motions tend to become formed and gradually approach the adult type.

ABNORMAL MOTIONS.

1. Green motions. Greenness is commonly a sign that the bowel-contents are being hurried on too quickly, due to some disturbance.

The disturbing factor may be, on the one hand, a mild, passing chill, a nervous disturbance, or a slight disagreement of food; or, on the other hand, the greenness may be the first sign that hostile microbes have invaded the bowel in force and the baby is threatened with an attack of grave diarrhoea. If in doubt, give a dose of Castor Oil and allow nothing but boiled water for a few meals; don't feed and encourage the microbes. An occasional green motion is consistent with health; indeed, a baby will sometimes have one or two green motions every day for a week or more, without appearing to be upset, but when motions are green the mother should always be on guard. (See page 110.) The worst motions of this class are grass-green when passed, or look like chopped spinach. The sign that improvement is taking place is the gradual appearance of more and more of the yellow element among the green.

Motions which become green only after they have been passed for some time are usually of less significance. Taking too much whey may cause bluey-green relaxed motions. If a baby is given grey powder or calomel, the mercury tends to cause the motions to be greenish.

2. White, tough, pasty, bulky motions are apt to occur where babies are fed on unmodified or merely diluted cow's milk, owing to excess of indigestible curd.

3. Curd in the motions. The significance of particles or lumps of curd in the motions is described on page 110.

4. Pale, clay-like motions may be due to deficiency of bile, arising from obstructed bile duct or disordered liver.

5. Hard, dry, or crumbly motions. Motions may be passed dry and crumbly, or as hard balls. An enema may be needed (see page 112).

6. Brown, black, or red motions. Bleeding into stomach or bowels causes brownness, blackness, or redness, according to site of hæmorrhage.

Black motions are normal in the first week of life, and may also be caused by drugs. Brownish motions are a normal result of starch or starchy patent foods.

7. Thin, watery stools are common in diarrhoea, but are most marked in rare choleraic summer diarrhoea, tending to rapid collapse.

8. Frothiness and foulness of motions are evidences of abnormal fermentation which may call for washing-out or irrigating the bowel.

9. Slime or mucus in the motions. Much slime and mucus is specially seen in disorders of the lower parts of the bowel, and may be the herald of acute dysenteric diarrhoea, leading to blood and pus in the motions followed by rapid poisoning of the system, torpor, and collapse. Much jelly-like mucus, associated with the presence of worms, may be present as a chronic condition in weakly dyspeptic children.

General Hygiene.

Pure Air and Sunshine.

The question as to whether the injury done by living in closed rooms is mainly a physical or a chemical effect, does not concern us here. Throughout this section I assume for the sake of simplicity that the damage is toxic.

Keep the baby in the open air as much as possible. A sun-bath does not stop at the surface—radiant energy penetrates the body and stimulates the vital processes. When the baby is in the house, let the room (whether bedroom or sitting-room) have an ample current of pure cool outside air flowing through it all the time. Keep baby out of the direct line of draught, but don't be frightened of the air being cold. Pure cold air is invigorating, and prevents "catching cold." Warm stuffy air is poisonous and devitalising, and makes babies liable to "catch cold" when taken out into the open. There is no danger, but actual safety, in free-flowing night air.

N.B.—At the Karitane Harris Hospital the babies live out of doors all day, and a broad stream of pure cold outside air flows through the sleeping rooms all night long; tiny, delicate babies, after a week or more of gradual habituation, sleep well, grow and flourish in rooms where the temperature may sometimes fall almost to freezing-point. Of course the babies are properly clothed and covered (see pages 73, 84, 85).

Where should Baby Sleep ?

The baby will thrive best if given a ventilated room to itself.

Opening a bedroom window does not suffice for ventilation. There must be a continuous stream of pure cool air entering direct from the outside, passing across the room and then up a chimney or ventilator, or out of a door or window on the opposite side of the room.

Where there is no chimney to the bedroom, an excellent cross-current can be maintained by opening the bedroom window, closing the kitchen windows, and leaving open the doors which lead from the bedroom to the kitchen. The warm kitchen chimney then ensures an ample flow of air from the outside, through the bedroom to the kitchen.

It will be better still if the baby can be removed to a separate room. The cot may be taken into the sitting-room or kitchen when the parents go to bed, if there is not a separate room available. In this case, of course, the room so used must first have been well aired, and must have the window open so as to establish a pure cool stream from it to the fireplace.

As regards the window inlet, a two- or three-inch opening is quite inadequate: and when the opening is covered (as it usually is) with a blind, very little air can enter. The window should be wide open, and the opening should be quite free from obstruction. If a wind is liable to blow in direct on to the baby the cot should be sheltered by a low screen.

The baby should never sleep with its mother, but in a separate cot. If the cot is kept in the same room, it should be on the side of the room opposite to where the parents' bed stands, and there should be a current of

pure outside air flowing across the room between the cot and the bed, so that the baby may not re-breathe what its parents have used up and poisoned.

Effect of Pure Air.

Nothing is more striking than the marked improvement in colour, tone, condition, and liveliness shown by babies when the bedroom is freely ventilated, and they are moved away from the vicinity of their parents, especially when they are moved to an adjacent room. Mothers are inclined to be strongly prejudiced against allowing their babies this inestimable boon—the one thing capable of healing delicate consumptives—making them whole again. Let any mother try a separate bedroom and pure air for her babe for a month and she will not go back to her old ways. Properly fed babies who have plenty of open air and kicking exercise during the day, and pure cool air at night, sleep like dormice and give their parents from six to eight hours of uninterrupted rest. The use of a pad of sphagnum moss or Gamgee tissue, or a bran bed (see page 76), renders napkin-changing during the night unnecessary. A baby should have no food during the night (see page 36).

PLAN OF BEDROOM FOR MOTHER AND CHILD.

(When both have to occupy one bedroom.)

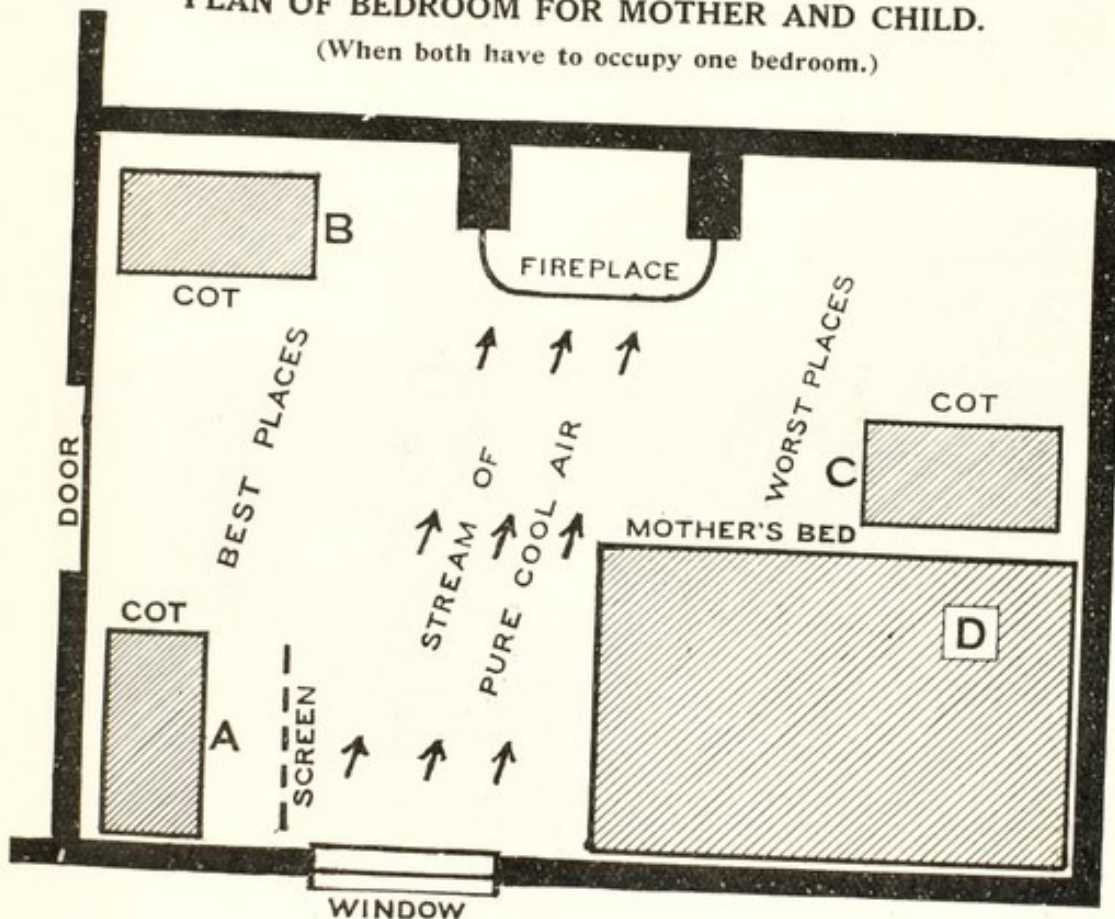


FIG. 20.

The arrows show a broad stream of fresh air flowing across the room from the wide open window to the fireplace.

BEST PLACES FOR BABY.

(A) With a low screen, as shown, to prevent direct draught blowing on to the cot, the best position for the baby is at A, especially if the adjacent room is occupied in the evening or at night, because then the fouled air would be drawn through the chinks around the door, and a baby in the cot at B would inevitably suffer.

(B) This position may be quite as good as A, except when the air of the adjacent room is fouled. In a very cold, bleak situation, B might be even the safest place for a delicate baby, especially during the winter; but later on it would be better to transfer the cot to A, where the air would be purer and cooler. The screen would prevent direct draught from the window. For poor people the side of a packing-case hinged to the wall suffices (see illustration, page 69).

WRONG PLACE FOR BABY.

(C) This is objectionable because the baby is placed in the current of poisoned air from the mother on its way to the fireplace. Mother and child should always sleep on opposite sides of a pure, cool stream of outside air, if they cannot have the still greater advantage of sleeping in adjacent but separate rooms.

WORST PLACE FOR BABY.

(D) This is by far the worst place in the room—the baby being in bed alongside the mother. The objections are fourfold, viz. :—

- (1) Risk of suffocation by "overlying."
- (2) The baby is more or less poisoned by inhaling the breath of the mother.
- (3) The baby inhales its own breath over and over again, because when the air round about the mouth and nose is warm the breath stagnates, instead of rapidly ascending to the ceiling. (See page 69.)
- (4) The warm "muggy" air alongside the mother is enervating, and tends to render the baby's skin tender and more susceptible to cold when exposed in daytime.

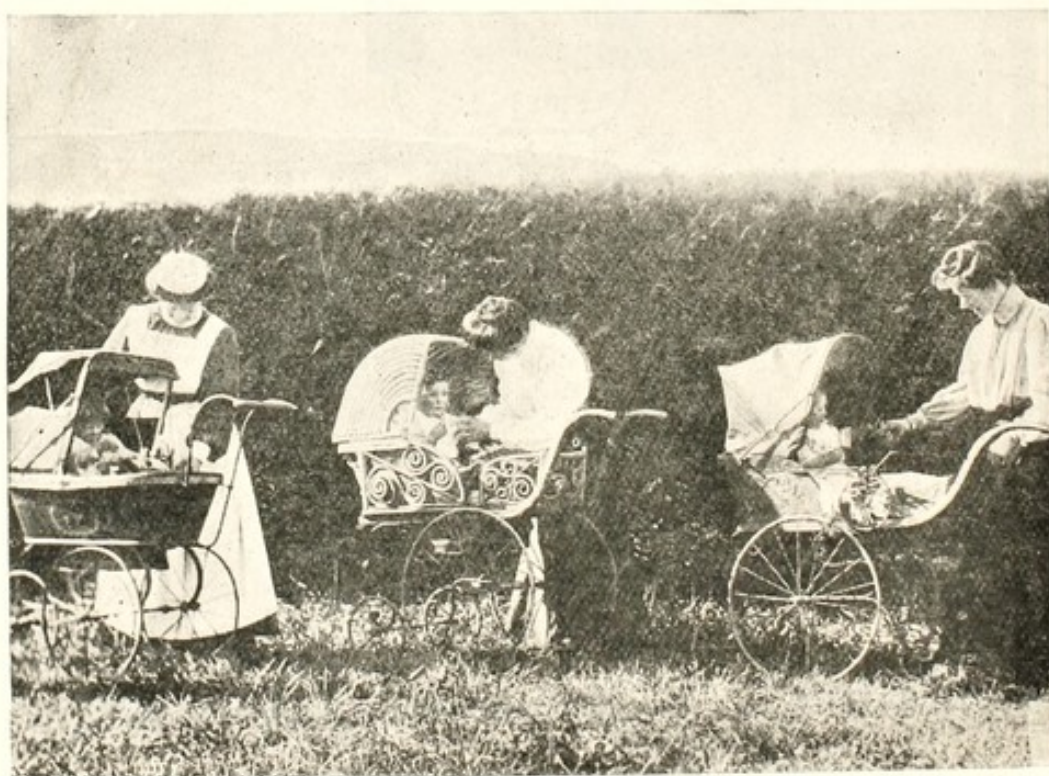
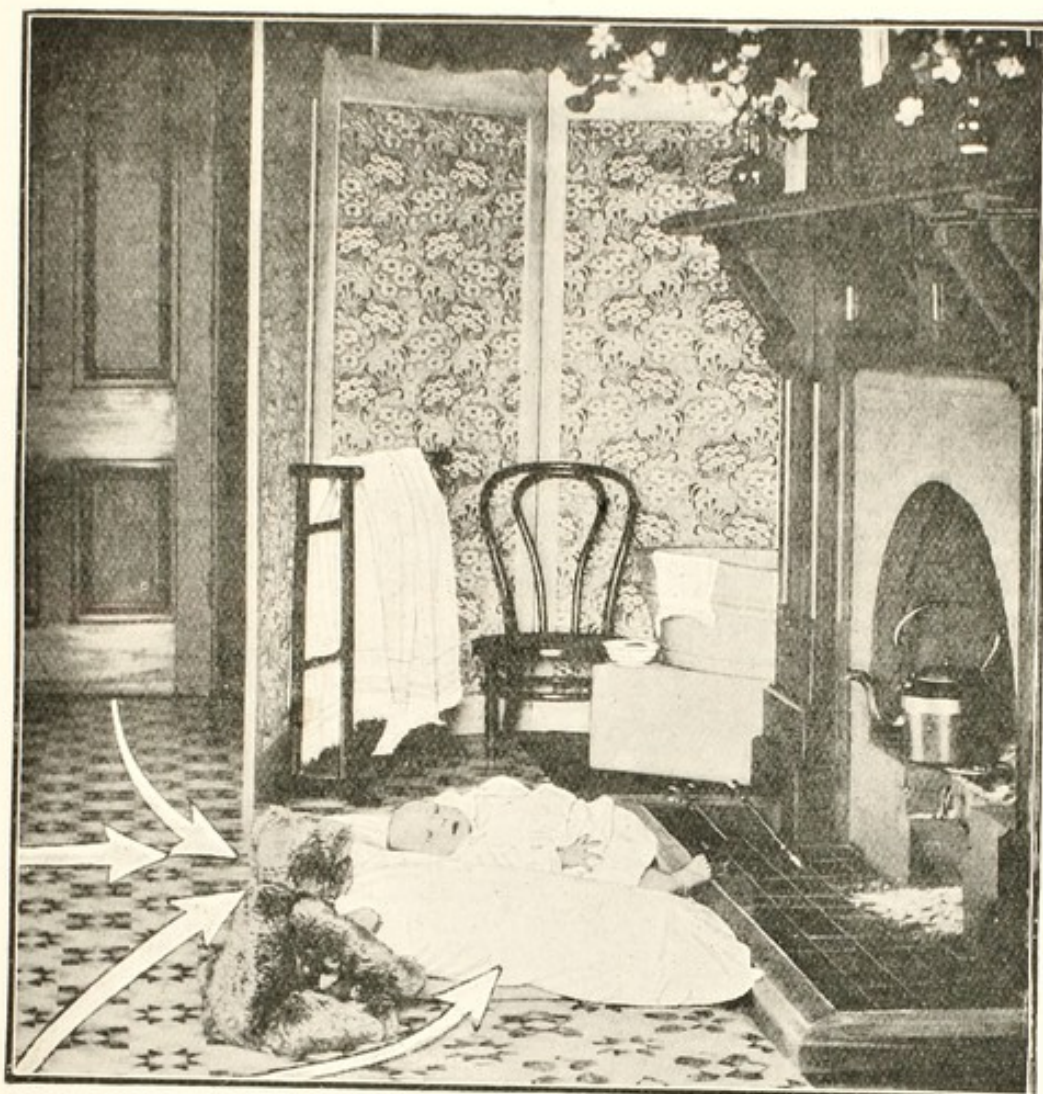


FIG. 21.

Three types of hood described later under the heading "Prams." The special point to note here is that the shade of a hedge or tree affords a much better protection for the baby than any artificial canopy, because when the sun pours down direct on the best of hoods the air surrounding the baby becomes more or less warmed and stuffy. One constantly sees canopied prams stuck out in the broiling sun (as shown in the picture), when the hood might have been lowered and the baby healthily placed under cool, pleasant, leafage near-by.



Toasting Baby's Toes.

FIG. 22.

This is a most injurious and widespread practice. Many nurses and mothers take it for granted that a baby should be placed before the fire to toast just after he has had his bath—just when he is most susceptible to cold. They think of the fire as a source of heat, whereas to a baby placed on the floor-level it is at best a source of heat at one end and cold at the other. But the blueness of the legs often shows that even the foot-end is losing more heat than it is gaining. Naturally the head suffers most, not only because the hair is damp, but because the head receives the full blast of concentrated cold air-currents from all directions rushing and scurrying along near the floor to supply the fire. A woman who would never dream of opening wide the bedroom window in order that the baby, lying snugly tucked up in his cradle, might breathe the pure cool night air, which he needs, does not hesitate to place him scantily clothed, bare-armed, bare-legged, bare-headed, and fresh from the bath, in the very draughtiest place in the room.

Of what avail is the proper care she may have just bestowed in bathing—quickness, draught screen, warm water, two towels ready warmed with which to sandwich the baby immediately he is received from the tub—of what avail are such precautions if, having thus assured a comfortable free flow of blood to the surface and the so-called “opening of the pores,” she then takes the most effective means to rob the baby of more than all the heat and energy she has conserved?

The arrangements for bathing, shown in the picture, are handy and suitable. Specially note the relation of the screen to the door, fireplace, and bathing apparatus.

Bedroom for Mother and Baby.

The pictures opposite show a bedroom arranged for mother and child. Note that there are no curtains, because these harbour dust and interfere with the free passage of air. There is a holland blind, which can be dark coloured if preferred. The blind should not be lowered to the extent of interfering with the free passage of air through the open lower sash. People who have not been used to free admission of light in this way may fancy that it would cause them to wake too early, but this happens for a few mornings only. The floor is polished (linoleum would do as well), and there is a rug beside the mother's bed.

(A) Baby's cot to left, parents' bed to right. Still evening, window wide open. Large white arrow shows free, full stream of pure, cool, outside air flowing straight across to fireplace, or other exit. Small white arrows show side currents of pure air flowing gently round screen from main stream towards baby's cot, to take the place of warm foul air shown as a black arrow rising from region of baby. Mother and child thus live on opposite sides of a broad pure river from which they draw their supplies, unpolluted by their own or each other's poisoned breath. Screen not absolutely necessary, but may be used as precaution against wind rising during night.

(B) Wind blowing in strongly from right side. Baby protected from undue draught by rough screen, made by hinging side of packing case to window architrave. Gently diffused currents of pure air pass round and over screen. Such diffused flow is good for both mother and child. Only excessive, direct, rapid draughts of cold air are harmful. Indeed, it is wonderful how soon babies, used to nothing but fresh air day and night, become proof even against direct draughts. However, their mothers should be careful to protect them from undue trials in any direction. Screen for parents' bed is shown turned back close against wall. Note that there is nothing in the room that cannot be equally well provided in the humblest cottage. Outside air is free to all, and no sane mother should clutter her bedroom with any unnecessary furniture or hangings. All superfluous dresses and other clothing should be removed from the room, if possible, or neatly stowed away, so as not to foul the air and lessen the space. One often finds bedrooms hung all round with dresses, skirts and hats, so vilely close and stuffy that the wonder is not only why mother and babe are pale and sickly, but that they manage to survive at all. Town mothers often excuse themselves for the foulness of their rooms by blaming the crowded city and their neighbours. There is no such thing as general serious pollution of the outdoor air. Town air may be regarded as practically pure, though it is not quite so fresh and invigorating as country air. However, that is no excuse for rendering it filthy inside the house. The outside air of our slums is infinitely pure and clean compared with the saturated, breath-poisoned bedroom air of many persons living in the midst of green fields.

"God lent His creatures light and air,
And waters open to the skies,
Man locks him in a stifling lair,
And wonders why his brother dies."

Why not accept the gift for our children, if not for ourselves? The picture on the wall illustrates what is free to all, and what nearly all reject.

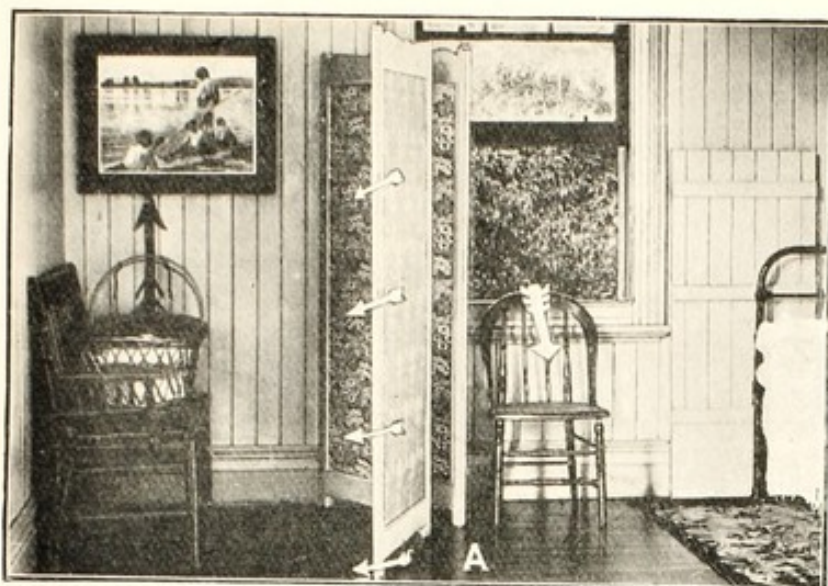
(C) Window wide open, but blind down. The keeping of the lower sash wide open and the provision of an outlet on opposite side of room does not suffice to establish any appreciable cross current if the opening is closed by a blind. The feeble inflow of outside air represented by the tiny white arrows is better than nothing, but it is quite inadequate, and in warm weather the poisoned breath hangs around the baby and is breathed over and over again.

The black arrows show the deadly human exhalations, by means of which, concentrated in a barrack room, notorious as the "Black Hole of Calcutta," 146 of our countrymen poisoned one another in the few short hours of a summer night, so that "next morning only twenty-three ghastly figures, such as their own mothers would not have known, staggered one by one out of the charnel house" [Macaulay]. The poisoning which these unfortunates were forced to do quickly, we elect to do slowly and by the same agency—we poison and enfeeble ourselves and our children with our own exhalations. We choose to starve and poison ourselves and one another in the midst of plenty.

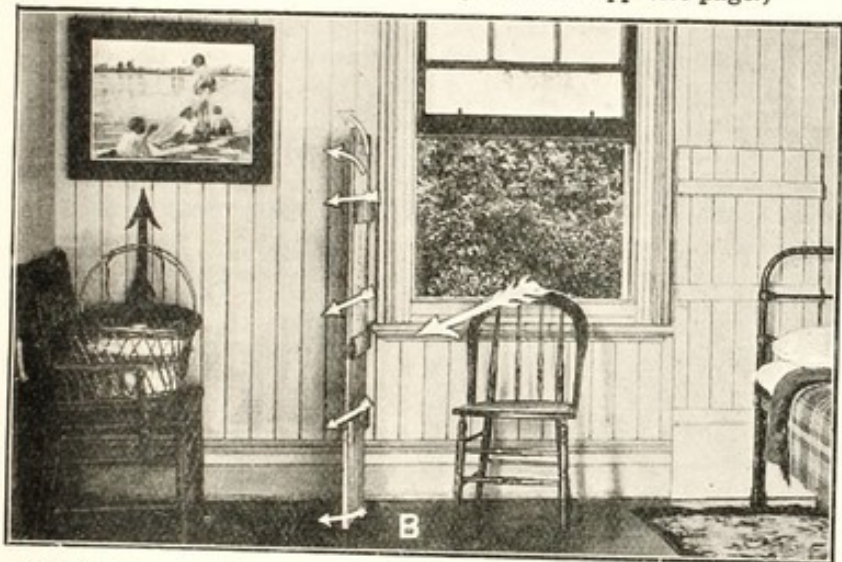
Don't be misled by the absurd idea that "airing a room" makes it fit to sleep in. A good-sized "aired" bedroom contains only enough air for one person for half an hour! There must be a current right across the room, not a mere feeble circulation confined to the region of the window, though many people regard this as ample ventilation.

How to do the Best for Mother and Child when both occupy the same Bedroom.

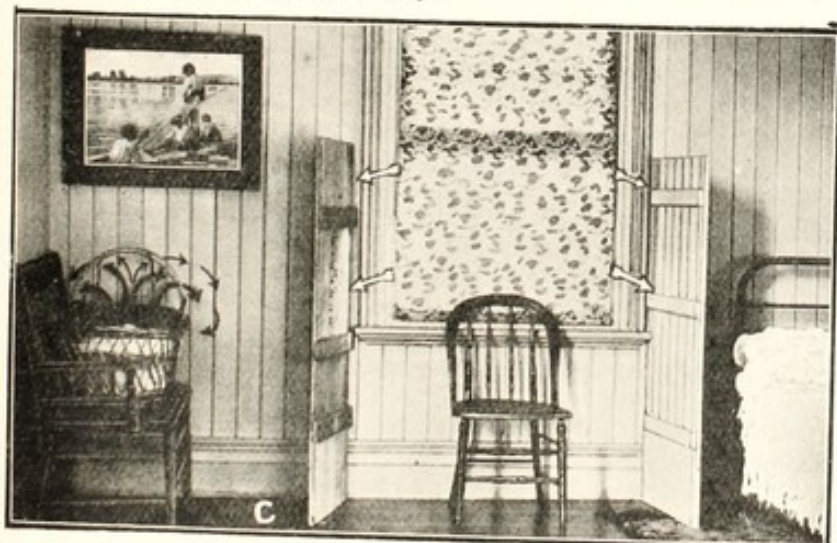
FIG. 23.



(A) Good ventilation. Lower sash raised, no oblique wind. White arrows show cool, pure, "white" air; black arrow shows used-up, poisoned, "black" breath—not air. (Details on opposite page.)



(B) Similar to A, but showing wind blowing in obliquely through raised sash. Screen protects baby.



(C) Sash raised as above but blind down, and entry of air almost stopped. Baby's breath hanging round him like a pall.

What becomes of our Breath?

FIG. 24.



When the surrounding atmosphere is fresh and cool our breath ascends, and we take in pure air at each inspiration.



When the surrounding air is close and warm, our breath hangs round about us like a cloud and may even fall instead of rising, so that we take in our own poisoned exhalations over and over again instead of inhaling fresh air.

Cradles.

(A) **Best form of cradle.** Escape of breath and access of fresh air unrestricted.

(B) **Same as A, but upward motion of breath hampered by mosquito netting** used for keeping off flies. Harm is minimized by not carrying net below upper margin of cradle—which usually suffices for flies. To keep out mosquitoes, the net must, of course, completely envelop the cradle. This is highly injurious as the breath can scarcely escape, and fresh air makes its way through to the baby with great difficulty. To counteract this, place the covered cradle in a perceptible "draught" if the weather is moderately warm. A fairly strong air-current is so impeded in making its way through fine netting that a draught flowing past a net-enveloped cot at 5 or 6 miles an hour would be reduced to, say, a 1 or 2 mile rate inside the tiny tent—a quite imperceptible current, indeed not sufficient for very warm weather.

On sultry nights the exposure of the cradle in a draught which is just appreciable, and not tempered to the baby by any netting, is highly beneficial, provided the infant has had, say, a week's training to gradually accustom him to fresh air. At the Karitane Harris Hospital the average baby is found to thrive best if placed, a few weeks after admission, in the most airy ward of the Institution—the cradle being in a position where the motion of the air is slightly perceptible to the senses—air at the freezing point in mid-winter! Speaking of summer-time, the matron says she always notices that "rickety" babies tend to become bathed in perspiration within a quarter of an hour if a mosquito netting is used, unless the cradle is placed in a good air-current.

Regarding the use of protective nets the practical rule should be:—

1. When the net is used as an overhead canopy for flies, increase the ventilation.
2. When the baby is completely canopied in mosquito netting, place the cradle in a more or less appreciable draught, increasing with the temperature.

(C) **Same cradle as above but daintily lined and canopied for effect.** This may be even more injurious than complete envelopment in mosquito netting. On sultry summer nights the baby's breath, being heavier than the surrounding heat-expanded air, fills up the cradle just as water fills a tub, and when the cradle is full of poison it flows over the rim and settles about the lower strata of the room. This goes on all night, the baby breathing-in and breathing-out, over and over again, its own poisoned exhalations. Summer or winter, there should be neither lining nor canopy nor curtains to a baby's cot or cradle. Adults have long ago given up all bed-hangings for themselves—why do they continue them for the baby, whose rapidly growing body burns three or four times as fiercely as their own and has therefore the more pressing need for pure air?

(D) **Same as C, but shawl thrown over front to keep off light and draughts.** Here the baby and its fate are indeed sealed. Comment is scarcely needed. Summer or winter, day or night, such immuring of infants is unpardonable, even though the enveloping fabric should be the thinnest gossamer. The breath should be free to escape, and pure air should have unrestricted access to the baby at all times.

Again, there is no greater fallacy than the idea that babies need shading from soft diffused light when sleeping in daytime. All that is ordinarily done at Karitane Harris Hospital is to shade them from direct sunlight, and if the day is very bright, the cradle is placed under the lee of a wall or hedge, or beneath a verandah or tree—the latter the kind of protection that animals in the open instinctively seek in similar circumstances.

Soft open diffused light from the sky, shaded if need be in the direction to which the eyes are directly turned, does not interfere with sleep in the daytime, and promotes sound reactionary sleep at night. But the mother says, "Is it not **trying for the eyes?**" Why should soft diffused daylight be trying for eyes curtained with eyelids—the same eyes that take pleasure in gazing directly at open light when the child wakes? The keeping of infants in darkened rooms or closely canopied prams during the day, under the mistaken notion that light prevents sleep as it tends to in adults, is responsible for a great deal of debility in babyhood.

For the first week of life it is true that babies are acutely sensitive to light, and should be carefully screened; but after the first week they grow more and more fond of light, and need it for proper growth and development.

(E) **Face covered with a thin cambric handkerchief.** Here the warm, moist, poisoned cloud of breath is kept hanging immediately round the baby's nose and mouth. This is an amazing practice. One often hears a woman say that she feels stifled in a veil, which is infinitely more porous and usually exposed to freely moving air.

The handkerchief forms a close dome over the baby's face—often a dome within a stifling pram canopy. Under this dome is concentrated the breath of a rapidly growing being who needs the purest and coolest of air to supply a lamp burning three times as quickly as an adult lamp, and giving off poisonous exhalations in the same proportion.

FIG. 25.

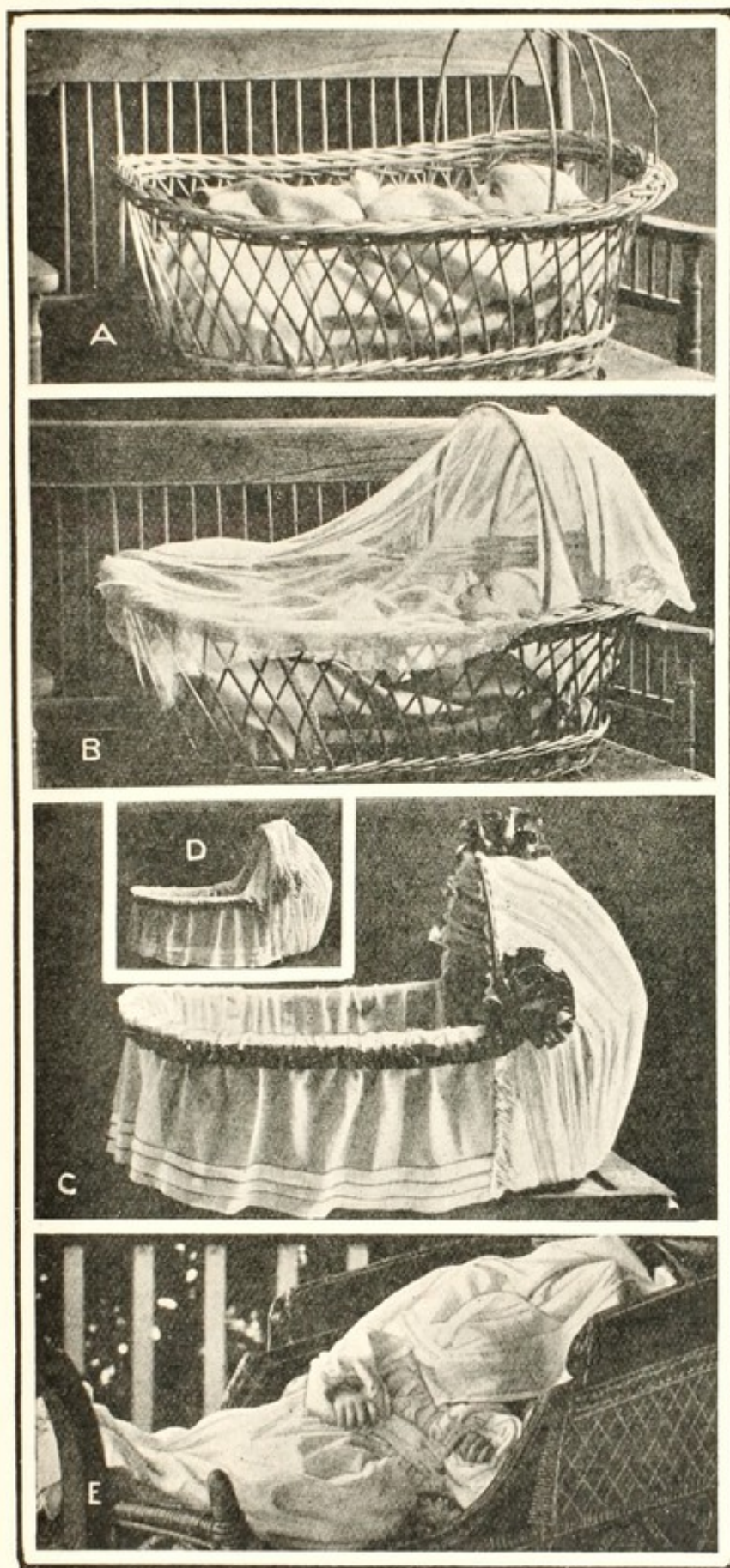
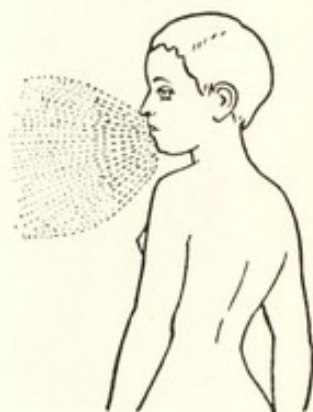


FIG. 26.



1. Air fresh and cool—
breath rises. We in-
hale pure air.



2. Air warm and stuffy—
breath hangs round
us. We inhale used-
up, poisoned breath



3. Air very warm (80 to
100 deg. F.)—breath
hangs round us or falls,
accumulating in the
lower parts of the
room and filling any
closed-in cradle with
poison.

Prams and Hoods.

One of the most pitiable and exasperating sights of modern babyhood is the spectacle of an unfortunate infant sweltering and sweating under an American leather pram hood. Here surely is human ignorance at its worst—a glorious sunny day, intended to give life and strength to all young creatures, perverted by the mother into an agency of debility and sickness for her offspring!

The ordinary unventilated leather pram hood is most injurious, as there is no current of pure air passing over the baby's head. It is especially harmful in warm weather, when the baby's breath stagnates around the mouth and nose, so that it breathes its own breath over and over again, thus poisoning the system. The enfeebling effect is increased by the fact that the hot air causes sweating and general limpness of the whole body.

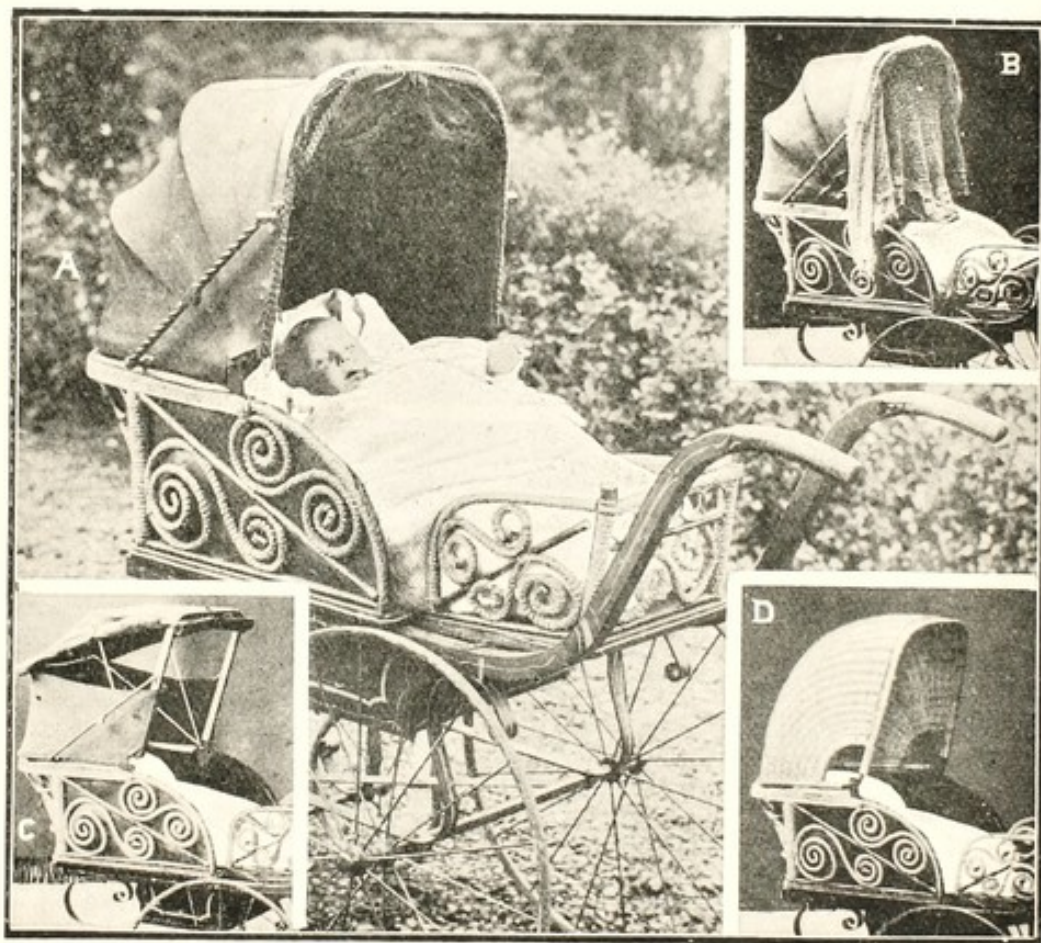


FIG. 27.

(A) **Pram with ordinary leather hood.** This is most injurious (see text). With the sun shining on the canopy the temperature of the air around the baby's head is found to rise 10 or even 20 deg. F., if, as is usually the case, the baby is right under the hood, and not, as shown above, just at the margin.

(B) **Leather hood with light wrap thrown over opening.** This common practice converts the canopy into a veritable Black Hole of Calcutta. The woman who does not hesitate to allow a tender infant to swelter thus in a tiny, dark, close, foul tent, with the sun pouring down on it, would quickly faint herself if similarly treated.

(C) **Ventilating canopy devised by Lady Plunket.** With the blinds raised, as shown in the picture, a wind blowing from either side passes across about six inches above the baby's head, thus preventing the evils referred to above.

(D) **Wicker hood.** This also is an excellent device, but more expensive.

A baby out in the midst of a green field under a close leather pram hood on a warm sunny day is actually far worse off for air and healthy stimulation than if indoors in a well-ventilated room. Every one knows how bad it is for a baby to be kept indoors, but few realise that it may be even worse off under a leather pram hood in the open air and sunlight!

The ideal sunshade is a tree, shrub, or hedge, such as animals instinctively seek on bright days. Next best is a verandah or wall; failing these, and for use when being wheeled about, there should be a small canopy or blind or an umbrella-like shade sufficing to keep off the wind and the direct rays of the sun from particular directions, but not causing heating up of air and stagnation around the baby's head. If there is a close-fitting hood it should be made of wicker-work, which stops draught but allows free passage of air. **The best colour for a pram-shade is green inside and white outside. Simple white linen is too glaring.**

Never make a pram serve the purpose of a baby's cot, because there is bound to be constraint and limitation of movement. Further, a proper cot is more cleanly and free from stuffiness.

Go-Carts.

Go-carts should never be used until a child can sit up and rest its feet on the foot-rest. Care should be taken to see that the child is properly clothed and covered. The best plan is to put a warm wrap in the cart, and seat the child in it. Then bring the wrap round the legs and fold it up over the feet, securing it in position with safety-pins. This is absolutely necessary in cold weather, or the child will lose a great amount of heat and will become devitalised and a ready prey to disease.

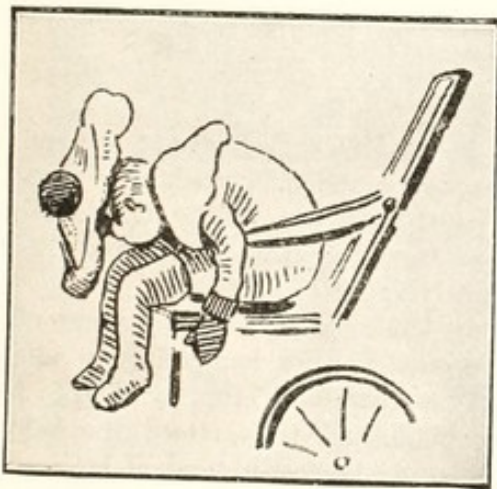


FIG. 28.

A child should never be allowed to sleep, as is so often the case, in the awkward, constrained positions almost inseparable from sitting or reclining in an ordinary go-cart. Great care should be used in the selection of a conveyance suitable for babies.

Fig. 28. A frequent spectacle in our streets. One of the many uncomfortable positions in which children fall asleep in go-carts. Observe the dangling feet, etc.

This clever sketch, by the late R. F. Reynolds, Esq., is reproduced with kind permission from the publishers, Messrs. Reynolds and Branson Ltd., Leeds.

Baby Clothing.

The best all-round material for baby-clothes is the cheapest flannel, costing retail about 10d. to 1s. a yard. This is more porous and open in texture than expensive flannels, and not only shrinks less but is decidedly warmer, weight for weight, on account of the air imprisoned both in the meshes and between successive layers. It has the further advantage of being decidedly elastic, and, in common with all woollens, does not harbour a chilly dampness like cotton.

Next the skin it is better to have some thin, soft, open material made of

silk and wool, because many infants suffer very much from itching and irritation owing to the use of harsher materials. The wearing of flannel next the skin irritates all babies more or less, though some do not show it obviously. Does the mother ever reflect that she herself may suffer torture from wearing flannel, though her skin may present no visible sign of irritation? How about the baby, whose skin is far more delicate and sensitive? Irritability and peevishness are often due to this cause, and many cases of prickly heat and eczema would be obviated if the material used were suitable for the tender skin of an infant. The fabric chosen must contain a fair proportion of silk. Dr. Rotch (Boston) says that yarn made of half cotton and half silk can easily be knitted into the best, warm, soft, delicate, elastic, unshrinkable baby-underclothing—superior to anything else. A good material is economical in the long run, because it does not shrink.

Many babies are burned to death annually owing to flannelette catching fire. Further, as with all cotton fabrics, to secure adequate warmth a baby must wear much heavier garments than if clad in open, porous woollen stuffs with silk-mixtures next the skin. Why use any pure cotton for baby clothing? Grudge every unnecessary ounce of weight. Why hamper exercise and free breathing?

All clothing must be loose, nothing to restrict free play of chest and abdomen. Enlarge or discard garments before they become in the least degree too small. The singlet should be amply long to pin to napkin; don't leave chilly space between napkin and singlet.

Mothers spoil their babies by tying tapes round them, preventing full expansion of the chest and belly. The hand placed between body and clothing should feel nothing whatever in the way of constricting lines or bands. If such can be felt, the system of clothing is radically wrong. One finds babies trussed up like chickens prepared for roasting!

Binder.

The binder should be given up when the cord is healed, say at the end of ten days or a fortnight. Neither the back nor abdomen needs any support whatever. A binder may cause rupture, and will not prevent it. On the other hand, it prevents the walls of the abdomen from becoming strong, and always restricts deep healthy breathing, even if lightly applied.

The use of swaddling clothes for young babies may be classed along with binding or swathing. There is no excuse whatever for hampering an infant with long clothes at any time, though many mothers still stupidly cling to the old evil tradition for the first month or more, and thus retard the baby's activity and vitality just at the very time when he is most in need of both—the critical point when, as Professor Budin says, **"the baby has less chance of living a week than an old man of ninety, and less chance than an octogenarian of living a year."**

"One of the most important things I have to contend against is the binder or swather, a relic of the ancient custom of swaddling infants, which arose from a sort of superstition that infants required to be artificially pressed into proper shape. The idea prevailed that Nature, which could perfect the cat from the tiny half-formed kitten, could not perfect the man from the little clumsy infant, without help from Art. An author in 1658 says of the children of the Caribs: **'Although the little creatures are left to roll about on the ground in a state of nudity, they NEVERTHELESS grow marvellously well, and most of them become so robust as to be able to walk without support at six months old.'** The word 'nevertheless' is an expression of naive surprise, for the author had been accustomed to the swaddling and restraint system. By means of natural and proper exercise the muscles get strength and tone and the bones acquire firmness. I do not think any one can cite the case of even one baby brought up carefully in arms, which could walk, if only a few steps, when six months old."

(From *Cradle to School*, by MRS. ADA S. BALLIN.)

Composite Pictures of Babies.

(Derived from Röntgen-ray photographs by Dr. Cotton, Professor of Children's Diseases, University of Chicago).

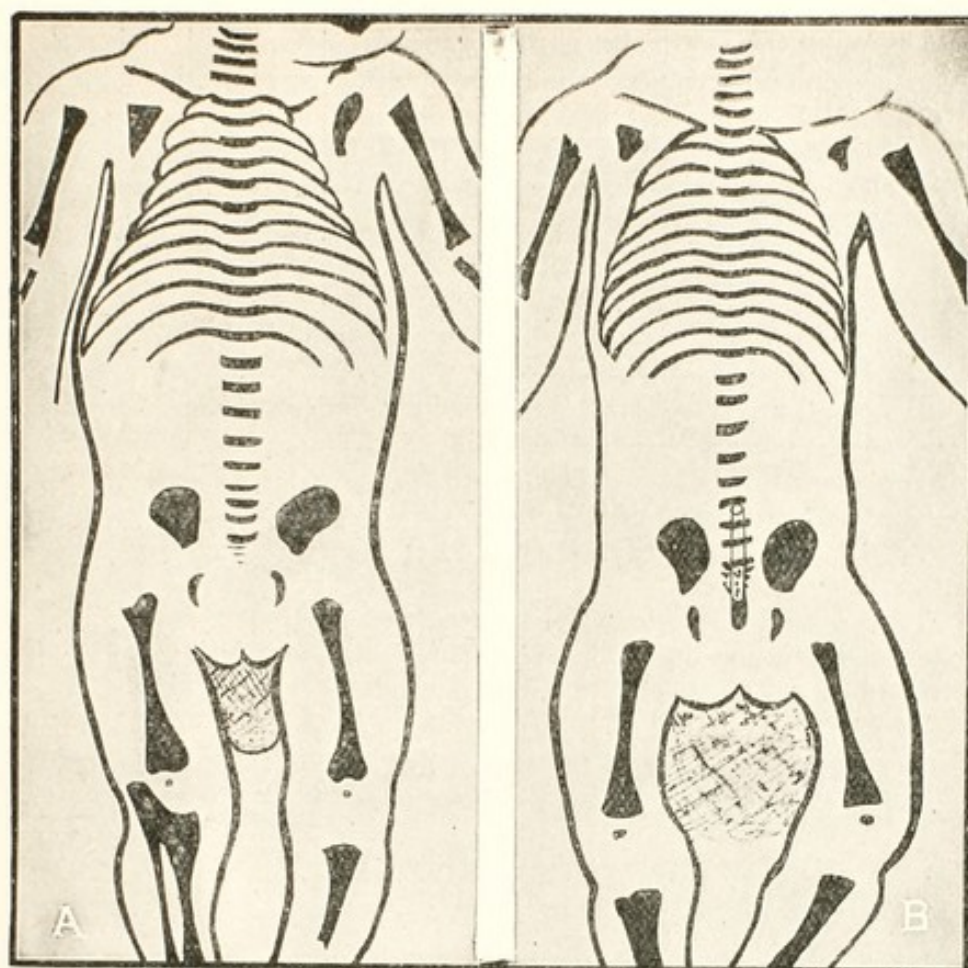


FIG. 29.

(A) **Normal Form of Baby.** Baby not compressed by binder or stays, and legs not "bowed" by large bulky napkins.

(B) **Deformities due to Binder and Napkins.** Note compression of Chest, Abdomen, and Pelvis, and "Bandy-legs," due to bulky napkins.

Napkins.

The napkin, though used as a protection to the clothing, is itself one of the most important of the baby's garments. If applied too "snugly" or tightly; or if allowed to extend down nearly to the knees; or if made too bulky and bunched, the napkin hampers free exercise, and is liable to give rise to grave deformities of the pelvis and legs, as shown in the illustration. To avoid these objectionable features, when the square napkin is folded into a triangle, only one thickness should be pinned up between the legs, leaving the other hanging loose. Another way to avoid unduly bunched and hampering napkins is to use the kind now procurable in America from the Stork Napkin Company of Boston, and other manufacturers. These consist of a simple triangle of one thickness of soft, elastic stockinet or other such material, with a specially thick, absorbent portion towards the centre to receive the excretions. This is an admirable plan, and can be imitated by cutting triangles out of old linen tablecloths or old twill sheeting. Then

take a smaller portion of any similar soft, absorbent material, or, better still, if the expense is immaterial, a pad of wood-wool and absorbent gauze, or of wood-wool tissue, and fold into a square, which can be applied to the triangle as shown in the illustration. This patch should be made just large enough to absorb the urine. In this way perfect freedom can be given to the limbs, and there will be no irritation or overheating. On the other hand, immediate and complete absorption of urine prevents the chilling which results from the widespread soaking of ordinary napkins. Change napkins at once when soiled; remove them from the room, place them in cold water, and wash the hands at once. Never dry, and re-apply wetted napkins, but where a patch is used only the pad may need changing on occasion. Don't use waterproof diapers, because they act as poultices, and are apt to cause eczema, etc. Other sources of irritation of the skin must be avoided: therefore soda should never be used in the washing of woollens, because it renders them harsh. If used for washing other underclothing, every trace of soda should be got rid of by thorough rinsing. If proper care is taken, no dusting powder should be needed. Folds of skin should be dried with a soft towel, not with dusting powder.

Use of Sphagnum Moss.

In the country, wherever sphagnum moss is abundant and easily procurable, it is probable it will prove useful if combined with bran in making the baby's bed, the moss being infinitely more absorbent than bran.

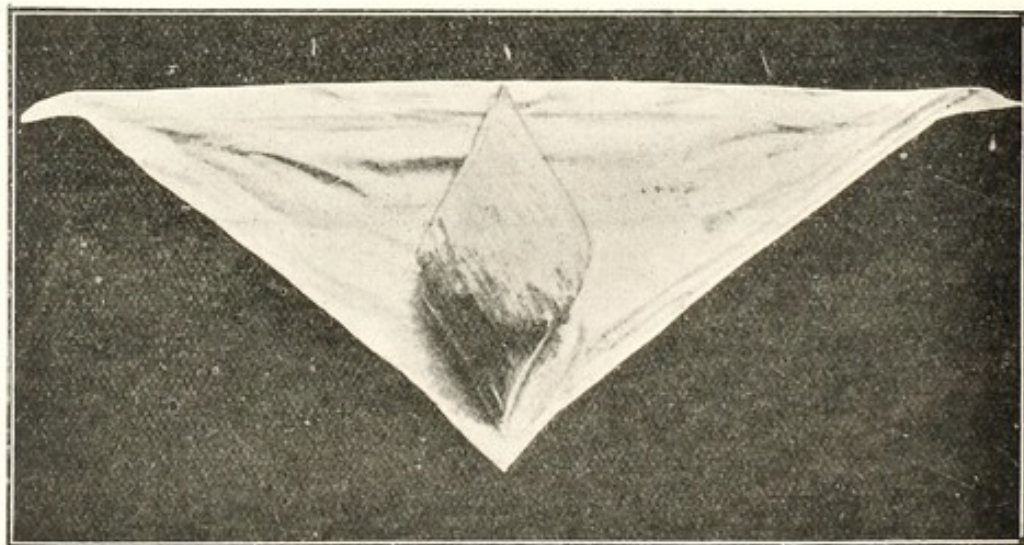


FIG. 30.

Napkin, with pad of sphagnum moss enclosed in butter muslin. Such a pad, weighing only an ounce, will completely absorb and retain a quarter of a pint of urine—say as much as would be passed in the night. This is infinitely cleaner and healthier than allowing the urine to spread over a wide area of napkin and nightdress, and thus cause extensive chilling, and more or less irritation of the skin.

Dry sphagnum forms an extremely light, clean, airy, elastic pad, which will yield in any direction, and accommodate its shape to the parts. If preferred, a larger square may be carried round the buttocks, without any portion going between the thighs, or a still larger square may be attached to the bed, so that the baby may merely lie on it. In the latter case, the nightdress should not reach below the hips, and no napkin need be used. In this way, sphagnum moss may be made to serve the same purpose as the "**bran-bed**" now extensively used in France. This gives the baby the fullest use of his limbs while in bed and at the same time keeps the excretions away from the body, thus preventing chilling, irritation, etc.

French physicians of late years have been removing restriction after restriction from the baby, and it is contended that the giving up of the napkin and the adoption of a bran-bed and short nightdress are as beneficial to the infant as they are satisfactory to the nurse. The

excretions, both liquid and solid, form with the bran a small compact ball, which is easily removed without soiling the hands, and the rest of the bed is entirely unaffected. The avoidance of napkin washing is claimed as a great advantage, the only objections mentioned being—

- (1) The sticking of the particles of bran to the skin.
- (2) The fact that if alterations take place in the colour, consistence, or smell of the motions, such changes cannot be detected, because the ball is practically odourless, etc.

Further particulars will be supplied by the Matron of the Karitane Harris Hospital Dunedin, N.Z., if desired.

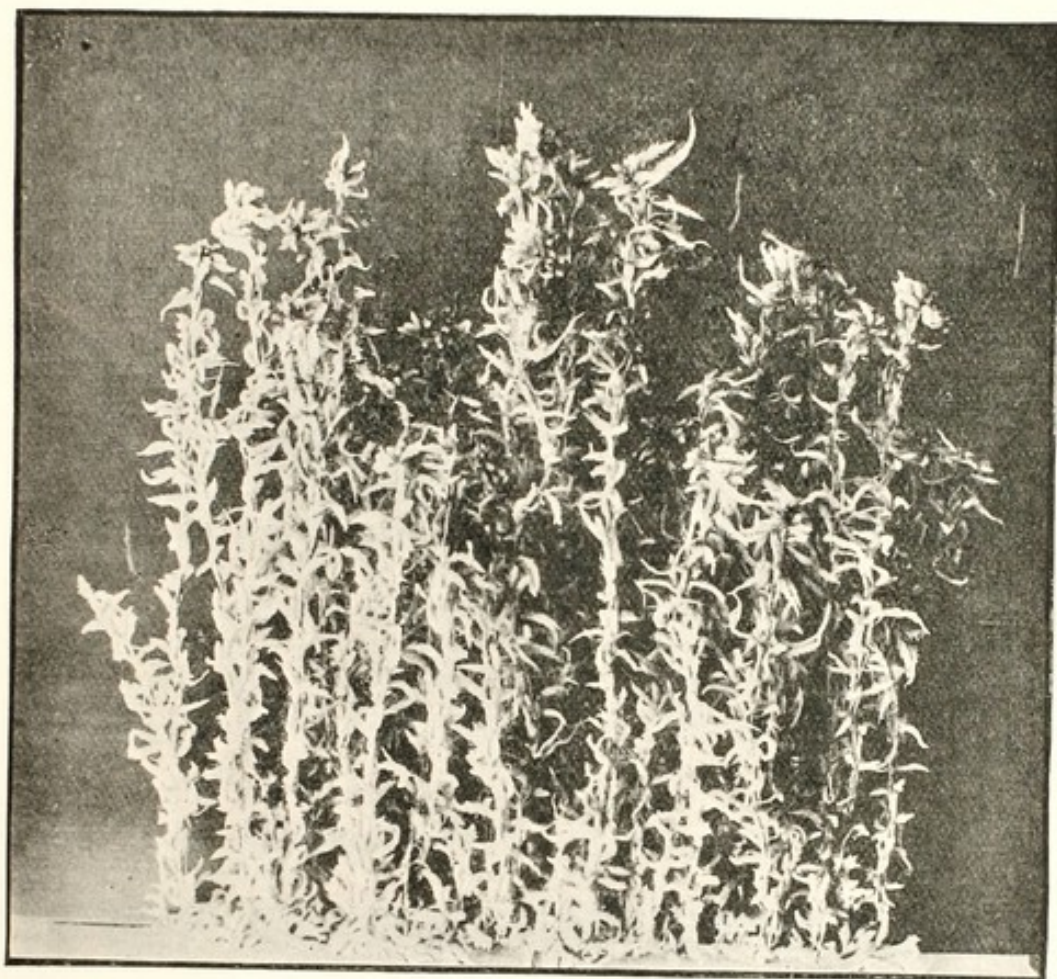


FIG. 31.

Sphagnum Moss. The illustration shows the plants about a third of their natural height. There is plenty of moss in many parts of the Dominion, and as it often covers acres of bog, which will grow practically nothing else, an ample supply can be readily gathered and stored up. In summer it forms a close even crop about a foot deep. After gathering the moss, it merely needs to be dried and pressed into sacks for future use.

Shoes and Socks.

The question as to whether ordinarily strong children should have the legs and feet habitually clad, after they can walk and have become fairly active, is one on which there is room for difference of opinion; but there is no doubt that all very young or delicate infants should ordinarily have their feet, legs, and thighs clothed suitably, when they are being carried about, or when they are laid on a rug in the open air to kick for exercise. The skin surface of babies is so great in proportion to their size that undue exposure of large areas is very devitalising, and is often a main factor in hindering growth, or retarding recovery. The stockings ought to be removed before tucking baby into bed (see "Warmth," page 84, and "Exercise," page 82).

If children wear shoes, they should be "rights" and "lefts," and should be made the shape of the natural foot, so that no deformities may be brought about. The same applies to the socks, which should not be pointed to the middle line (see illustration).

Shoes and socks should always be changed if damp.

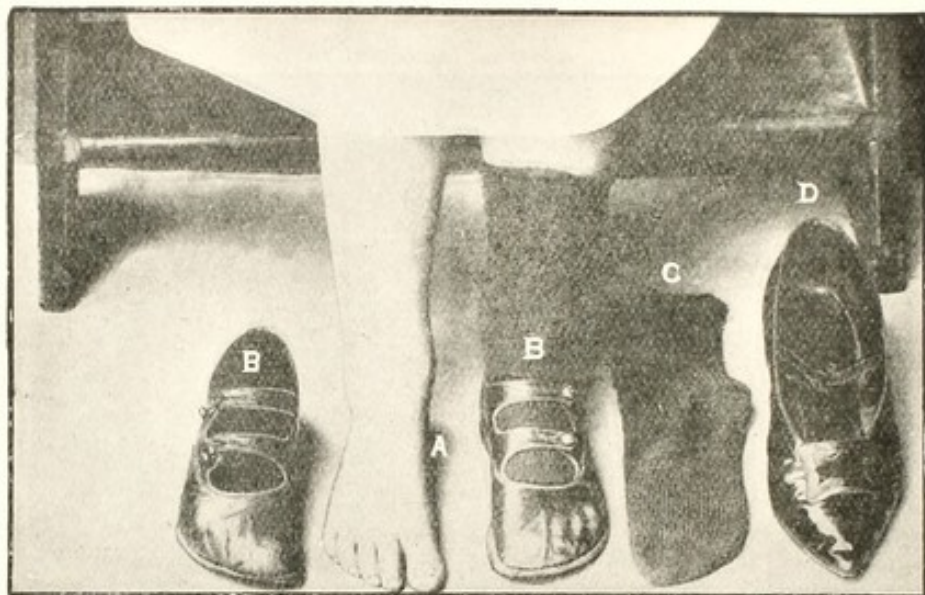


FIG. 32.

- (A) Normal foot of child, never deformed or cramped by ordinary shoes or socks.
 (B B) Shoes properly shaped as rights and lefts.
 (C) Sock properly shaped, being straight along the inner side, not pointed to the middle. The mother can as easily knit the right shape as the wrong.
 (D) Ordinary girl's shoe, designed for foot deformed by wearing the usual wrongly shaped shoes.

Typical Feet of Civilization.

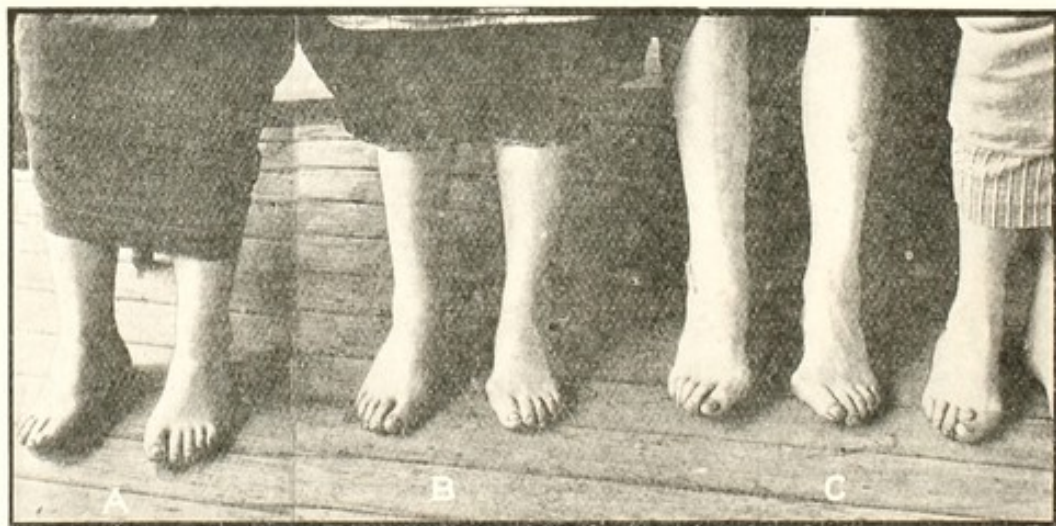


FIG. 33.

- (A) Feet markedly misshapen, but deformity much below average. (These comparatively undamaged feet belong to an imbecile, who has not had the opportunity of indulging her vanity!)
- (B) Average woman's foot.
- (C) Excessive, but not rare, distortion.

Professor Rotch has clearly shown that the baby's health depends largely on the mother having good feet and comfortable shoes. Daily open-air exercise is the first essential for the expectant or nursing mother, but she neglects this if walking is painful or irksome. Moreover, **walking in discomfort will not do.** By analysing the milk of the sedentary, boot-crippled mother, whose breast-fed baby was suffering from indigestion, Rotch found that the chemical composition of the milk was at fault. Daily exercise, when attended with blistering of the feet, did not correct this, but exercise with suitable shoes did, and as the milk became normal, so did the baby's health. This effect of pain on the secretion of milk appears quite natural when we reflect that the secretion of tears is dominated by pain (bodily or mental), and that comfort or discomfort at meals largely determines the composition and quantity of the digestive secretions.

Perfect feet cannot be attained by the mothers of to-day, but extreme discomfort in walking can be obviated by all who will be sensible in the matter of shoes. We cannot too strongly appeal to parents and teachers to do all in their power to **protect the rising generation from the physical VICE of deformed feet. Let us start with the babies.**

Care of Cord, Bathing, etc.

Modern medical opinion does not favour complete immersion of the baby at the daily bath until the navel string or cord has fallen off. A shallow bath is used at first. In private houses the simplest and safest way of dealing with the cord is as follows :—

Procure in advance a dusting-powder made up of :—

Finely powdered starch	3 oz.
Boracic acid	3 oz.
Zinc oxide	3 oz.

This can be applied by means of a tin pepper-pot. Have also in readiness a supply of soft old linen or cotton which has been perfectly cleansed, boiled, dried, and kept covered. Divide some of the linen into four-inch squares ; cut a hole out of the middle of each square such as would admit the tip of the finger, and cut a line to this from one side of the square.

After thorough cleansing of the tied stump of the cord and adjacent skin with boiled water, or some suitable antiseptic solution, the parts should be dried by dabbing with a piece of the clean linen and dusted with some of the powder. Then take two of the four-inch linen squares (or similar squares of lint) and place them with the central holes at the navel and the cord protruding through. The stump of cord and exposed surface of linen should be freely dusted with powder, and the upper square of linen should then be neatly wrapped round the cord. The dressed cord will now lie snugly on the under square of linen, and will be covered and kept in place by the putting on of the binder. If several teaspoonfuls of powder have been used there will be no trouble in perfectly cleansing the parts with warm boiled water the next day. The process of dressing will then be gone through as before. This careful cleansing, dusting, and dressing should be repeated daily until the stump comes off; the raw scar should then receive similar attention until quite healed.

Oil Bathing.

For premature or very delicate young babies it is well to rub or bathe with oil, and not to use water until sufficient vitality and resistiveness have been acquired. Many delicate infants, who now die, would be saved if women understood how necessary it is to guard against any avoidable loss of heat in weaklings at the dawn of life.

Some American authorities go further, and say that it should be a routine practice with all babies to use only the oil bath for the first week of life. We do not agree with this, being satisfied that bathing with warm water, rapidly carried out, acts as a pleasant, invigorating stimulus in the case of a normal healthy baby. But this is not so with chilly, delicate infants—they are depressed, not stimulated, by the ordinary bath, and oil should take the place of water until a normal blood temperature has been established and improved nutrition and vitality have been built up. Then hot-water bathing may be started, beginning with partial sponging followed by rubbing with warm oil—thus the mother may work up to the daily warm bath in a few weeks.

The following digest of remarks by an American mother, who is also a doctor, shows what is aimed at by the advocates of oil bathing, and shows also how to set to work:—

“To-day many physicians advocate wrapping the new baby in cotton batting, covering it quite closely and laying it away in a warm corner for several hours, until it becomes adjusted to its new home. Then, instead of washing, it is treated to an oil bath before a warm fire, with only a small part of its body exposed at one time. Good clean freshly rendered lard is best, as it removes most easily the cheesy ‘vernix caseosa’ with which the baby is covered. By some sweet oil is preferred.

“After baby has rested, nurse, with her basket at hand, her oil on the hearth well warmed, is ready to give him his first dressing. Use a small piece of absorbent cotton. Cover the head well with the oil; with a soft piece of old linen rub it off: with it will come the vernix caseosa, leaving the head clean. Do this with the entire body, little by little, taking great care that all creases are thoroughly clean and left well oiled, that no chafing may follow. For a week baby will need no other than the oil bath daily, and the restfulness and comfort of the little one will be expressed in sleep, sleep, sleep. The full bath in water should be reached by degrees only; proceed from partial bath with sponge to sponge bath; then, as baby grows stronger, put him into the tub. Approached in this way baby will take his bath with delight and look forward to it daily.”—Mrs. E. F. A. DRAKE, M.D.

The mother is strongly advised to read section “Warmth,” page 84, at this stage.

The Ordinary Bath.

Before starting to undress baby take every precaution to prevent loss of heat before, during, and after the bath. Undress, bath, and dress quickly—no delay or dawdling and no unnecessary exposure of the skin. Provide:—

1. Suitable bath; hot and cold water; bath thermometer.
2. A cosy corner in warmed room; draught screen if needed.
3. Dry warmed towels and baby clothing, and all other necessary materials and appliances ready at hand, and not needing to be hunted for during the bathing, as is so often the case.

Bathing preparations, extemporised in an ordinary sitting-room, are shown in the illustration on page 67, but the galvanised iron bath is not so good as the soft yielding rubber one shown on page 81.

Take great care in cleansing and drying eyes (page 121), ears, lips, and folds of skin, but on no account wipe out the mouth (see page 120).

When a young baby is taken out of the bath, he should not remain exposed, but should be placed at once between two warmed towels and dried rapidly by gentle dabbing movements rather than by rubbing.

The daily bath for the first six months should be given at a temperature of 98 deg. to 100 deg. F. A baby can be kept perfectly clean by means of warm water alone, but there is no objection to using a little soap two or three times a week. A mild superfatted soap is best. At the Karitane Harris Baby Hospital scarcely any soap is used, and powder is found to be unnecessary. If the infant is weakly, turns pale, and becomes blue about the lips, discontinue the tub and substitute "sponging" quickly with a cloth. (Actual sponges should not be used, as they tend to become infested with microbes. The "sponging-cloth" should be boiled frequently to ensure absolute cleanliness.)

Fig. 34. An admirable bath which can be made by almost any one. This is preferable to a hard tub because the waterproof yields to baby's form and causes the bath to be more enjoyable. This form of bath is very handy as it folds up and is easily carried about.



FIG. 34.

Cold Bathing.

This should be begun as soon as the child is sufficiently strong to take really active exercise. Most children of two years, and some even younger, would be benefited if given a cold bath every morning—the following precautions being carefully attended to:—

I. Gradually reduce the temperature of the water day by day—in ten days or a fortnight the bath can be taken quite cold. With a very young child, it is well to start in summer, and in any case to pave the way by standing the child with its feet in warm water while sponging with cool water, reducing the temperature of the latter each day until cold is reached.

II. The child should be taken straight from its bed, popped into the bath for a few seconds, rubbed and dried well with a good linen Turkish towel, dressed very quickly, and taken for an active walk, run, or game (in the open air if possible) for not less than quarter of an hour. The exercise must never be omitted, and should be made as active and pleasurable to the child as possible. Never allow a child to dawdle about either before or after the bath. **Cold bathing, followed by really active exercise, is a most invigorating and health-giving habit, and should be continued for life.**

Special Exercises for Women.

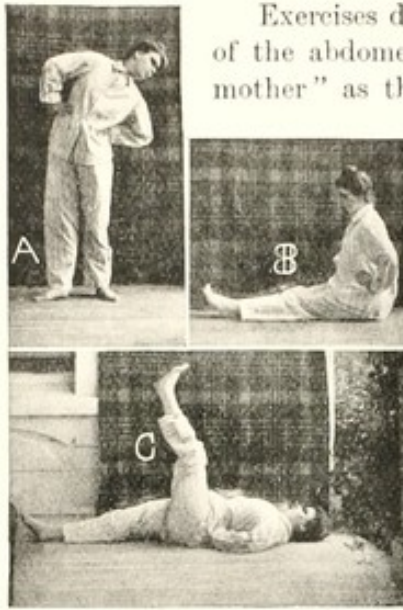


FIG. 35.

Positions B and C are preceded by lying at full length. Rising into the sitting posture (B) is helped by putting the tips of the toes under a chest of drawers. Elevation of the legs (C) is best done only one at a time, as shown.

Exercises designed for toning up and developing the muscles of the abdomen are of supreme importance for the "expectant mother" as they tend to ensure good digestion and regularity of the bowels—especially if accompanied by proper deep breathing and followed by vigorous self-massage. Further, when the abdominal muscles are in good form child-birth is generally safe and easy, and the use of chloroform and instruments is obviated. During nursing such exercises tend to ensure a steady flow of healthy milk.

The exercises should be done morning and evening very slowly and deliberately for only a few minutes at first—gradually working up to say ten minutes morning and evening. Get skilled instruction if possible (see page 7).

Exercise for Baby.

Sensory and Muscular.

Sensory exercise is most important, because it is what "runs us." It is the main source of the stimulation of all our bodily machinery, including even the voluntary muscles. The essential vital organs (nerve centres, heart, lungs, digestive and excretory organs, etc.) depend for their activities almost entirely on stimuli coming to them through the sensory nerves: hence one cannot overstate the advantage of pure, fresh, flowing air day and night, and of open-air outings, especially in sunshine. Keep the skin active.

A large amount of exercise should be taken, from a very early age, in the form of vigorous sucking, kicking, waving the arms, etc., and later on by crawling. Every such activity should be encouraged. At least twice a day the infant should have for fifteen or twenty minutes the free, unhampered use of his limbs. In warm summer weather, if protected from wind by a screen, a fairly strong baby may be laid on a bed or rug in the open air on a sunny verandah, clad merely in a woollen shirt, long stockings, and napkin. Here he may be left to freely kick and enjoy himself for five or ten minutes. Then, if he seems to be getting chilly, it is best to put on a light extra garment, when he may be allowed to kick for another five or ten minutes. A delicate baby would need more clothing from the start, except on a very warm day; but it is wonderful how soon such infants gather strength and resistiveness if properly treated, and how soon they cease to be chilly on moderate exposure. In good weather very strong babies may kick out of doors for ten minutes or more without stockings. On cold winter days such babies take no harm if allowed to kick in the open air with warm clothing and stockings on, and screened from wind or draught. As baby gets older, he learns to take more and more exercise; first, rolling and tumbling about, then crawling, and finally standing and walking.

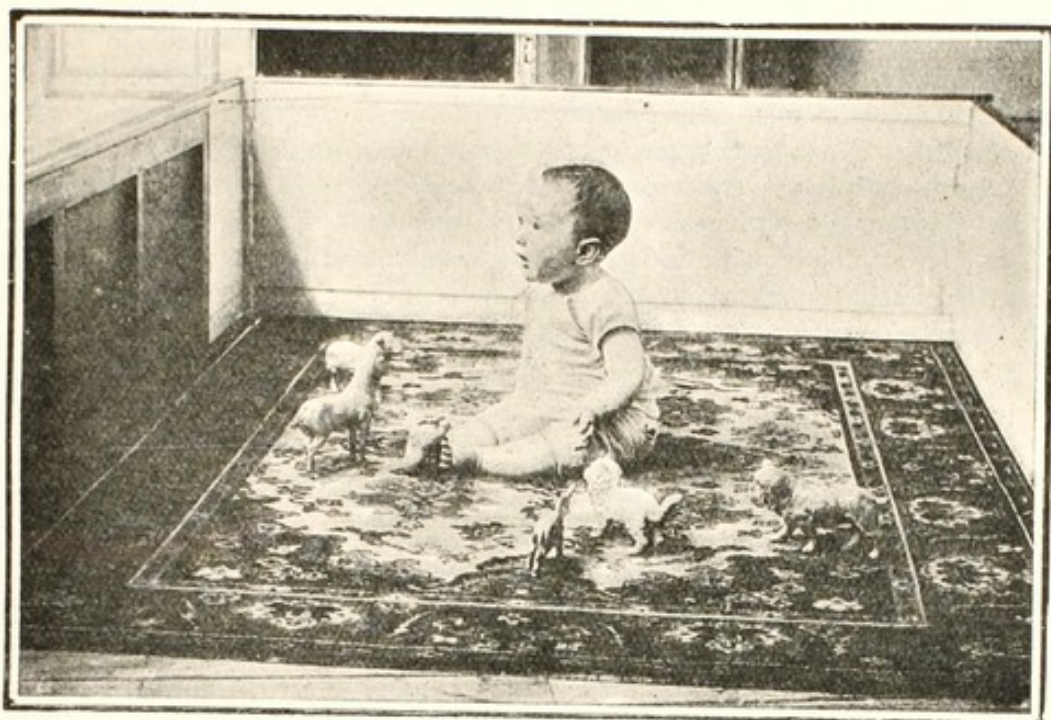
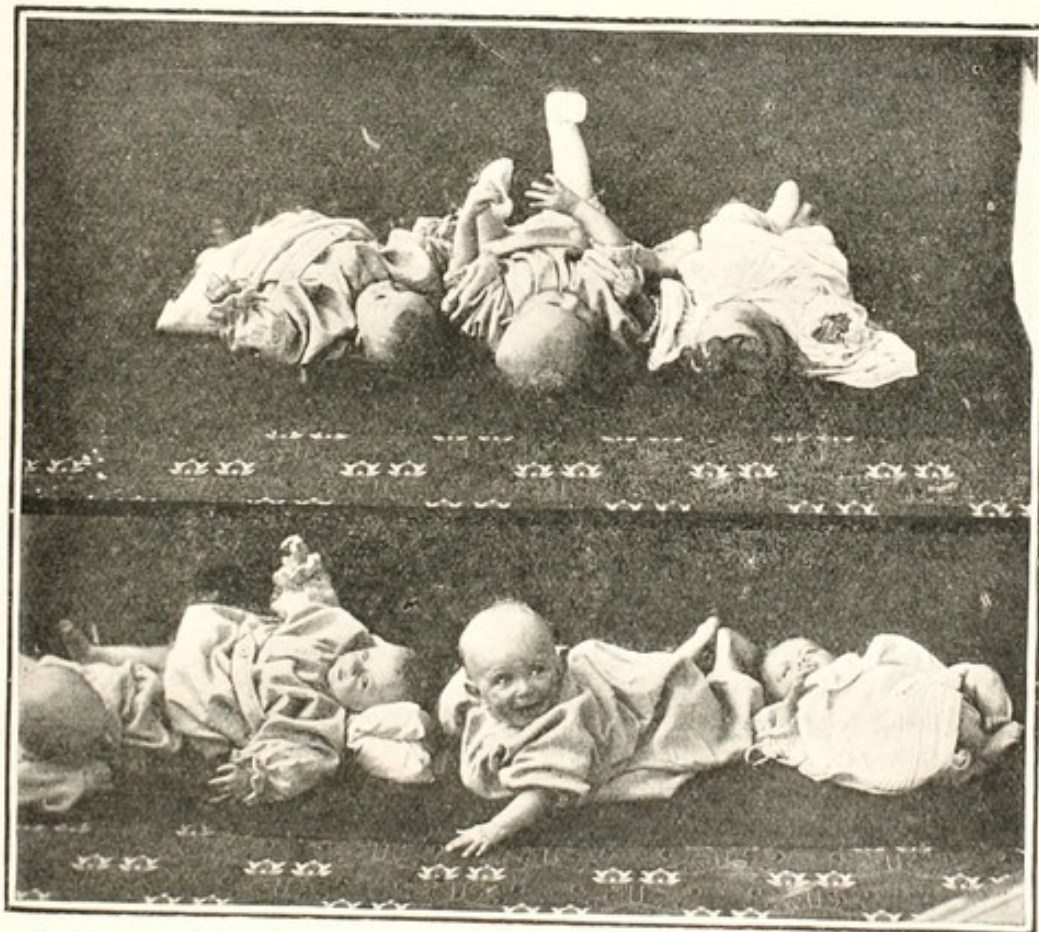
Kicking-Pen.

FIG. 36.

This should be provided for every baby. Any one can make a kicking-pen. Four sides of an old packing-case, eighteen inches high and four feet long, jointed together by means of leather hinges cut out of old boots and fixed with tin tacks, suffice.



Babies in "Kicking-Pen" at Karitane Harris Baby Hospital. FIG. 37.

The pen is best stood out of doors on a piece of cork-carpet placed on the floor of a verandah, or on a lawn, or in any other suitable position. Cork-carpet is preferable to ordinary carpet because the latter is so liable to be dirty, dusty, fluffy, and infested with microbes. All porous fabrics for floors are specially objectionable in the case of babies on account of their becoming wetted and fouled. The baby puts his mouth to everything, and being at the floor level, he also breathes in every impurity. In warm dry weather the pen may stand direct on the grass, whereas when the weather is bleak, blustering and rainy, it may have to be brought indoors. Whatever the situation, the pen saves the baby from cold draughts coursing along the floor or at the ground level. It can be folded when not in use.

Warmth.

It must always be kept in mind that a baby's skin-surface is three or four times as extensive in proportion to its size as that of an adult; therefore when an infant is exposed to cool air he must always be warmly enough clad to prevent excessive escape of heat. Small dumplings cool quicker than big puddings. On the other hand, mothers tend to overclothe their babies in warm weather, thus making them delicate and over-sensitive to cold. The general tendency is to muffle up and overclothe babies rather than to underclothe them.

The gravest and the commonest mistake in the clothing of babies is careless sudden changing from one style of garment to another (*e.g.* arms and legs clad one day and exposed the next); changing from homely flannel to embroidered cotton finery for exhibition purposes; taking a baby out of a warm stuffy cot indoors and wheeling him about in a push-cart, with bare arms and uncovered dangling legs. These are extreme cases, but there are few mothers who do not give their babies colds by serious, though less obvious, mistakes in the same direction.

Bed-Clothing.

When lying in its cot the baby (and indeed older children also) should be comfortably tucked in. The ideal bed-clothing is that which will afford the greatest warmth with the least weight, oppression, and hampering of the baby's breathing and other movements. Many of the lower animals, such as birds, opossums, sheep, etc., are ideally clad, their clothing being air imprisoned in the meshes of feathers or fur, the total weight of which may be quite insignificant. We should imitate this condition as nearly as possible by using only wool, instead of cotton or linen, and selecting very open cellular or fluffy fabrics instead of close-woven or felted ones. There may be more warmth in two or three thicknesses of a light, fleecy shawl than in the close, thick material of a rug weighing three times as much—just as there is infinitely more warmth in a light, fleecy new blanket than there will be in the same blanket when shrunk and felted by washing, although the shrunk material may be heavier per square yard, and therefore more oppressive to the child. Several layers of clothing are always warmer than the same weight of material would be if it were woven into one thickness, because air is imprisoned not only within the meshes of each layer, but also between the layers.

While air imprisoned between the layers or within the meshes of wool keeps in the warmth, it must never be forgotten that any distinct air-current circulating round the child's body, and passing freely in and out of the bed by means of untucked coverings, etc., will cause great chilling in cold weather. It is desirable to avoid this unnecessary waste of heat at all times, and it is imperatively necessary to guard against it when babies sleep in cold air. At the Karitane Harris Baby Hospital, where the sleeping rooms are sometimes at the freezing point all night, the bed is made as follows, and the same plan is advisable at all times, except when the weather is uncomfortably warm.

Making the Bed.

Place a fluffy new blanket on the bare floor of the child's cot or bed. On the blanket put the mattress, and then make the bed in the ordinary way, tucking in as usual, but using only as much covering as will be needed when the blanket which goes under the mattress has been brought round and overlapped so as to envelop the whole bed. The size needed for the enveloping blanket will vary according to the size of the bed. It should be large enough to completely envelop the bed with at least six inches of overlap, and should project twelve inches beyond the mattress at the foot end. The overlapping portion should be secured with a few safety-pins. The foot-end must be turned up neatly and pinned across. The baby will then be in a kind of sack, and you may put him on the verandah on the coldest day and he will be quite cosy and comfortable, so long as he is protected from strong direct draught. (See illustrations in Appendix, page 160.)

If necessary, hot bottles may be used. Be careful not to overclothe.

Professor Holt says:—"The common mistake is to overload all children, but especially infants, with covering at night. This accounts for much of the restless sleep which is seen, especially in delicate infants."

If the above precautions are taken, there need be no fear of subjecting a young infant to pure cold outside air. It will make him bright, keen for his food, contented, and a sound sleeper. He will grow and flourish, his flesh will become firm and his cheeks rosy (if the other essentials for health are attended to at the same time), while a baby coddled in a warm, unventilated room will become irritable, sickly, pale, and flabby.

Hot Bottles.

There are many occasions when a well-muffled hot bottle or brick is the best means of making a baby comfortable; for instance, in cases of sickness where the feet tend to be cold (*e.g.* colic, indigestion, diarrhoea, etc.), a warmed bed is a better sedative than any drug or soothing powder. However, the use of hot bottles may be overdone, and a baby may be rendered soft and delicate by habitual and unnecessary warming of the bed. None but delicate or sick babies need hot bottles—the healthy are better without them, unless occasionally and under exceptional circumstances. Further, much harm may be done in cases of sickness by leaving a bottle in the bed long after it has cooled down.

N.B.—Many babies are seriously burned by kicking the covers off hot bottles which have been carelessly muffled, or through the mufflings being too thin. Extreme care is needed. Indeed, the best plan is to place the bottle, well muffled, between a mattress and shakedown (see illustration, page 160), where it will retain its heat and tend to keep up an equable temperature for a long time. It is a safe rule never to put a hot bottle in a position where the mufflings can be reached by the baby's feet, because if the bottle is very hot it may burn the tender skin of infancy through several thicknesses of blanket.

Head Coverings.

Thick woollen Dutch bonnets are very heating, and therefore bad for babies. The head covering, if any is used, should be cool, light, and porous. The heads and eyes of little babies ought to be shaded from strong direct sunlight.

Cleanliness and Prevention of Fermentation.

Napkins.

Soiled napkins must be removed from the room at once, and placed in water. Hands which have come in contact with soiled napkins must be well washed before again handling the baby or its food.

Feeding Bottles.

The feeding bottle needs as serious consideration and attention as the milk itself. The use of improper forms of "feeders," and carelessness as to perfect cleansing (see page 20) are main sources of poisoning by microbes. This is a large factor in the high death-rate of children under one year of age, and is a leading cause of indigestion and summer-diarrhœa. Every part of the feeding bottle must be capable of easy sterilisation. It must have no corners or angles, and must have no letters stamped on it causing projections inside. The simpler the form of bottle the better. The neck must be sufficiently wide to permit of easy scouring—preferably without the use of a brush.

There must be no tube or screw to harbour dirt and germs. The use of tube feeding bottles is illegal in France and some other parts of Europe, and in many of the American States. The "Long-tube" feeder is a dangerous and filthy abomination which ought to be condemned everywhere. It is practically impossible to keep an indiarubber tube in a state fit for use—it becomes a slimy sewer lined with microbes. Further, a baby gets no proper exercise with a tube-feeder, and the teat tends to cause deformity of the palate and jaws, bad teeth and adenoids. The nipple is the only part of a feeder where indiarubber is permissible, and it should be so formed that it may be readily turned inside out for cleansing.

Turning to Fig. 38, it will be seen that the **Hygeia Feeder** (marked *A*) best fulfils all requirements. Here, instead of a bottle, an open glass jar is used. This jar is covered by an indiarubber cap shaped like the human breast. There is no trouble whatever in keeping the vessel perfectly clean without the use of a brush. Further, the process of sucking from this feeder closely resembles natural suckling. The baby will be found to nuzzle into the artificial breast, thus helping to press out the milk. He also takes portions of this "breast" between his lips, just as he would do with the mother's breast. He does not confine himself to the nipple, as is necessarily the case with ordinary teats, and the wide action of mouth and jaws provides a better form of exercise, resulting in improved blood supply to all adjacent parts. Thus it is that natural suckling, or the nearest approach to it, tends to ensure better development of the teeth and jaws (and muscles acting on them), better tongue, palate, nose, etc., and immunity from sore throat and adenoids—these affections being mainly expressions of inactivity and impaired nutrition of the parts.

B and *C* (Fig. 38) are both good forms of bottle, but *B* is preferable. The sole advantage of the "boat-shape" bottle is the power to run water through it, but a brush is needed for perfect scouring, and with a brush *B* is quite easily cleansed. THE DISADVANTAGES OF THE "BOAT-SHAPE" ARE FOURFOLD, VIZ. :—

1. Extra expense. Better buy two or three bottles of type *B* than only one of type *C*.
2. The presence of indiarubber at both ends involves extra risk of germs, and more work.
3. The "air-valve" is liable to get blocked, and is not needed in any case, because air finds its way in fast enough between the teat and the neck of the ordinary bottle. In the case of the latter, the bubbles which so alarm mothers are **entering**, not **leaving**, the bottle, and it is rather easier for a baby to "swallow air" with the boat-shaped feeder than with the simple type. The way to prevent this is to hold the bottle all the time, which should be done whatever type of feeder is used.
4. The sterilising of an occasional feeding, or the heating to 155 deg. F., when necessary, is readily effected in the case of a bottle which stands upright, but is inconvenient with a bottle lying down.

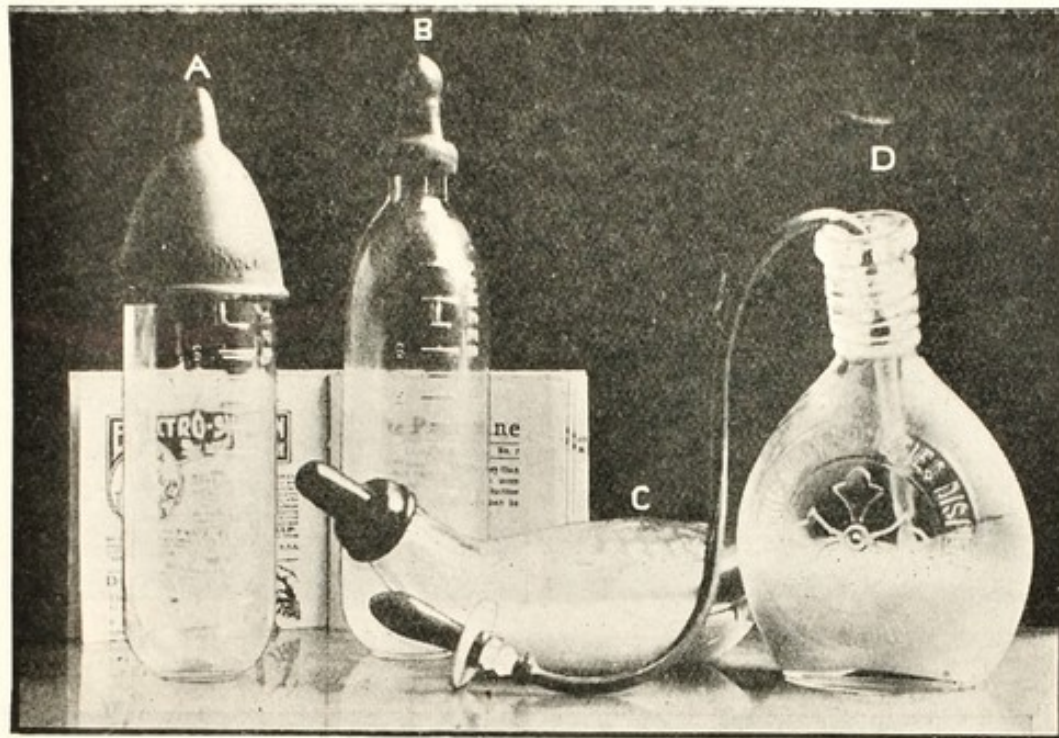


FIG. 38.

(A) **Hygeia Feeder.** Note open-mouthed jar in place of bottle, and artificial breast instead of mere nipple. For details see text.

(B) **Good Simple Feeder.** Note that every part is rounded and easily cleansed. The cloudiness of the glass compared with the "Hygeia Feeder" (print behind can be read in the one case, not in the other) is due to the fact that *A* was thoroughly rinsed out with cold water before using hot; whereas in *B* boiling water was used at once. Hot water coagulates milk and makes perfect cleansing more difficult.

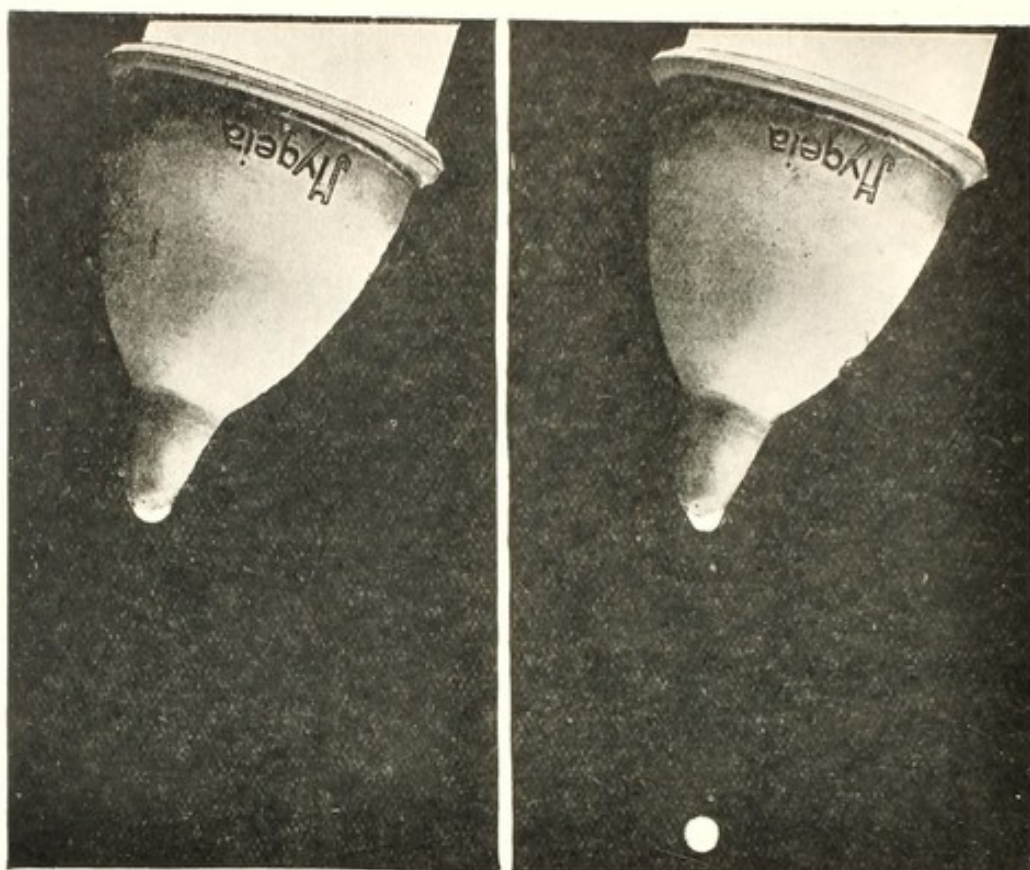
(C) **Boat-shaped Feeder.** Note inconvenience of lying-down position if a particular feeding needs boiling. The nipple is also inferior to nipple *B* because the slightly bulbous tip of the latter gives the baby a better "grip," more like the result of burying the lips in mother's nipple. (See full criticism in text.)

(D) **Long-tube Feeder.** Note screw, angles and long tube, all harbouring slime and germs. Note also that there is nothing for baby to tug at. (See further criticism in text.)

Teats.

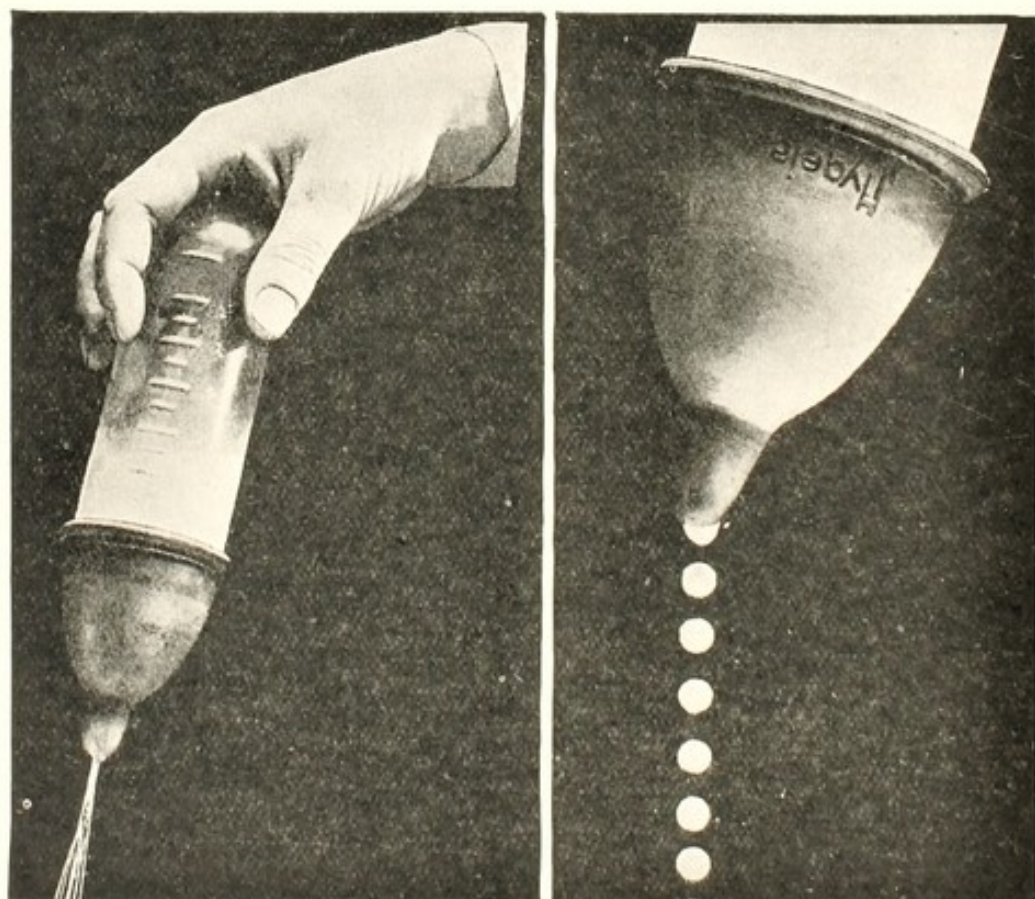
The teats should be made of black rubber, and should be fairly firm, so as not to collapse readily. Several should be kept in stock, because a teat needs replacing directly the hole becomes too large, or when the rubber shows distinct signs of perishing or becoming too soft. The size of the hole is very important. In general it may be laid down that **the best aperture is the smallest through which the particular baby can suck his feeding in about fifteen minutes.** Unfortunately, frequent or prolonged scalding, soaking in water or in solutions of boracic acid or soda, too much exposure to air, light, etc., may bring about such rapid changes in the indiarubber, that a nipple from which no milk drops when first used may allow it to spurt in the course of a month. This is why several teats ought always to be kept in stock, and it also shows how important it is to adopt the best system for their preservation. If a teat is not perforated, a hole can be made by puncturing with a very fine red-hot needle; but this tends to damage the indiarubber.

TESTING TEATS Merely turn the half-filled bottle upside-down. Don't SHAKE out the drops. If the feeder were full the rate of flow would be increased; if almost empty the flow might cease.



Hole right for average healthy baby.

Hole right for rather poor sucker. FIG. 39.



Hole much too large, milk spurting out.

Hole too large, except for extremely feeble baby.

FIG. 40.

WHY TEATS PERISH.

The leading causes of deterioration are :—

1. Scalding or boiling, especially if frequent or prolonged. This makes teats very soft and collapsible.
2. Continuous soaking in water, or worse still in solutions of boracic acid, soda, etc. This common practice quickly "rots" teats—they swell up, become thick, coarse, granular, porous, and inelastic, and tear readily.
3. Keeping exposed in damp air; also, too free exposure in any atmosphere, especially in air-currents. Still, dry, more or less confined air of equable moderate temperature is much better, but rubber keeps best if hermetically sealed.
4. Keeping exposed to strong light. Darkness is the ideal condition.

EVIDENCES OF DETERIORATION.

The rapid spoiling of teats, as ordinarily kept, is easily proved. One simple test of fitness for use is the rate of flow when a feeder, say half filled with milk, is turned upside down. (See Fig. 39.) With a new teat the milk should drop extremely slowly or not at all—indeed, none may appear even at the aperture. Assume the last condition: on trial, say, it is found that the baby takes its feeding in a quarter of an hour. We regard this as the ideal teat. It is scalded six times daily and kept in boracic solution: tested a few days later, the milk drops every minute; at the end of a week it drops every few seconds; in a fortnight it drops several times a second; in three weeks the drops touch one another; and at the end of a month the milk spurts out.

The baby meantime has taken a quarter of an hour over his bottle at every feeding. Naturally the nipple has been regarded as satisfactory; but in reality the child has insidiously come to do less and less work at each meal, and in the end is doing almost none. Anxiety about microbes has made us too forgetful of an equally important matter, viz., the ensuring of a sufficiency of daily work for the muscles of tongue, mouth, and jaws; involving secondarily an adequate supply of blood to the adjacent teeth, nose, and pharynx; and, ultimately, freedom from **Adenoids** and other conditions associated with imperfect development of the upper food and air passages.

A teat often perishes far more quickly than is indicated above, and is really not fit for use at the end of a few days.

The following is a simple means of checking growth of microbes, and at the same time preserving the teats in the most effective way:—

HOW TO KEEP TEATS.

1. Scald teat **once** a day by pouring boiling water over it.
2. Immediately after each feeding rinse the outside of teat with cold or warm (not hot) water, and rub with common salt; then turn teat inside out, rinse and rub thoroughly with common salt. This removes the "milk-slime" which always gathers on the inside surface of teats.
3. Rinse with clean boiled water (not hotter than the hand can bear).
4. Place the clean wet teat in a small perforated box surrounded with recently baked sawdust, which ensures dryness, equable temperature, practically still air, and absence of light. (Details will be supplied on application to the local Plunket Nurse.)

If preferred, the cleansed wet teat may be merely put on a saucer and then dried quickly on a warm plate-rack and stored in a small covered jar or box.

The whole process of cleansing and putting away the teat should occupy only a few minutes—minutes well spent for the sake of the baby.

No brush is needed for cleansing teats. Rubbing with the fingers and a pinch of salt is preferable.

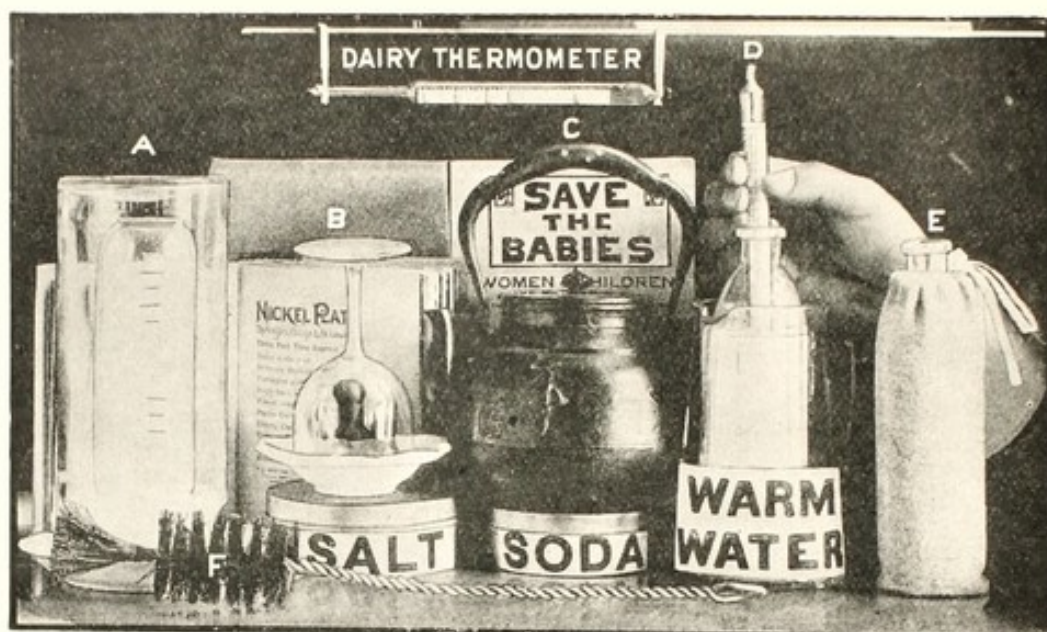


FIG. 41.

The above serves to illustrate some of the most important points in connection with feeders.

(A) Feeding bottle cleaned and standing upside down to drain under cover of a Mason's fruit jar. If the bottle is baked as recommended, this is not needed; it is handier to lay the bottle on its side.

(B) Teat in saucer under wine glass. In practice don't use a glass cover, because light causes rubber to perish. Salt provides a ready means of removing slime from teats.

(C) After feeding bottles have been rinsed with cold water, boiling water and soda afford the most effective and practical means of cleansing. A brush may be needed. Finally, rinse thoroughly with boiling water, and place in the oven to bake and dry. This is a much better plan than keeping in boracic solution. If the bottle discolours on being baked, the cleansing must have been imperfect.

(D) Feeder of milk heating in jug of warm water. The thermometer is the only means of ensuring the right heat, viz., 100 deg. F. Note that the bulb is held about the centre of the milk, not resting on the bottom. The top milk is warmer than the average of the contents, while the bottom is cooler.

(E) The feeder prepared, as shown in D, is now ready for use. Note the enveloping flannel bag, which lessens escape of heat during feeding. It is better for the flannel not to reach so near the teat as shown in picture. In any case the bag must be very frequently washed. It would be well to make the upper margin of some smooth waterproof material.

(F) This is stronger than the type of brush ordinarily used, and is more effective. If the bottle cannot be made perfectly transparent without a brush, use one, but it must be kept scrupulously clean.

Sleep and Rest.

A baby needs abundance of sleep. A newly-born baby normally sleeps nine-tenths of its time. At six months it should sleep two-thirds of the time. If it is sleepless, it is uncomfortable, due most probably to its being dyspeptic, irregularly or too often fed, overfed or hungry, wet and cold, or oppressed by excess of bedclothing and overheating; or the nursery may be insufficiently ventilated; or baby may be suffering from thirst or irritation of the skin.

Children should be put to bed regularly at a reasonable hour.

It is well to continue the morning sleep or rest until the child is five or six years old, especially during the summer when children wake early. This can easily be accomplished if there is a little firmness on the mother's part. A short sleep or rest restores a child wonderfully, and the result is that there is no crossness or fatigue at the end of the day.

Various Notes.

Need for Thinking.

The extreme importance of care and system in the rearing of babies is becoming so universally recognised that there is some hope now that many mothers may be brought to give serious attention to the matter, and try to understand the simple requirements essential for the health of themselves and their offspring. Meantime only comparatively few of the more sensible women are prepared to take adequate trouble to understand the simplest reasons for what they are daily called upon to do, or to avoid doing, in the interests of their offspring. The ideal baby food of the typical modern mother is a powder to which only warm water need be added, and a feeding bottle and comforter, with which the child can be left to itself. If any properly regulated system is advocated, she asks to have it expressed in half-a-dozen all-embracing, hard-and-fast rules, to be blindly followed without calling for thought. Unfortunately, the exercise of intelligence cannot be dispensed with. Indeed, reason becomes continually more necessary for women as they depart further and further from the simple ways of Nature, and the knowledge they need cannot be compressed into a nutshell. However, there are certain first principles—one might almost say commandments—which every mother ought to have ingrained into her.

Golden Rules.

- I. Baby should be breast-fed. Failing this, give Humanised Milk, but never start with full strength. (See page 31.)
- II. Feed regularly, no "night-feeding." (See Feeding Table, page 34.) Wake the baby if asleep when meal-time comes round. Give no food between meals. May have water if thirsty.
- III. If a baby is artificially fed, the bottle used must not have a long tube, but simply a rubber teat. Both bottle and teat must be kept scrupulously clean. Never omit to thoroughly stir the milk before putting it into the feeder. Always hold the bottle while feeding, and keep a slight tension on it. (See page 19.)
- IV. Don't use a comforter. It is utterly unnecessary, and is always prejudicial to health. A dummy deforms the jaws, teeth, and palate, and causes saliva to dribble all the time, thus interfering with digestion. Further, it is a leading cause of "adenoids."
- V. Don't use grey powders, teething powders, or soothing drugs—never give baby any drugs, save under medical advice.
- VI. Don't resort to Patent Baby Foods. If used after nine months they may be suitable for a part of baby's food, but they are not needed, because "Oat Jelly," toast, bread, etc., are as good or better, and infinitely cheaper.

- VII. Don't listen to the advice of so-called "experienced" people merely because they have brought up a number of children, or "buried seven," and therefore think they know how babies should be fed and cared for.
- VIII. An infant should never remain in its cot continuously in one position. Not only should its position in the cot be changed from time to time, but every few hours during daytime it should be taken up and carried about.
- IX. A baby will not thrive properly unless it has free exercise for its limbs by kicking, waving its arms, etc., and full expansion of its lungs by occasional natural vigorous crying.
- X. Clothing should be light, porous, warm, free from irritating properties, sufficiently loose to allow perfect freedom of the limbs, and free play for expansion of chest and abdomen, but not so loose as to ruck into folds. Beware of constricting tapes or belts; these can be felt by pushing the hand up under the clothing.
- XI. Let the baby have plenty of sunlight and plenty of fresh air day and night. Never cover the mouth with anything—not even with the openest muslin. The more a baby is out in the open air the better he will thrive.
- XII. The nursery should have a sunny aspect, should be cool, and should have a current of air passing through it day and night. Keep the baby out of direct draught; cool air does good if baby is protected from draught and properly clad. Premature babies may need warm air for some time.
- XIII. The daily bath for the first six months should be given at a temperature of 98 deg. to 100 deg. F. Always bath and dress rapidly—no dawdling. Dry thoroughly, especially about the fork, buttocks, and all folds of skin. When the child is able to take active exercise, cold bathing is most beneficial. (See p. 81.)
- XIV. Early education of bowels and bladder is most important. Baby should be "held out" at regular times every day.
- XV. A baby needs abundance of sleep. (See p. 90.)

Rules such as the above are good guides so far as they go, but no set of rules will save the baby if the mother fails to cultivate the use of thought and common-sense in dealing with the various matters which crop up daily.

The Start of Life.

In every work, the beginning is the most important part, especially in dealing with anything young and tender.—SOCRATES.

Proper feeding and warmth of body afford practically the sole satisfactions of earliest infancy—expressed by contentment, quiet, and sleep.

Improper feeding, and wetness and coldness of the skin, are the leading sources of discomfort—expressed by fretfulness, crying, and restlessness.

Feed your baby properly, give him pure, cool air to breathe, keep his body "saug," and he will be contented; ill-feed, starve, or chill him, and he will feel wretched—and will let you know it!

Milestones on the Baby's Road.

End of first week. Begins to like soft diffused light. Before this baby bears light badly, and opens eyes only in darkness or shadow. **Squinting** is common in the first month, because the mechanism for moving the two eyes together is not yet in working order. Marked squint later on is suggestive of indigestion, morbid irritation, and a tendency to convulsions. Consult doctor.

End of first month and early in second. May begin to notice differences in foods by combined smell and taste; and on this account, if offered a milk slightly different from what he has been accustomed to, may refuse to take it.

Dawnings of **attention** begin to be "**expressed**" by pursing up mouth, wrinkling forehead, elevating eyebrows, fixation of gaze, etc. From this time forth the baby looks out on his little world with wide-open, wondering eyes, vaguely drinking in impressions more and more day by day.

Presently **he manifests distinct interest** and more or less **pleasure**, not only in food, but also in various sensory impressions coming to him:—

- (a) **Through Touch, Warmth, etc.**—Likes to be stroked, handled, patted or caressed.
- (b) **Through Sight.**—Enjoys sunlight, fires, lamps, shifting lights and shadows, bright moving objects, people, animals, etc.
- (c) **Through Hearing.**—Shows interest in various sounds, *e.g.* ticking of watch, barking of dog, musical notes, singing, etc.

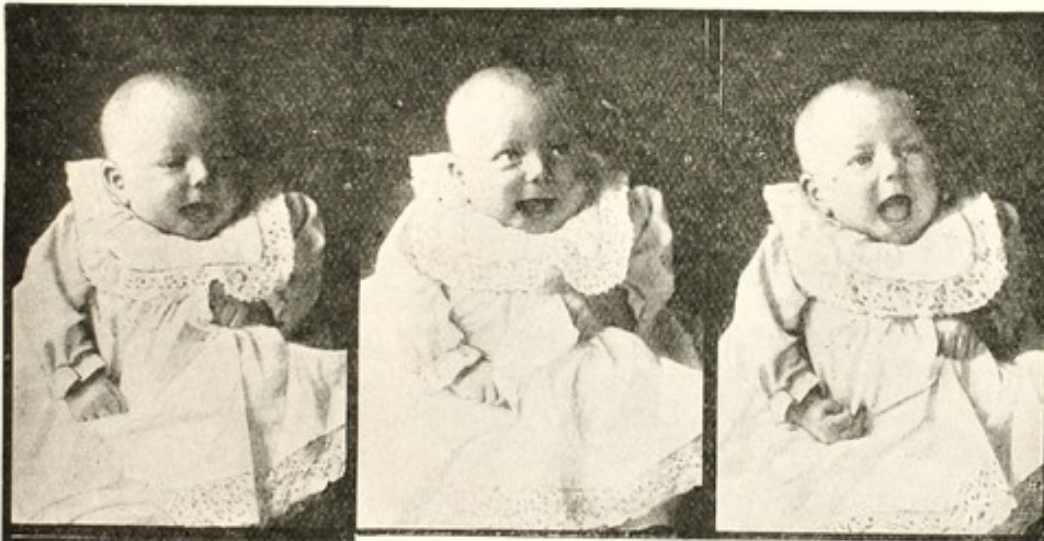


FIG. 42.

Smiles of happy breast-fed baby, three months old.

Sixth to seventh week. Birth of distinct "**expression**" of feelings. First true, **bright responsive smile**, and cooing, chuckling or babbling with pleasure.

Eighth week. Begins to show distinct concentrated **attention**; to follow slowly-moving objects with his eyes, to notice faces, etc.—"knows his mother."



Fourth month. Head ceasing to be "wobbly"—can with effort "hold up his head." (This is regarded as the first manifestation of the exercise of **will-power**, and as such marks an important stage in the baby's mental progress.) Shows increasing interest and joy in parents and familiar friends, but tends to be alarmed or frightened by strangers—he is "becoming shy."

Fifth month. "Crows" and laughs aloud. "When the first baby laughed for the first time its laugh broke into a thousand pieces and they all went skipping about and that was the beginning of fairies."—*Peter and Wendy*, J. M. Barrie.

Sixth month. Weight at birth doubled.

Fifth to seventh month. Reaches for toys and handles them. Delights in noisily crumpling, banging or knocking things about, repeating these actions over and over again. Carries everything to his mouth, including his own toes, which fascinate him by their constant movements. They are more than mere **playthings**—they are his chief **playmates**! A young baby has no idea that his toes belong to him—they are interesting as live moving things always at hand. About the sixth month there comes a dawning, wondering consciousness of **self**. The baby then begins to realise that his own limbs possess for him a quality which all objects apart from himself lack—they are sensitive—from them come **feelings** of pleasure or pain—they are parts of himself, and thus quite different from his toys or companions.

An infant that is handling, for example, a wooden brick derives from his fingers sensations of touch, of temperature, and perhaps of weight, but when he drops the piece of wood and grasps his toes, stimuli now stream up to his brain, not only from the hand that grasps, but also from the toes grasped. The infant is not able at first to appreciate this difference, and is longer still in associating this peculiar quality with those objects which alone possess it, and in marking them off in his own consciousness from those that lack it. But even before this understanding is reached, the child will prefer to play with his toes rather than with a piece of wood. He derives more sensations and therefore more pleasure from the former. Gradually there is borne in upon his mind the fact that a difference exists in the objects touched, and the earliest appreciations of this fact are associated with wonder. Thus an infant grasping hither and thither, happens by chance to seize one hand with the other. He is plainly astonished. He becomes quite still and steadily stares at his interlocked fingers. Then slowly opening the enveloping hand, he supports in its palm the fingers of the other. Again he stares mystified. He begins to feel the fingers of the passive hand, bending them open and shutting them again. This investigation is continued, until finally the hands move apart, and the child's attention wanders to other things . . . The sense of touch is therefore of the very greatest importance in laying the foundations of the consciousness of self.—David Forsyth, M.D., D.Sc.

Eighth to ninth month. Able to sit erect.

Ninth to tenth month. Crawls or attempts to bear his weight on the feet.

Eleventh to twelfth month. Stands with assistance.

Twelfth month. Weight at birth trebled. Six teeth cut. Says single words.

Twelfth to fifteenth month. Walks alone. "The child's principal interest is no longer restricted to the immediate neighbourhood in which he sits, but henceforth he is able to concern himself with a wider area, and, in nursery, garden or field, discovers a thousand and one novel delights that urge forward his mental development at a great speed. New experiences are of frequent occurrence, and the eager intelligence of the child absorbs them like a sponge absorbs water."—David Forsyth, M.D., D.Sc.

- Eighteenth month.** "Soft spot" in the head closes. (If closure is delayed beyond two years, consult a doctor.)
- Eighteenth to twenty-fourth month.** Begins to have some power of distinguishing colours—especially red and green.
- Twenty-fourth month.** Puts words together into sentences, and should talk well. Sixteen teeth cut.

N.B.—If the MILESTONES are reached in good time the mother may feel sure that her baby is not backward or defective. There may be delay on account of rickets or other retarding illnesses, or marked backwardness may be the first evidence of mental deficiency. On the other hand, even an able child may be late in holding up his head; late in walking, talking, etc.; and "defectives" are not invariably much behind-hand in these respects. If a baby is backward consult a doctor.

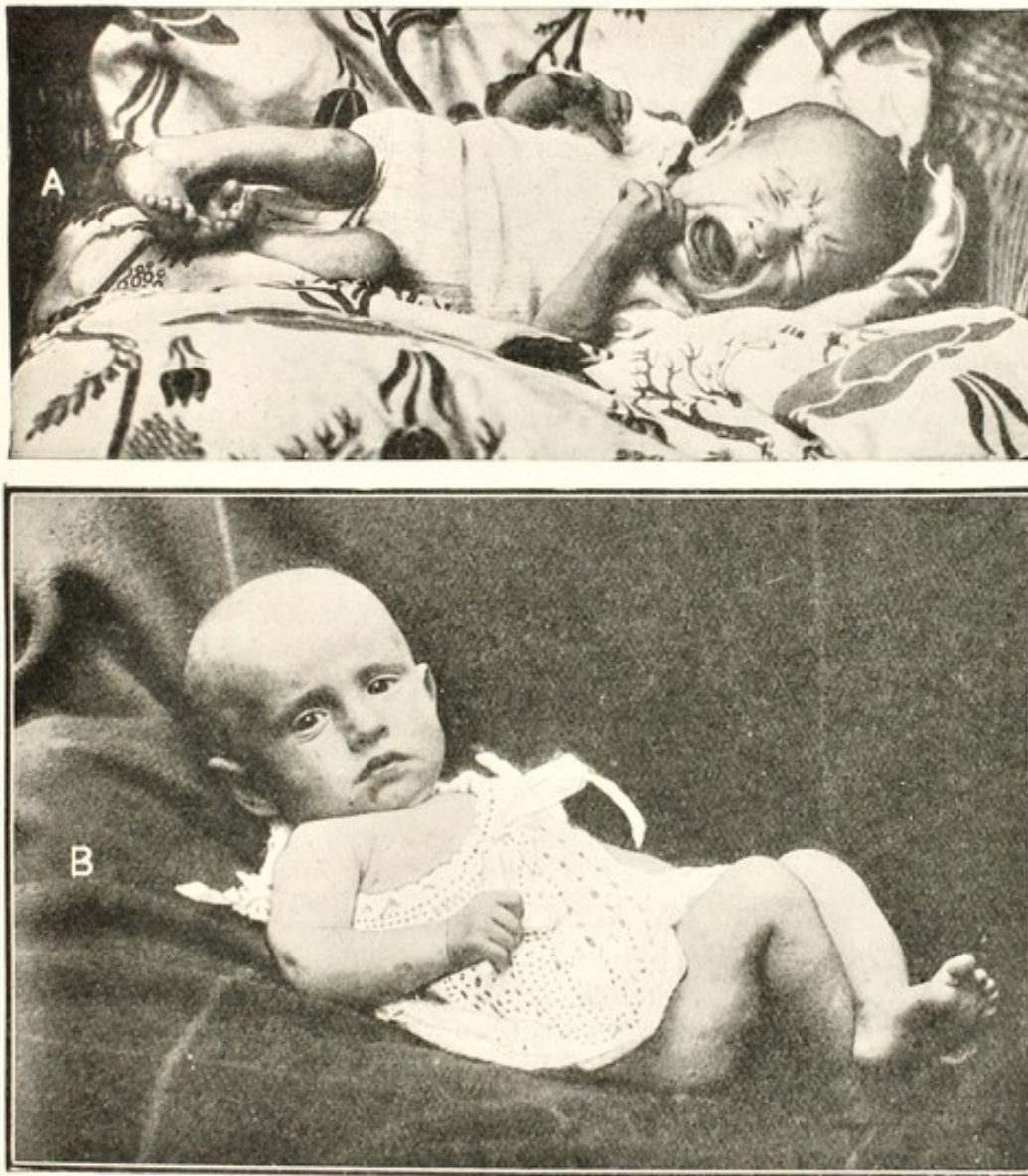


FIG. 43.

(A) Baby extremely emaciated—weighed only 5½ lb. at 6 weeks, when admitted to Karitane Hospital.

(B) Same, a few months later. Was fed on humanised milk.

Cries of Baby.

Learn to recognise the different forms of crying—then act kindly, sensibly, and if necessary firmly. Never stop crying by using a "Comforter" or a "Soothing-powder." Never feed a baby out of his proper time to pacify him: don't "spoil" him.

Three Main Varieties of Crying in Babyhood.

1. Primary, painless, reflex crying, needed for expansion of lungs and exercise.
2. Crying due to bodily discomfort, or to being "out of sorts," ill, or in actual pain.
3. Crying without pain, merely to gain attention. This is the cry of the "spoiled" infant, and needs firmness, not further attention and yielding.

PAINLESS REFLEX CRYING.

Crying at birth is reflex, natural, and necessary for proper expansion of the lungs; further, a certain amount of crying during the ensuing months is healthful, because the normal act of crying involves, besides deep breathing, considerable all-round nervous and muscular activity and exercise. This explains how it is, that when no motion has taken place on merely "holding-out" the baby, he may have a good motion directly he cries. However, a young baby should get his main exercise by vigorous suckling—there being added later, kicking, waving of arms, etc.

Is the crying normal or abnormal? Crying in moderation is natural, but baby should not cry too much, and he should not cry the wrong way.

Professor Holt says: "The proper cry is loud and strong. Infants get red in the face with it; in fact, it is a scream. A cry is abnormal when it is too long or too frequent. The abnormal cry is rarely strong; often it is a moaning or a worrying cry, sometimes only a feeble whine."

"The nurse should learn to recognise the loud cry of temper or of hunger, the intermittent, sudden outbursts suggestive of pain, the long-drawn wail of continued suffering, the sharp penetrating cry of brain trouble, or the mournful whine of utter exhaustion."—Forsyth.

CRY OF HUNGER OR THIRST.

This is generally fretful, but may be loud and may merge into the screaming of temper. It is usually **continued**, is accompanied by sucking of the fingers, and stops promptly when the baby is fed or given a drink. However, **never resort to feeding as a mere means of stopping crying—never feed except at feeding times.** If the baby habitually cries, before the appointed hour comes round, probably his allowance is not enough (consult "Feeding Table"); but remember that indigestion and discomfort arising from **overfeeding** may cause similar crying. Don't jump to conclusions. Investigate.

CRYING BECAUSE UNCOMFORTABLE.

This may be due to baby being too hot or too cold; to wet napkins; harsh, tight, over-heavy or rucked clothing, or discomfort from lying too long in one position. In the last case, crying stops if baby is turned on to the opposite side.

Any other **external irritation**—such as fleas, sore buttocks, or prickly-heat, eczema, etc.—will keep a baby awake and fretful: the same applies to the **internal discomfort** of hunger or thirst, slight indigestion or wind, thrush, the irritation of teething, or any of the other aches of infancy.

CRYING FROM OVERTIREDNESS, FEEBLENESS, OR EXHAUSTION.

An overtired or sleepy baby may cry and fight for a time against going to sleep, but will drop off when made quite cosy and comfortable.

Though an overtired baby always tends to cry, a very weak, delicate, exhausted child is incapable of loud or continued crying. If severe pain is long-sustained, even a strong baby becomes exhausted, and loud cries give place to mere feeble wailing or moaning—a much more dangerous state than the earlier stage when the child is able to cry lustily.

CRIES OF ACUTE PAIN.

1. Pain of Injury to Skin—*e.g.* pricking with pin, or burning with hot-bottle. The cry is usually sharp, piercing, and sustained; but there may be no loud warning in the case of a feeble infant who is being slowly burned.

2. Pain of Stomach-ache.—This is the popular term for all abdominal pains. The pain generally comes in waves or spasms, leading to recurrent outbursts of crying or screaming.

Slight indigestion may cause anything from mere restless moaning to lusty crying. Severe **COLIC** causes repeated paroxysms of screaming, turning of thumbs inside the closed fingers, thrusting of fists into mouth, and agonised puckering of forehead; also board-like hardness of belly, and kicking or drawing up of thighs against abdomen. Such attacks if neglected are very liable to lead to Convulsions. (See “Colic” and “Convulsions.”) Consult a doctor.

Babies are specially liable to suffer from intensely painful abdominal disturbances, due in the great majority of cases to fermentation and irritation occurring in the bowels, rather than in the stomach itself, though the term “Stomach-ache” is commonly applied in all cases. **Most baby-pains are bowel-pains.**

3. Pain of Earache.—This is often mistaken for **Colic**—sometimes with fatal results. The tormenting pain of earache causes more or less **continuous, prolonged** attacks of crying or screaming, accompanied by rolling the head about, or boring one side of the head into the pillow, or pressing it against the mother, or tugging the ear, or placing the hand against it. Some relief may be afforded by dropping warm oil into the ear, and by the external application of a heated bag of salt or bran; but earache may lead to such grave results that a doctor should be called in at once. Pain and tenderness of the bony prominence behind the ear, when tapped with the finger, is a specially dangerous sign.

Nearly all cases of serious earache are accompanied by fever, which is often severe, the temperature rising as high as 104°, or 105°. But though both fever and pain should happen to be absent, the mother should never fail to call in a doctor if baby forms the habit of rolling his head from side to side on the pillow, because the habit is usually due to irritation of the internal ear which may lead to grave results, if not promptly attended to. **Frequent banging or beating of the head** may be due to the same cause or to the irritation of teething, etc. All such troubles are specially liable to arise when a child has been “out of sorts,” or after fever or sore throat, and they often occur in rickets. Never disregard or neglect the formation of any “curious habit” by a baby: if in any doubt get a doctor without delay.

SPECIAL WARNING.—Beware of the dangers to the Brain and to Hearing, arising from failure to do the right thing promptly in any case of ear trouble. There should never be any doubt or delay as to securing the best advice where there is pain or discharge from the ear. If this rule were always observed, the lives of many children would be saved every year and deafness would be much less common. Tendencies to inflammation and abscess of the brain following on ear trouble may be arrested, provided only the surgeon is summoned in due time—unfortunately he often arrives too late, the parents having put off for days where they ought not to have wasted an hour.

SYRINGING EARS.—Much harm is done by syringing. Don't attempt it unless you have been ordered to do so and shown how.

4. Eye-pains, Headache, etc.—The above observations apply also to "Eye-pains," Headache, etc. Don't delay. Get doctor at once, whether the trouble be crying and shrinking from the light, persistent rubbing of the eyes, redness, discharge, or swelling of the eyelids (specially dangerous in first week, see page 121).

5. Mouth and Jaw Pains.—Ulceration of the mouth (due to Thrush, etc.) and "Teething" are common causes of pain in infancy. Dribbling, fingering the mouth, crying on taking food, etc., attract attention.

6. Pain and Tenderness of Bones and Joints.—This is the main cause of crying in "Scurvy-rickets." Consult a doctor at once.

7. Pain in Privates.—Pain and crying during or after passing water may be due to stone or gravel, or to a reddish-brown gritty material in the urine, or to tightness of foreskin. Consult a doctor. A red sediment from the urine, showing on napkins, should always be noted and mentioned: baby may need more water.

CRYING BECAUSE ILL.

Any illness may lead to crying. Make sure baby is not "ill" before deciding that he is merely "trying it on."

CRYING BECAUSE SPOILED.

A normal baby whose habits have been properly regulated day and night, given his twelve primary simple rights (see page 1), should be happy, good-tempered, and a joy in the home—not a source of anxiety and worry. But **any baby can easily be spoiled and made a cross, fretful, exacting little tyrant.** The following is full of ripe wisdom:—

"Baby very soon finds out that he likes attention. When he is laid down alone, or if the mother or nurse goes out of his sight, he sets up a cry for renewed attention; **he wants to be cuddled or rocked.** If he does not get just what he wants, he will cry! His cry will immediately stop when he is taken up, held or rocked. **When he sees his mother coming to him his cries cease; in other words, he is rapidly becoming a 'SPOILED BABY.'**"

"One cannot begin 'too young' to train a baby. We often hear the remark made by some dear old grandma or loving mother, 'Oh! he will grow out of it,' or, 'Wait until he grows a little older and understands what you say to him.' **Li you do wait you are lost! Begin when a baby is born to make him understand that you mean what you say; you are the one to be obeyed: it is for your child's good.**"

"We now come to the TREATMENT, as it were, for a baby who cries simply because he wants attention, which is: 'Baby must cry it out.'"—*Cries of the Baby*, by Dr. Theron Kilmer. Read "Forming a Character," page 149.

"If a baby cries, GO OVER THE LIST OF CAUSES, and if he is not crying from any cause except the 'WANTS ATTENTION' cause, LET HIM CRY IT OUT" (Kilmer).

Don't be fooled by the absurd old wife's notion that a male baby must be denied a lusty cry for fear of causing rupture! (See "Popular Errors," No. 22, page 101).

WHAT SHOULD BE DONE IF A BABY CRIES AT NIGHT.

"One should get up and see that the child is comfortable—the clothing smooth under the body, the hands and feet warm, and the napkin not wet or soiled, or otherwise uncomfortable. A change of position may be needed. If all these matters are properly adjusted, and the child is simply crying to be taken up, it should not be further interfered with."—Holt.

If the night cry is habitual some other cause should be sought. "Night-feeding" is one of the main causes of "night-crying." There may be discomfort from too little or too much clothing, or want of a current of fresh air in the sleeping room, or he may not have enough fresh air, outing, and exercise in the daytime, or the nurse may be in the habit of exciting the baby by playing with it about bedtime.

Chronic pains, or frequently recurring night-pains, may give rise to disordered sleep and cause the child to wake up with a sudden sharp cry. In infants this is most often due to scurvy. In older children it may be the earliest symptom of disease of the Hip, Spine, or Brain, or it may result from Worms. Consult a doctor.

Popular Errors.

"Seriously, is it not an astonishing fact that, though on the treatment of offspring depend their lives or deaths, yet not one word of instruction on the treatment of offspring is ever given to those who will by and by be parents? Is it not monstrous that the fate of a new generation should be left to the chances of unreasoning custom, impulse, fancy—joined with the suggestions of ignorant nurses and the prejudiced counsel of grandmothers?

"To tens of thousands that are killed, add hundreds of thousands that survive with feeble constitutions, and millions that grow up with constitutions not so strong as they should be; and you will have some idea of the curse inflicted on their offspring by parents ignorant of the laws of life."

Extract from Herbert Spencer on *Education*, given under the headings, "What Knowledge is of Most Worth?" and "Preparation for Parenthood."

Error I.—That human pregnancy is naturally a time for rest, idleness, depression, and semi-invalidism.

Nothing of the kind. The pregnant woman should be radiantly healthy, happy, and uplifted. If she will only take plenty of outdoor exercise, and lead a bright, healthy, active life (see page 6, 7), she need have no fear for herself or the baby.

There is no warm-blooded mother in the world, from the humblest mouse to the most exalted human being, who can be healthy herself, or give birth to and rear healthy progeny, unless she has plenty of daily exercise and outing. Ask any capable farmer what steps he takes to ensure the health and safety of the mothers of his flocks and herds, and he will tell you free range in the open air and daily exercise are the first essentials, and that without these both mother and offspring suffer.

Error II.—That various birthmarks and blemishes are liable to arise in offspring owing to "maternal impressions" during pregnancy.

Mothers should rid their minds of all such fantastic ideas and silly worries.

Error III.—That the expectant mother should "eat for two."

Absurd. The carrying of a full-term baby means an increase of only half a stone in the mother's weight: and most of us overeat. The real essentials for health are the same for all, namely:—pure air, daily outdoor exercise, care and moderation in regard to eating and drinking, regularity of bowels, etc. Overeating and indolence upset everything.

Error IV.—That Stout should be taken by expectant and nursing mothers.

This is quite wrong. Alcohol in any form, taken by the mother, flows as a poison in her blood. The tender growing cells of the baby, directly nourished by this poisoned stream, or fed with milk derived from it, tend to become stunted and degenerate.

Error V.—That the nursing mother needs frequent feeding.

Most nursing mothers overfeed and feed too frequently, under the mistaken notion that this induces an increased flow of milk. In reality, stuffing and taking scraps or sips at all times tends to ruin digestion and spoil the milk. By taking food only three times a day, nutrition and milk secretion are better promoted and sustained than if the digestive organs are irritated and overtaxed by more frequent feeding. A glass of water morning and evening and between meals is good for the nursing mother, but she is better without gruel or milk, except at or just after meals.

The least objectionable of ordinary dietetic indulgences to the nursing mother between meals would be represented by a cup of non-fatty cocoa, barley water, or very weak tea, none of which should contain more than a quarter of a pint of milk. Cakes or solids of any kind should not be taken either between meals or near bedtime. Of the above drinks tea is the most objectionable, and should certainly be avoided at night.

Error VI.—That the baby should not be put to the breast until the third day.

This widespread fallacy is responsible for much bottle-feeding. Milk is secreted mainly in response to the stimulus of active sucking, and if the breasts are not thus stimulated during the first day after childbirth, indeed within the first twelve hours, Nature may keep the blood in the pelvic organs and refuse to send it where she intended. The ancients 2000 years ago realised this (see page 153), though at that time nothing was known as to the circulation of the blood! Yet ignorant women of to-day say: "We advise delay because if the baby sucks it causes 'after-pains.'" Quite so: "after-pains" are due to the contractions of the womb engaged in diverting the blood stream to the breasts and in expelling from its interior clots which tend, if retained, to become infested with microbes, and may thus give rise to poisoning of the whole organism. To escape the possibility of a little extra pain for a few hours the mother is induced to sacrifice her own health and that of the baby.

Error VII.—That the newborn babe needs some food for the first day if he gets nothing from the breasts.

The baby takes no harm if given water only (no food) for a day or two. If he fails to draw anything from the breast, proceed as indicated under heading "Feeding Details, First Month," page 20.

Error VIII.—That if the milk does not come by the third or fourth day it will not come at all.

Quite wrong. A week or more should elapse before giving up putting the baby to the breast every 3 or 4 hours in daytime. Further, the breasts should be stimulated by sponging and massage, and everything should be done to free the mother from worrying about herself and the baby. The best frame of mind for promoting the secretion of milk is one of trustful faith that Nature is going to do her part and provide what is needed. If the mother is perpetually thinking about her breasts, and worrying on account of the flow of milk not coming, she is liable to interfere with the course of Nature—just as over-anxious attention directed to the stomach will interfere with digestion, or the keen desire for sleep will keep us awake.

Error IX.—That nursing should be abandoned directly if there is a return of menstruation.

Quite wrong. Menstruation comes on during nursing in a large proportion of cases, and is a natural process which should not interfere with suckling, except where the milk manifestly disagrees with the baby. Even then, all that is needed in the majority of cases is to keep the baby from the breast for a few days at the "period," the milk being drawn off by manipulation or breast pump for the time being so as to keep up the flow. Never wean simply on account of menstruation unless under a doctor's order. The mother should wean at once if she becomes pregnant.

Error X.—That plain cows' milk—or cows' milk, cane-sugar, and water or barley-water—are suitable substitutes for mother's milk.

An infant may live and grow fat and heavy in spite of wrong feeding, but why overtax and damage him—why give him food not adapted for ensuring proper bone, muscle, and stamina? The mother may be sure that her baby will thrive better if she prepares the best substitute, viz. humanised milk. Patent foods and condensed or dried milks are the worst enemies of the modern baby.

Error XI.—That a baby should not be roused if he happens to be asleep when feeding-time comes round.

This is a serious and widespread fallacy. A feeding "time-table" should be made out and strictly adhered to. In the course of a few days, if this be done, the leading organic events of the baby's life (sleeping, waking, feeding, movement of the bowels, etc.) will ordinarily take place with clock-like regularity. Nothing is more saving of stress and wear and tear to mother and child than the early establishment of perfectly regular habits, day and night.

Error XII.—That when a baby cries the natural and proper course is to give him the breast or a bottle or a "comforter" to "comfort" or pacify him.

There is no surer way of ruining a baby's digestion and converting him into a fretful, exacting little tyrant, who knows he can get his way by merely crying. Feed by the clock at duly appointed meal-times only. "Comforters" spoil digestion and give rise to defective teeth, deformed jaws, and "adenoids."

Error XIII.—That babies need some "solid food."

In general, anything beyond human or humanised milk should be regarded as harmful, not beneficial, for the first nine months of life. During this period nothing but milk should be given, unless prescribed for some special reason.

Error XIV.—That taking "what's going" does the baby no harm in the second year.

Utterly wrong. The utmost care and attention should be given to feeding baby properly throughout second year (see page 44, and "Training Habits," page 52).

Error XV.—That the giving of "pieces" between meals does no harm.

In reality this habit is very injurious. The natural processes of digestion need certain times for their completion; and nothing tends to upset the child's digestive system more than the allowing of pieces of bread, cake, biscuits, sweets, etc., or even drinks of milk, apart from the regular meal hours.

Error XVI.—That a baby's mouth should be "swabbed" out with water two or more times a day to prevent risk of Thrush.

This injurious routine often leads to ulceration of the mouth and thrush. If a baby gets thrush it should be properly treated. (See page 120.) No baby in normal condition should have his mouth washed out until he has cut several teeth.

Error XVII.—That a baby needs a binder to give support to abdomen and back, and to prevent risk of rupture.

Preposterous. Babies are no more in need of binders than are little pigs! A binder weakens both the back and the belly, and increases the risk of rupture. The only excuse for using a binder at all is to keep the dressing on while the stump of the cord is healing. Even for this purpose the binder if used should be light and elastic (say stockinet), and it should be left off immediately the cord is healed. Even if there is an actual rupture a binder should not be used. Consult a doctor, and he will treat it on modern lines without interfering with breathing and the growth of the muscular walls of the belly.

Error XVIII.—That the modern baby needs no "Mothering."

This is the view of the lazy women who hold that an infant should merely rest, passively imbibe milk, sleep and grow fat. In reality, every baby should have the active exercise and stimulation afforded by suckling, or the best available substitute. But he is entitled to, and needs, much more than this. Dr. Fordyce says: "SUCKLING is a prerogative of the mother; the capability of MOTHERING is common to all normal adult females, and under skilled guidance and direction is the most valuable aid in the treatment of infants (whether sick or healthy)." (For details see "Handling the Baby," page 102.)

Error XIX.—That "night air"—especially pure cold night air—is dangerous for babies.

The reverse is the case. Nothing makes babies so strong and free from "colds" as living in pure cold air. At the Karitane Hospital the sick babies sleep (after a short preliminary hardening) in rooms where there is a constant broad stream of "night air," which often keeps the temperature near freezing-point in winter from dusk till dawn. It is hard to get mothers to realise that this is safe and beneficial for babies only a few weeks old, if they are provided with suitable bed-clothing and the bed is properly made. (See pages 64-69 and page 85.)

Error XX.—That the baby's face should be covered with a handkerchief or piece of muslin when sleeping in his pram, etc.

The mouth and nose should on no account be covered, even by the most open muslin, because any covering imprisons the breath and causes the baby to breathe its own exhalations over and over again. This is highly injurious and enfeebling. It is also a great mistake to gather the bedclothes close round the baby's face, because this also causes the re-breathing of poisoned expired air. For the same reason no pains should be spared to prevent the baby forming the bad habit of burying his face in the pillow or the bedclothes. (See illustrations, page 71.)

Error XXI.—That the nursery should be warmed to 65 or 70 deg. F.

The only time when a baby needs to be in a warmed room is when his clothes are off—for instance, at bathing time. Even then the temperature need not be above 55 or 60 deg. F., if he is protected from draught by means of a low screen. For twenty-three out of the twenty-four hours the air need not be kept much above freezing-point (32 deg. F.) even for babies only a few weeks old, so long as they are properly clad, kept out of direct draught, and provided if necessary with a hot bottle (see page 85).

Error XXII.—That there is a special risk in allowing a male baby to cry, as the strain tends to cause rupture.

This fallacy often makes mother and nurse nervously anxious to prevent crying. Hence they give the baby his own way day and night, and he soon becomes a spoiled, exacting, fretful little tyrant. If he cries he is given what he wants, whether it be food between meal-times, or cuddling in his mother's bed when he ought to be asleep in his own cot. Both the digestion and the nervous system may be more or less ruined in this way.

Error XXIII.—That in the case of female babies the nurse should massage or "break down" the breasts so as to soften them and promote future development.

Much harm and no good results from this extraordinary proceeding. It sometimes causes abscess, and, without doing this, may so injure the parts as to prevent proper growth of the breast, and predispose to flat nipples and inability to suckle. The idea that the breasts want "breaking down," or that "the nipple strings need to be broken," is parallel to the opinion widely prevalent among mothers and nurses, that many babies are born "tongue-tied" and need "snipping," or that circumcision is a frequent necessity. **People tend to get too much ahead of Nature!**

Error XXIV.—That if mixed feeding is resorted to (the baby being fed partly by the mother and partly from a bottle), it is best for the mother to suckle only at night.

This is absurd. **There should be no night-feeding!** By weighing the baby both before and after suckling, the mother should ascertain precisely how much he is getting at each nursing. Knowing this, she should supplement each breast-feeding with the requisite quantity of properly graded humanised milk—thus preventing her milk being too long dammed up in the breasts. Prolonged retention of milk materially alters its quality and composition. Further, the stimulus of suckling at regular intervals is needed to keep up the supply. **The "eight-hours'-rest" at night causes no undue accumulation of milk, as secretion slows down during sleep. Indeed the breasts—especially the nerves and the nipples—need rest, and Nature will give it if we don't thwart her.**

Handling the Baby.

Natural Mothering and Moderate Handling Beneficial.

Babies who are allowed to lie passively in cots, and who do not get sufficient "mothering," tend to be pale, torpid, flabby and inert, and they often develop rickets or waste away with marasmus. This has been a common fate of babies boarded in institutions or licensed homes, and physicians have remarked how much rarer are such diseases where the baby, though placed under otherwise similar conditions, gets a good deal of handling through the presence of older children. The stimulation afforded by simple natural handling is beneficial and necessary, but much harm is done by excessive and meddlesome interference and undue stimulation.

Injudicious or Excessive Handling or Stimulation Highly Injurious.

Where there are many callers, a first baby is apt to lead the life of an infant prodigy in a side show, decked out for exhibition half its time, and always at hand for special performances before special visitors.

The putting-up of food or "**regurgitation**" by babies soon after feeding is generally attributed to the nature or quantity of the milk or the manner of feeding, but in reality there may be little or nothing wrong with the food or with the times or system of feeding. Mother and nurse often bring on regurgitation by handling a newly fed baby carelessly (fondling, rocking, jogging, or jolting him), instead of gently putting him into his cradle. It is true that if an infant is subject to colic, he may benefit by being carefully sat up for a few minutes just after feeding (or even in the middle of the meal) to enable the wind to come away, but he should not be jogged or patted after a meal. Indeed, habitual patting on the back, done at any time of day, is highly injurious. Many women thoughtlessly and almost mechanically pat a baby to **soothe** him whenever he is un-

comfortable or fretful, and in this way they may insidiously bring on serious indigestion accompanied by inability to keep down a sufficiency of food.

Considering how readily sea-sickness, train-sickness, or swing-sickness is induced in adults by infinitely less disturbing movements, one cannot wonder that infants often become profoundly upset by injudicious handling. If a woman's whole aim were to induce vomiting, she could not set about it more scientifically than when, picking up her baby and deftly balancing it face downwards with the belly and chest supported on her open palm, she proceeds to rapidly pat the back with the other hand, thus subjecting the stomach to a series of direct concussions and squeezings while the head dangles over her wrist.

Apart altogether from the manifest absurdity of this particular practice, every woman should realise that any form of jolting, swinging, rocking, or concussion may induce **giddiness** in babies just as it would in adults, and thus indirectly upset the stomach through the nervous system. Babies have been sent to our Baby Hospital suffering from emaciation, vomiting, and grave nervous debility, due almost solely to this one factor. The same mother has been known to encounter similar difficulty in rearing child after child, and has arrived at the conclusion that her progeny had some grave inborn tendency to vomit, until the contrary was proved by removing the latest arrival to the charge of a quiet, sensible, trained baby nurse.

Treating Babies as Playthings.

The following quotations from leading authorities may be of some avail in preventing young mothers from treating their babies as mere interesting playthings, or allowing others to do so. This does not mean that babies are not to be allowed to play or to be judiciously played with. Play is the natural, joyous, overflowing expression of child life and activity, and as such should be encouraged; but the baby's earliest play should be mainly with **its first play-mate—itsself—its own feet** (see "Milestones on Baby's Road," page 94, 5th to 7th month).

N.B.—Never play with and excite a baby just before bedtime.

Nervousness.

PROFESSOR HOLT, of Columbia University, Chief Physician, Babies' Hospital, New York, says:—

What are the principal causes of excessive nervousness in infants and young children, and what can be done to prevent this?

The most important cause is the delicate structure of the brain at this time, and its rapid growth. It grows as much during the first year as during all the rest of life. This requires quiet and peaceful surroundings. Infants who are naturally nervous should be left much alone, should see but few people, should be played with judiciously, and should never be quieted with soothing syrups or the "comforter"—the latter, of course, applies to all children.

What harm is done by playing with very young babies?

They are made nervous and irritable, sleep badly, and suffer from indigestion and in many other respects.

DR. COTTON, University of Chicago, Professor of Children's Diseases, says:—

Rocking of infants should be discouraged. This subject should not be dismissed without reference to a practice that is as pernicious as it is common—viz., **the custom of regarding the baby as a plaything, an animated toy for the entertainment of the family, as well as of a large circle of admiring friends.** Children are fond of babies and never tire of stimulating their funny performances. The same is unfortunately true of parents and friends. From a purely economic point of view, such amusement is exceedingly expensive, and the mortality is constantly increased for the amusement of the elders. Nervous and mental wrecks too frequently owe the origin of their disorders to want of repose in early infancy, due to injudicious stimulation. In this connection let it be understood that all evidences of mental precocity, called "**smartness**," should be regarded as danger signals, and call for repression rather than encouragement.



FIG. 44.

How a fond relation may make a baby habitually smile and "perform" until his nervous system becomes so irritable, hypersensitive, and precocious that he can neither rest, sleep, nor digest his food. (The nurse kindly undertook to imitate the real thing.)

Parents should never lose sight of the fact that infinite harm is done by ignoring the delicate and highly sensitive nervous organisation of infancy; that theirs is the most sacred trust and privilege in the world—to mould the body and shape the destiny of a new human being, intended for a century of health and happiness here, and eternity hereafter. Half the irritability and lack of moral control which spoil adult life originate in the first year of existence. The seeds of feebleness and instability sown in infancy bear bitter fruit afterwards. "For the ordinary family ill-health and instability mean unemployableness; unemployableness means morbid thought and feeling; and morbid thought and feeling mean loafing, vice and crime."

Lifting and Carrying Babies.

These seem to be very simple matters, but many serious injuries in the way of dislocations, fractures, and deformities are due to women not learning how best to lift or carry children. The so-called "bones" of little children are very fragile and easily distorted or broken, being largely made up of cartilage—hence the need for special care. One often sees a woman forcibly swing or drag a child by one arm. Fig. 47 (*B*) very feebly illustrates the action, because the nurse could not be induced to even simulate the common practice.



Carrying the Baby.

FIG. 45.

- (A) Correct and comfortable way to carry baby.
 (B) Wrong way—baby uncomfortable and liable to fall.



Lifting Children—Right Ways.

FIG. 46

- (A) Right way to lift young baby.
 (B) Right way to lift child up a step or on to a sidewalk.



Lifting Children—Wrong Ways.

FIG 47.

(A) Lifting by upper arms—a common cause of fracture or dislocation.

(B) Picture intended to show forcible dragging and swinging on to sidewalk by one arm. Action of nurse too gentle to properly illustrate this common practice.

Children are the perpetual Messiah, sent into the arms of fallen men to win them back to Paradise.

EMERSON.

Ailments and Precautions.

Eminent physicians say to a patient who comes to them with bad eyes, "We cannot cure the eyes by themselves; if the eyes are to be cured, the head must be treated"; then again they say that to think of curing the head alone, and not the rest of the body also, is the height of folly. Arguing in this way, they apply their methods to the whole body, and try to treat and heal the whole and the part together.—PLATO, 2300 years ago.

Nursing and Treating.

Every woman must at some time or other become a NURSE—that is, have charge of somebody's health . . . therefore every woman should know how to nurse.—FLORENCE NIGHTINGALE.

Every woman—indeed every grown girl—should understand the simple measures needed for keeping a baby in health; she should know how to **nurse** it, and give it the best chance of speedy recovery from illness. On the other hand, there is no greater mistake than trying to specifically **treat** disease without competent advice. Without special training and experience no one is capable of finding out the exact nature of disease. Even if a mother should succeed in determining that a baby is suffering from Eczema, that fact alone would not enable her to decide on appropriate treatment, because the nature of the disease and the specific means to be adopted for curing it are not indicated by the mere name of the malady—they vary with the particular variety of Eczema, with the stage arrived at, and the condition of the patient. The same applies to summer diarrhoea and other common infantile diseases.

Disturbed Sleep—Sleeplessness.

The habit of sleeping peacefully is one of the clearest evidences of sound health. Habitually disturbed sleep and restlessness may arise from not giving "what every baby needs" (see page 1), especially in regard to pure air, proper feeding, exercise, outing, and strict regularity of habits.

Discomfort caused by indigestion, due to irregularities and errors in regard to food or feeding, is the main cause of imperfect sleep—avoid night-feeding, over-feeding, under-feeding, irregular feeding, and feeding with unsuitable food.

When a baby has any distinct illness sleep is usually affected.

Wet napkins, over-clothing, or under-clothing are very common causes of restlessness. Lack of fresh air, due either to want of ventilation or to the presence of obstruction in the child's throat or nose, through enlarged tonsils or adenoids, will cause broken sleep.

Disturbed sleep may become habitual in a healthy baby if he is badly trained or spoiled, for instance by petting him whenever he wakes and cries, or worse still, by giving him food to stop crying. Any of the causes of crying may be a cause of sleeplessness. Therefore read carefully "Cries of the Baby," page 96.

Never give soothing powders because a child sleeps badly. Try to ascertain wherein you have erred—what is causing broken rest. If you can't—consult a doctor.

Vomiting and Diarrhœa.

First—Read carefully “What Every Baby Needs—whether WELL or ILL.” (See page 1.)

Habitual putting up of food soon after feeding is usually due to baby being given too much food at each feeding, or to being fed too often; to being allowed to suck too rapidly and greedily without interruption; to wind or colic (often caused by the foregoing); or to jolting after meals, injudicious handling, too much stimulation, etc. (see “Handling the Baby,” page 102). Where the feeding is partly from the breast and partly from the bottle, too much food is almost invariably given—hence the vomiting.

The only sure preventive is weighing the baby before and after suckling, so as to make certain that he is given neither more nor less than he needs (see “Overfeeding” and “Mixed Feeding,” page 11, and “Weighing Before and After Suckling,” page 57). Due attention should, of course, be paid to the habits of the mother, as affecting the quality of her milk, or to the proper preparing of artificial food.

DIARRHŒA.

At the onset of diarrhœa ensure prompt cleansing of baby's bowels by means of a dose of castor oil—say from one to two drachms, according to age. The average need is an ordinary teaspoonful. Where the child appears drowsy, torpid, and poisoned, the prompt use of an Enema or Irrigation (see page 112) is always desirable, in order to immediately rid the lower bowel of microbes and poisonous fermenting material, especially if the stools are foul, dirty, slimy, and show matter or blood.

Diarrhœa occurs mainly during artificial feeding. For suckled babies, a course of boiled water may generally be followed by diluted mother's milk—attained by giving the infant some ounces of boiled water just before nursing, and suckling for only a few minutes—the allowance of water to be reduced cautiously at each feeding, and the suckling extended.

In all cases of Diarrhœa call in a doctor if possible; withhold food and give only boiled water for twelve hours; then proceed (in the case of an artificially-fed baby) as shown on page 32.

It must not be assumed that the occurrence of a green motion or two and some relaxation of the bowels (in other words, a mere threatening of diarrhœa) will always necessitate keeping a baby on a diluted preparation for a whole week or more. In some cases the mere tendency to diarrhœa may be overcome by replacing one or more meals with boiled water, followed by the boiling and dilution of the humanised milk for a day or so. Take the case of a baby three months of age, who has been receiving say 30 ounces of humanised milk a day (six feedings of 5 ounces each): at the 6 P.M. and 10 P.M. feedings he might be given only boiled water; next day, if he had passed a good night, he might be fed as follows:—

<i>Time of Feeding.</i>	<i>Boiled Humanised Milk.</i>	<i>Boiled Water.</i>
6 A.M.	1 ounce	4 ounces
9 A.M.	2 ounces	3 “
Noon	2 “	3 “
3 P.M.	3 “	2 “
6 P.M.	3 “	2 “
10 P.M.	3 “	2 “

If all went well, there being no further green or frequent motions, full-strength boiled humanised milk might be reached at the end of another day. After that only a pint need be boiled; next day half a pint; then boiling might cease.

One can give only general hints as to coping with diarrhœa, leaving the rest to the **MANAGEMENT** of the Mother or Nurse, where a Doctor is not available. Regarding sick babies Florence Nightingale says:—

Perhaps you will say to me, "I don't know what you would have me do. You puzzle me so. You tell me don't feed the child too much, and don't feed him too little; don't keep the room shut up, and don't let there be a draught." Dear little nurse, you must learn to MANAGE.

People ask for hard and fast rules, but Diarrhœa varies greatly according to the condition of the child, the nature of the previous feeding, the time of year, etc. Indeed there are really half a dozen different diseases—diseases due to different microbes, and affecting mainly different parts of the bowel—grouped under the one name Diarrhœa. At present the precise nature of these different forms of Diarrhœa and their best treatment are imperfectly known, so that all we can do is to point out what has been found most efficacious in mitigating or arresting the Diarrhœa of infants in general (see page 32).

In occasional cases of severe diarrhœa, or other grave digestive disturbance, where for the time being no form of milk modification happens to agree, a baby may be kept going for a few days with clear, fat-free broth (made from veal, chicken, or mutton), or with Albumen-water (the white of an egg to $\frac{1}{2}$ pint of boiled water). Cereal decoctions (see page 27) sometimes prove of temporary service, especially in the case of babies approaching a year old and upwards—babies who have developed some power of digesting starch. However, any benefit that may ensue in such cases is attributable mainly to the water rather than to the trace of starch: what the baby really requires is water, but the mother wants to be satisfied that he is "getting something"!

Some forms of infantile Diarrhœa are among the most rapidly fatal of all diseases, and among the least amenable to treatment, however skilful. Safety lies in **PREVENTION**—in building the child strong and resistive from the start, giving him his natural rights (see pages 1 and 2).

WARNING.

Diarrhœa is by far the most frequent cause of death in young children, and where it does not kill it often injures for life. Therefore never allow diarrhœa to continue without calling in a doctor. If the simple dietetic changes shown on page 32 do not suffice, baby may need medicine as well.

The immediate cause of Diarrhœa is generally careless artificial feeding, especially in warm weather: it would be rare, even among "bottle-feds," if mothers would attend to the following:—

PRECAUTIONS.

- 1. Feeding Bottle.**—No tube, perfect cleanliness.
- 2. Food.**—Avoidance of cane sugar, condensed milk, patent foods, etc. Scrupulous care in making and safeguarding humanised milk. Eternal watchfulness in warm weather, when microbes rapidly accumulate in millions if given any opportunity. Milk or any other fluid used as baby-food must be kept as cool as possible. (See page 28.)
- 3. Motions.**—Daily attention to the state of the bowels and the appearance of the motions. The danger signal is green colour apparent in the stools at the time they are passed. Directly this is noticed put the baby on pure boiled water followed by dilution and boiling of the humanised milk, etc. (see "Indigestion and Diarrhœa," page 32). If the first symptom is dealt with at once, there will be no need, as a rule, to continue the restricted feeding for long. However, it is always safer not to return to unboiled humanised milk of full strength for a week or more after serious diarrhœa.

Indigestion may be brought on by any irregularity or carelessness in regard to feeding. Much undigested curd in the stools should be noticed at once, and the food should be properly modified to prevent dyspepsia or diarrhœa (as described below under, "Curd in Stools"). Marked foulness of motions should also attract attention. Beware of constipation. Babies subject to constipation readily get diarrhœa.

Some greenness of one or more motions may occur from time to time without further manifestations of intestinal disturbance, but, as noted above, the symptom should always put the mother on her guard. A single meal of boiled water, followed by dilution of the ordinary food, tends to improve the digestion by giving relative rest. The return of yellowness to the motions is the evidence of restoration to normal. A motion looking like chopped spinach usually calls for an immediate dose of castor oil, but repeated doses of oil should on no account be given. If a baby happens to be taking grey-powder, calomel, or bismuth, the motions tend to be more or less green or discoloured on account of the medicine.

4. A Chill is often the exciting cause of diarrhœa; therefore special attention should be paid to having infants sufficiently clad at all times, but not unduly muffled up. They are made very susceptible to cold by being kept too much indoors, by living in stuffy, unventilated, overwarm rooms, and by wearing too heavy clothing, especially when in the house. On the other hand, undue or untimely and careless exposure will not harden an infant, but will render it delicate and prone to catch cold. Quickness in bathing and in getting an infant dressed afterwards is of great importance. Many chills are due to dawdling at the bath. Plenty of fresh air and sunlight, proper food, regular feeding, regular habits, and ample exercise are the true means by which to ensure strength and hardiness.

Curd in Stools, Green Motions, etc.

Mothers are apt to worry themselves unduly about the presence of a little **curd** in the **stools**, or because of an occasional somewhat green motion, and one sometimes finds a baby kept on too weak a milk mixture for a considerable time for such reasons, though there is no apparent ill-health. If there is much curd passed the food should be weakened, but the presence of a little curd at times may be of no consequence, and is compatible with proper growth and development. However, the "passing of curd" and "green stools" are important symptoms, and should always put the mother on her guard to avoid any possible source of indigestion—especially irregular feeding, too frequent feeding, tainted milk, too strong a milk mixture, or a wrongly proportioned mixture; also any of the sources of ill health mentioned on page 1.

Constipation.

First—Read carefully "What Every Baby Needs, whether WELL or ILL" (see page 1), and "The Bowels" (see page 62).

Mothers often say, "My baby's bowels will not move at a certain hour." **MAKE** them move. Babies are creatures of habit, and regular habits acquired in infancy are essential for health later in life. Professor Chapin says: "**A constipated infant should be constantly observed and treated until the condition is relieved, as most of the chronic cases in later life have their beginnings in early life.**"

Further, a constipated child should always be regarded as on the verge of diarrhoea : babies readily pass from one extreme to the other. Normal mother's milk, containing, as it does, abundance of fat from the beginning, has no constipating tendency ; but during the first few weeks of life babies cannot digest a full supply of any other form of fat. Even with humanised milk we cannot give enough fat at this period to ensure regularity of the bowels in every case. Artificially-fed babies generally suffer more or less from constipation during the first month, but this tends to disappear as the food is made stronger.

PERSISTENT CONSTIPATION.

Persistent constipation is more serious, and is generally due to lack of attention to ensuring at least one regular action of the bowels at the same time every day, to baby not having enough outing, and to the bedroom not being sufficiently ventilated. Nothing tends to enfeeblement more than coddling in warm, stuffy rooms (see pages 64-69).

Bear in mind that every baby needs, in addition to open air and sunlight, plenty of exercise. (See "Exercise," page 82.) Rubbing the abdomen has a great effect in stimulating the muscles, etc., and thus tends to cause the bowels to work. Begin at the right groin, move the hand up to the ribs, then across, just above the navel, to the opposite side, then around to the left groin, using a circular motion. Stroke the abdomen very gently at first with a warmed hand, using warm oil ; then employ a firmer, deeper pressure as the child becomes used to it. Do this massage just before the times when the bowels are to be moved. It may be continued for five minutes, and followed by further measures to induce a motion (see "The Bowels," page 62). Don't fail to read this.

Too much curd and too little fat in the food, due to the use of mere diluted cows' milk, tends to cause obstinate constipation. Excess of fat sometimes has the same effect. Boiling makes the milk more binding : heating should therefore not usually be carried above 155 deg. F. Indigestion, arising from the use of patent foods, often causes constipation, alternating with diarrhoea. Humanised milk, containing a normal percentage of fat, has no constipating tendency ; but some babies become extremely constipated even when breast-fed.

Fine spinach purée may be given after three months of age, commencing with half a teaspoonful, working up to 3 teaspoonfuls in 24 hours.

To make.—Thoroughly wash $\frac{1}{2}$ lb. spinach and cook from 10 to 15 minutes in 2 tablespoonfuls of water, add a pinch of salt, rub through a fine sieve.

If there is marked constipation part of the lime-water used in preparing humanised milk may be replaced for a time by fluid magnesia. Thus in making the day's supply of food $\frac{1}{2}$ ounce each of lime-water and fluid magnesia may be used instead of adhering to the standard formula. This should not be continued for more than a week without a doctor's advice.

N.B.—All purgatives are injurious. Persistent constipation is a serious affection, needing careful treatment under medical supervision.

DEFECTIVE BOWEL EVACUATION.

Professor Kerley of New York strongly emphasises the fact that even though there be a daily passage if the motions are dry, come away in pieces or hard balls, or in a firm, formed state with dry surfaces, it is practically certain that fecal matter is being improperly retained in the intestine. At any time in babyhood or childhood this may cause grave symptoms of poisoning, the child being seized

suddenly with persistent vomiting, prostration, diarrhoea and fever. If this should occur let the child have cold boiled water to drink and give an enema of a quarter pint of warm water (between 90 and 100 deg. F.). If a nurse is present she should irrigate copiously with normal saline solution, gradually reducing the temperature of the fluid to as low as 70 deg. F. if there is high fever. A doctor should be called in immediately.

There would be no risk of grave, sudden emergencies such as the above if mothers would pay due attention to the essentials of hygiene (page 1), especially suitable dieting and the hygiene of the bowels (see page 62).

Enema.

If a baby is troubled with constipation, a small tonic enema of $\frac{1}{2}$ to 1 ounce of "normal saline" (a level teaspoonful of common salt to a pint of boiled water) may be given by means of a tiny soft-nozzled bulb-enema pending the securing of natural motions. See page 62.

Much harm is done by the habit of giving ordinary enemas to babies. It is quite a common thing to find mothers giving a daily injection of from two ounces to a quarter of a pint or more of soap and water. This is highly injurious, causing as it does both distension and irritation and rendering the bowel more and more sluggish.

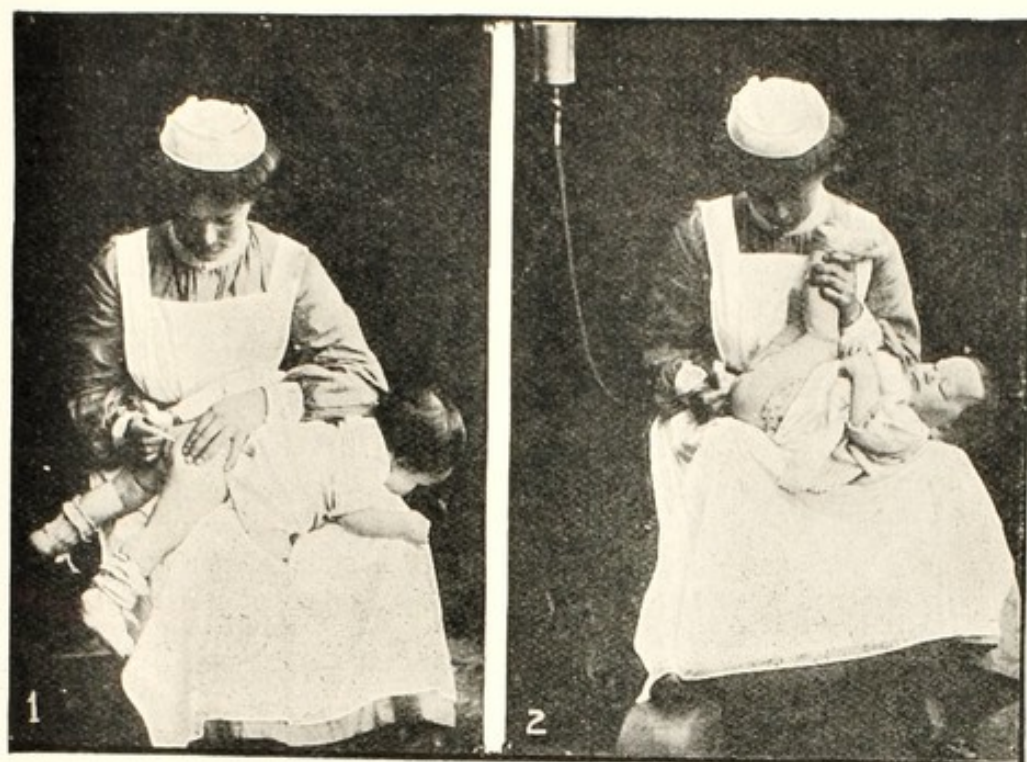
There are occasions when a baby will be much benefited by a fairly copious enema, say from 3 to 6 ounces of "normal saline" given at a temperature of about 105 deg. Fahr. This affords the best means of relieving a severe attack of Colic or Vomiting. A similar injection may be given to clear out the bowels at the onset of Diarrhoea or for Convulsions. If the baby's temperature is found to be higher than 101 deg. F. the enema should not be warmer than 90 deg. F., and where there is high fever it may be given as low as 70 deg.

Doctor or Nurse may resort to **Irrigation**—i.e. flushing out of the bowel with from a quart to a gallon of normal saline solution, ranging, according to the child's temperature, from 70 to 100 deg. F., never starting below say 90 deg. The mother could only do this under special directions.

Taking Temperature of Baby.

Every nurse now uses a clinical thermometer, and doctors often advise mothers to keep one in the home. However, the use of a thermometer is not always an unmixed advantage. The mother, generally on the look-out for trouble, is specially liable to worry unduly because there happens to be a rise in baby's temperature. She does not realise that in early life a rise of several degrees may be due to a comparatively trivial cause, such as a tooth coming through, indigestion, or a slight cold. **A temperature of 102 or 103 deg. F. may mean very little or it may mean a great deal :** as Dr. Leonard Guthrie says, we need not be greatly alarmed even when the thermometer registers 104 deg. F. **if baby is placidly sucking its thumb**, but of course a doctor should be consulted.

In forming a judgment as to whether an infant is seriously ill or not, physicians are guided largely by such signs as "the baby's facial expression, its frown and look of pain, and above all, its smile, the character of its voice, the movements of its limbs, chest, and abdomen, which are as significant as the condition of its tongue, pulse [and temperature]. **If it can smile its life cannot be in immediate danger**" (Leonard Guthrie). However, where there is any doubt, competent advice should be sought.



How to take a Baby's Temperature.

How to give an Enema.

FIG. 48.

1. Best Method of taking a Baby's Temperature.—The bulb of the thermometer should be oiled or vaselined, and then gently pushed into the anus until the bulb is at least half an inch out of sight, leaving visible fully two-thirds of the length of an ordinary clinical thermometer.

2. Best Means of giving an Enema.—Note elevation of buttocks effected by raising knee and by having towel folded under baby's hips—this serving also to catch water, etc. The elevation causes the water to flow easily up the bowel. Note the vessel containing fluid hanging from nail in wall. A glass or tin funnel will serve equally well. This leads into a piece of rubber tubing rather more than a yard long, attached below to the largest size soft red rubber catheter (No. 12 is the proper size; chemists nearly always supply too small a catheter) by means of a couple of inches of $\frac{1}{4}$ -inch glass tubing. This affords a cheaper and better means of giving an enema than the rubber syringe or bag for compression by the hand. The same contrivance, if provided with a larger funnel, serves for adults. It is convenient to have a small wire pinch-cock on the tube to control the flow.

For infants the funnel should not usually be raised more than three feet above the baby's buttocks. All air bubbles may be quickly forced out by alternately raising and lowering the funnel and catheter ends of the tube several times after the funnel has been filled with water. Vaseline the catheter and push it into the anus until the eye is just out of sight, then turn on the water and continue to push the catheter slowly into the bowel. If the water is not turned on before the eye of the catheter enters the bowel, it is liable to become blocked with feces. The precaution is still more essential for irrigation; otherwise the catheter generally doubles on itself and coils up in the lower bowel, instead of being carried up the intestine with the flow of water. The tube is usually pushed in about three inches for a simple enema, and a foot for irrigation.

Colic.

First read carefully "What Every Baby Needs, whether Well or Ill" (see page 1).

Flatulence is generally due to indigestion and chilling arising from several easily removable factors acting together. By putting everything on the best basis for health, the nursing mother will not merely cure colic, but will also

tend to establish a hardy, vigorous, condition of body for herself (see pages 3-11) and her baby.

Severe colic, or "windy spasm," is intensely painful. The baby is restless, begins grunting, writhing, and kicking; he puckers his forehead, and has an agonised expression; screams violently, and draws his thighs tight up against belly, which is hard and swollen. If wind passes there is some relief. Don't try to obtain relief by giving food either from breast or bottle, because feeding makes matters worse, even where it temporarily eases pain. The main factors of colic are:—

CAUSES.

1. **Faulty composition of milk**, due to mother's habits, or to giving unsuitable artificial food—especially patent foods or condensed or dried milk.
In the case of a breast-fed baby the tendency to colic may sometimes be temporarily prevented by giving a few teaspoonfuls of warm boiled water before suckling—thus diluting an over-rich milk. But the true remedy is for the mother to reform her own habits—regulating her diet, taking proper daily exercise, etc., so as to render the milk normal.
2. **Overfeeding**.—Study motions: if curdy, etc., food probably needs diluting or modifying (consult pages 63 and 110).
3. **Irregular, or too frequent, feeding of baby**.—An extra half-hour or hour between feedings will often stop tendency to colic.
4. **Too rapid, or too slow, feeding**.—If baby sucks too greedily or too rapidly, the mother should prolong each suckling by withdrawing nipple; "bottle-feds" may also bolt their food owing to too large a hole in teat; or the colic may be due to too slow feeding and chilling of milk—caused usually by not having a flannel bag to cover feeding-bottle (see Fig. 41, page 90), or by leaving the baby alone with his bottle.
5. **Constipation of mother or child, diarrhoea, etc.**
6. **Chilling surface of baby's body**, due to dawdling at bath, not making bed properly (see page 85), wet napkins, cold feet and legs, or exposure of coddled babies to chills or draughts which would do no harm to "cold-fresh-air" baby.
7. **Anything which restricts exercise and perfectly free movements of limbs and body.**
8. **Any irritation of skin**.—Clothe next skin with silk and wool.

TREATMENT OF ATTACK.

An actual attack of colic may be relieved by applying warmth to the feet and abdomen; massaging the belly with fingers dipped in warm oil; handling baby as shown in Fig. 49 opposite; giving one or two drops of sal volatile or a piece of baking-soda about the size of a pea in a teaspoonful of dill water or warm water, which may be slightly sweetened with glycerine or a trace of saccharin. If convulsions are threatened, treat accordingly (see page 115).

An enema given at 105 deg. F. and hot flannel wrappings applied at the same time to the abdomen affords the best means of treating a severe attack of colic. Not only is the pain relieved, but for the time being the cause is removed by the evacuation of wind and irritating material. However, enemas should not be used habitually. See "Enema," "Constipation," and Fig. 48. Consult a doctor. Irrigation is still more effective, and should certainly be used in all very severe attacks of intestinal colic with threatened convulsions. If the wind is distending the stomach, it should be washed out with warm water and soda.



FIG. 49.

Methods of handling baby to relieve it during an attack of Colic.

- (A) Nurse gently but firmly pats, rubs, or squeezes left side of back with right palm, while left arm and hand keep body upright, with belly pressed against nurse's chest.
 (B) Don't use this position just after feeding, as it tends to cause vomiting.

Convulsions.

WARNING TO PARENTS.

Convulsions would be rare if mothers would build their babies strong and resistive to disease by paying due attention to "What Every Baby Needs" (see page 1). Convulsions are not only dangerous to life, but they tend to permanently damage the nervous system. Half the cases of epilepsy come on in people who have had convulsions during infancy, and the seeds of many other grave nervous affections are sown in the same way. Avoid all causes of delicacy and ill-health, and you will save your baby from convulsions. Keep the bowels regular. The immediate forerunner of an attack may be indigestion, colic, teething, the onset of fever, etc. The symptoms of impending convulsions are squinting, rolling of the eyeballs, twitching of the fingers, and jerking the thumbs into the palms, stiffening the neck, throwing back the head, jerking the limbs, etc. Such symptoms should put the mother on her guard to prevent a fit.

TREATMENT BEFORE OR DURING CONVULSIONS.

1. Give warm saline Enema or Irrigation (see page 112). This, with hot fomentations applied to the belly, generally arrests the fit. Give a teaspoonful or more of castor oil as soon as baby can swallow.

2. A warm mustard bath may be given, prepared by adding a level dessert-spoonful of mustard to each gallon of water. The temperature should be about blood-heat (100 deg. F.). In the absence of a thermometer, a temperature that can be borne comfortably by the elbow will do. The child may remain in the bath from two to ten minutes. Cold water may be squeezed over the head, or cold cloths may be applied.

The mother often exposes her baby unduly, and wastes time over the drying of it after the warm bath. The baby should be wrapped up at once in a warmed Turkish towel, and dried rapidly. A warm nightdress should be slipped on, and the baby should be tucked up cosily in a warmed bed without a moment's delay.

3. If the child is known to have recently taken irritating, indigestible food, prompt emptying of the stomach affords the most rapid relief. To induce vomiting, give from a half to one teaspoonful of ipecacuanha wine in warm water every quarter of an hour until effective, but in no case give more than four doses. If ipecacuanha wine is not at hand, give a teaspoonful of mustard in warm water.

On no account omit to get a doctor without delay if there is any question of tendency to convulsions. The treatment varies according to the cause, and the doctor alone can determine what is best. Thus, although the measures given above would be suitable in most cases, they would not be applicable in fits due to loss of blood, heart disease, etc., and in any case a doctor has other resources available.

Croup.

First read carefully "What Every Baby Needs, whether Well or Ill" (see page 1).

Simple croup is very alarming, though not usually dangerous. As, however, it is impossible for the mother to distinguish between croup and very grave conditions such as diphtheria and other acute inflammations about the throat, a doctor should always be consulted where possible.

Croup is often ushered in by some hoarseness during the day and a sharp, barking, metallic cough in the evening. "After the child has been asleep for a few hours it awakes suddenly, sits upright and grasps at anything it can reach, and is scarcely able to get its breath. The cough is now loud and brassy, breathing laboured, and face bluish. Other similar attacks are very liable to occur on several succeeding nights. Croup is commonest about the third year."

TREATMENT DURING ATTACK.

The treatment during an attack is on the lines given above for Convulsions. In addition, the breathing of a warm, steamy atmosphere, generated by the use of a kettle, is generally recommended and may be tried, but is usually of questionable advantage. A warmed room is desirable, and the child should be kept out of draught, but there should be a good inlet for pure outside air. The tendency is to make the room too warm and stuffy. This weakens the child, and is liable to result in recurrent attacks night after night.

PREVENTION.

The prevention of croupy tendencies is best effected by paying very strict attention to the essential requirements for health (see page 1). Gradual habituation to daily cold bath, followed by active exercise (see page 81), is

specially effective. An attack is often brought on by careless exposure of a coddled child in cold, damp, windy weather.

Eczema.

NATURE.

Eczema is by far the commonest skin disease in babies. It may occur at any part of the skin, but most often begins where there are folds, or on the head, especially on the cheeks, forehead, and scalp, and behind the ears. It begins with an unusual redness and roughness. The surface becomes fissured and watery, then scabs tend to form, but the red, raw surface between the scabs continues to weep—weeping and crusting being the special characteristics of eczema. The affected area is intensely itchy, and this is made worse by scratching and rubbing, which it may be extremely difficult to prevent, especially at night, yet **friction must be stopped or the skin will not heal.**

CAUSES.

Breathing and living in impure air predispose to infantile eczema, but generally the leading factor is impaired digestion, due to errors in the quantity or quality of the food given, and lack of exercise. Overfeeding is the commonest predisposing cause, and frequently there is constipation. The taking of cane-sugar, even in small quantities, brings on in some children catarrh of nose, throat, or bronchi, and eczema, nettle-rash, or "heat spots." Eczema of the head is more often seen in fat, healthy-looking, or overfed babies, whether suckled or not, than it is in those who are thin, delicate, and underfed, though it is common among the latter also. Teething predisposes to eczema, but, acting alone, will not cause it. The same may be said of hereditary tendency, and, for the most part, of irritants acting directly on the skin. Local irritants specially liable to determine an attack of eczema and to prevent the skin healing are over-clothing, too much washing or washing with hard water, imperfect drying of the folds of skin, the use of strong, irritating soaps or irritating flannel under-clothing, soiled napkins, and excessive exposure of the face to direct sunlight or excessive exposure to wind—especially if the baby when indoors is kept in warm stuffy rooms. Scratching or chafing of the skin is specially liable to retard recovery. If the baby is suckled the mother's health is of prime importance.

TREATMENT.

Eczema is a very variable condition, and few skin diseases are liable to prove more intractable when neglected or improperly treated; therefore a doctor should be consulted if possible.

Where parents live in remote districts, beyond the reach of medical aid, the following course may be pursued:—

1. Observe all the conditions of general hygiene. (See page 1.)
2. Immediately desist from washing the affected skin with soap and water. Cleansing can be effected with olive oil and dabbing with a soft cloth—no rubbing. When healed, to prevent relapse, use only superfatted soap.
3. Remove all known sources of local irritation. To prevent scratching, cut a hole in the end of a pillow-case; put the baby's head through the hole; then secure the arms at the sides with a row of safety-pin, pinning together the front and back of the pillow-case between the arms and trunk. A similar row of pins may be used to fix each leg.
4. Coax off any scabs or crusts after some hours' soaking with sweet oil.

5. Protect the inflamed area by applying some simple, unirritating ointment, or recently boiled or perfectly fresh unsalted lard. This should be spread on butter-cloth, which may be made into a mask with holes for nose, eyes, etc. Change the dressing once or twice a day, using olive oil freely at the time of removal if there is the slightest tendency to stick.

An excellent simple ointment, for use in this and other conditions, may be made up as follows:—1 ounce white vaseline, 1 drachm zinc ointment, 1 drachm almond oil, and $\frac{1}{2}$ drachm lanoline.

If the condition does not soon clear up, all obstacles in the way of obtaining advice must, if possible, be overcome. Where the doctor cannot see the baby, one of the parents can usually manage to make a journey to consult him. Popular "Mothers' Guides" generally contain a few pages on eczema, with specific directions for medicinal treatment, but such advice may be very misleading and often causes delay in seeking skilled aid.

Eczema is sometimes associated with specific microbic or parasitic conditions which prevent recovery, unless there is appropriate medical treatment, which cannot be arrived at by mere guessing.

Patches of Greasy Scurf.

Scurfy, greasy patches, allied to ordinary eczema, but causing little or no irritation, often occur on babies' heads. The general lines of treatment are similar to those given above. To get rid of the scurf, rub the patches for a few moments with the tips of the fingers dipped in kerosene, followed at once by gentle combing with a small-tooth comb, and washing with warm water and mild "baby soap." This is very effective, but care must be taken to avoid risks of catching fire, and irritation of scalp by careless combing.

Irritated Buttocks.

Attend carefully to "What Every Baby Needs," page 1.

A little knowledge and care on the part of mother or nurse should prevent irritation and excoriation.

If there is any redness, extra care should be exercised to keep the parts thoroughly dry and free from every other source of irritation.

TREATMENT.

After cleansing, dry carefully, and apply some simple ointment and a small patch of wood-wool tissue, or other soft, highly absorbent material. A trace of ointment usually suffices, and even this may be omitted where the irritation is slight. The routine practice at the Karitane Baby Hospital is shown in the illustrations opposite.

Dusting Powder.

Where care is exercised, this is seldom needed, and probably most babies are better without it. It is rarely used at the Karitane Baby Hospital.

Never use fuller's earth, as cases of lockjaw have been traced to its use.

A good, safe, simple recipe is a drachm of zinc oxide to an ounce of finely powdered starch.

Dusting is the natural resort of the mother who is careless as to drying of the skin after bathing it. The folds of the skin should be dried with a soft towel, not with powder.

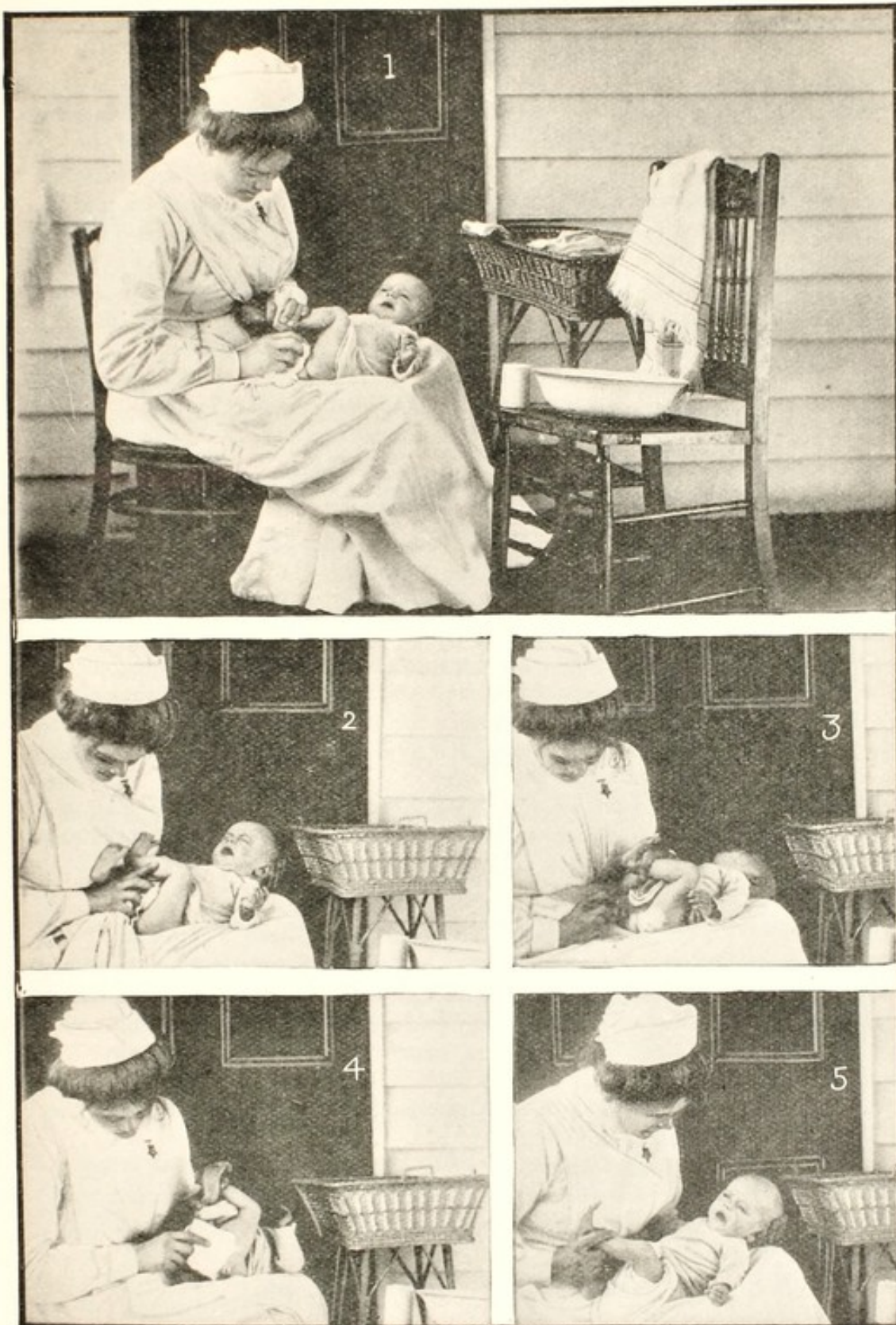


FIG. 50.

Irritated and Sore Buttocks.

1. Gently cleansing the parts with warm water.
2. Drying by dabbing gently with soft towel.
3. Applying ointment. (To make ointment visible in the illustration, more has been applied than is usually needed. A trace generally suffices.)
4. Applying simple pad of wood-wool tissue. A quarter of a pound, costing 6d., is usually found to be ample for the cure of even a bad case.
5. Napkin applied. Note the second triangle left hanging.

Care of Mouth.

Should the Baby's Mouth be Wiped Out Daily as a Routine Measure before the Teeth are Cut?

Certainly not! This is a point about which there need be no doubt whatever in spite of the contrary advice often given. There is no more need for meddling interference with the mouth of a nursling than there is for meddling interference with the lower bowel. One might imagine that the bowel might be better for a daily purifying by means of an enema, but it is strange that it should have occurred to any one that the pure mouth of a healthy baby needs cleansing from without, seeing that it is naturally irrigated many times a day by what Dr. Pickerill calls the best mouth wash—viz. the saliva. Swabbing out the mouths of young babies is a common cause of ulceration and "Thrush."

Thrush.

First read carefully "What Every Baby Needs, whether Well or Ill" (page 1).

"Thrush is a disease of the mouth far commonest in bottle-fed or sickly children in the early weeks of life. Small whitish patches, sometimes crowded thickly together, form over the lining of the mouth, and especially on the tongue, cheeks, and hard palate. They resemble curdled milk, but differ in that they can be removed only by the use of considerable force. A lack of perfect cleanliness about the mouth and the bottles and the rubber nipples, and the use of bottles with long rubber tubes, are active factors in producing the disease. It is very commonly associated with some disturbance of digestion, and it is distinctly contagious. The symptoms are an indisposition to nurse on account of the pain produced, often combined with colic and some diarrhoea and vomiting."—Dr. CROZER GRIFFITH.

How should the mouth be cleansed when there is Thrush?

Wash carefully after every feeding or nursing with a solution made by adding a drachm of boracic acid and half an ounce of glycerine to a quarter of a pint of boiling water. Use a tiny swab made by twisting a bit of pure absorbent cotton-wool (which may be got from a chemist) round the tip of a wooden toothpick or other slender piece of clean wood. With this swab gently cleanse the folds between gums, lips, cheeks. Don't use the finger: it is too large and may injure the delicate lining of mouth.

A much more effective means of killing the fungus of thrush is to let the baby suck a pledget of absorbent gauze, about the size of a filbert nut, containing, wrapped in the centre, a grain or more of dry boric acid and a trace of saccharin. Consult a doctor.

Summary of Treatment of Thrush.

Strict attention to hygiene, especially perfect care and cleanliness in every detail of food and feeding. Long-tube feeder and dummy must be got rid of. Don't give cane-sugar, condensed milk, patent food, biscuit, or sweets. Borax and honey will not do for swabbing the mouth, because honey feeds the microbes. Gently swab out the mouth with a solution of boracic acid as directed above. Pay strict attention to hygiene in the way of fresh air day and night, outings, suitable food, perfect regularity of feeding habits, etc.

Care of Eyes.

New-born babes are liable to grave inflammation of the eyes which may cause blindness. This is due to infection with discharges from the mother's passages. Therefore cleanse the eyelids and surroundings with special care immediately on birth.

Don't attempt to separate the lids, for fear of abrading the eyeballs and carrying in impurities. With the aid of a piece of "surgical gauze," or cotton-wool, or perfectly clean boiled rag, and plenty of warm boiled water, cleanse the lids thoroughly.

If preferred, "boric lotion" may be used, or a doctor may prefer a stronger antiseptic—but perfect cleansing is the first essential.

On the slightest sign of redness or swelling about the eyelids—especially in the first week—or on any sign whatever of matterly discharge, call in a doctor at once, as immediate active treatment would be needed.

The discharge from an inflamed eye can infect other eyes, so the utmost care must be taken not to risk carrying, by fingers, towels, etc., any impurity from the bad eye to the sound eye of the baby—or, indeed, to any one else's eye.

During the first week baby bears light very badly. He soon likes fairly strong diffuse light, but must be protected from glare (see Pram-hoods, etc., page 73).

Choking.

If possible, hook out obstructing material with forefinger thrust far back over tongue; anything arresting breathing is practically sure to be within reach of the finger. Other measures are to place the child face-down across the knees, and slap and squeeze him on the back; or he may be held suspended by the feet, head downwards, and slapped or squeezed. The last is best if a coin, fruit-stone bit of bone, or other such foreign body has lodged or gone the wrong way.

To restore breathing, if the child is blue and senseless after dislodging the obstruction, lay him flat on his back, with a small thin pillow, or folded towel or coat, under the shoulder-blades, and practise artificial respiration. If no one at hand knows how to do this, it will suffice to squeeze the front and sides of the chest firmly with the open hands about fifteen times a minute—alternately squeezing and relaxing until the child begins to breathe. There should be distinct intervals between the squeezings, so as to afford time for expansion and the inrush of air. If a second person is at hand, the lower jaw and tongue should be drawn forward at the same time, while the head hangs back over the low pillow or folded towel. If "artificial respiration" does not restore breathing in a few minutes, put the child into a very warm bath (say 110 deg. F.; or as hot as can be just borne by the elbow) for half a minute, and dash some cold water on the head and chest. Then roll him over and over in a dry towel and quickly resume artificial respiration.

Burns or Scalds.

Large burns are very dangerous, and may prove rapidly fatal from pain and shock. To allay this, pending the arrival of a doctor, cover the burnt area with perfectly clean soft linen or cotton cloths, or cotton-wool, soaked in carron oil (equal parts of limewater and raw linseed oil) or simple olive oil. Either of these may be improved and made antiseptic by the addition of an ounce (1½ table-spoonfuls) of oil of eucalyptus to the breakfast-cupful. Other soothing applications are vaseline or pure clean lard.

If the above are not handy, add a level tablespoonful of baking-soda to a pint of warm water and apply soft clean cloths soaked in this solution. In any case, this is very soothing before any oily dressing is used.

Immediate dredging with flour is permissible if the skin is unbroken; otherwise flour is messy and troublesome to remove. Don't use flour beyond the first day.

N.B.—Never leave a young child in a room where there is a fire without a good **FIXED** fireguard. Don't use flannelette!

Bad Habits.

Faulty habits, if firmly established in babyhood or early childhood, are often extremely difficult to break, and even though broken, they may recur later in life. Hence the extreme importance of forming the baby's habits and character on right lines from the start. Regularity, robust health, good digestion, and a well-nourished active body are the best safeguards. Nervous, unstable, disobedient, spoiled weaklings are specially liable to become the victims of uncontrollable habits such as :—

(1) **PERSISTENT SUCKING OF FINGERS, CLOTHING, Etc.** Often due to use of "Dummy." Years may elapse and irreparable harm may have been done to mouth and digestion before such habits can be broken.

(2) **BITING THE NAILS AND EATING DIRT.** Both practices are liable to be very injurious, and no pains should be spared to break such habits directly they are noticed. Parents who have seen a charming child with a rare gift for violin-playing forced to abandon the instrument on account of incurable nail-biting know how dominant and overmastering such an apparently simple fault may become.

(3) **INVETERATE AND PERSISTENT BED-WETTING.** The earlier a baby can be trained to be cleanly in the daytime, and not to wet the bed at night, the better.

Much depends on mother or nurse ; much on the general health and nervous stability of the child. In quite normal children wetting of the bed at night is liable to occur during the second year, and not infrequently well into the third year ; but if the habit cannot be broken towards three years of age a doctor should certainly be consulted. Often the main cause is poor health ; omit no detail of Hygiene—see pages 1 and 2. Or there may be irritation in connection with urine, foreskin, worms, etc. Professor Holt says :—"In all cases one should give a child a sufficiency of milk and water early in the day, but no fluids after 4 p.m., the last meal being always of solid or semi-solid food. The child should be taken up regularly at ten o'clock or thereabouts."

(4) **MASTURBATION.** This serious vice may begin as a simple, unmeaning habit, allowed to develop unchecked, indeed unnoticed, during infancy or early childhood, in the same way as persistent sucking or nail-biting.

The following passage from one of the highest authorities shows how grave may be the consequences :—

"The effect upon the physical and moral development of the child may be serious when masturbation is begun at an early age or is frequently practised. Even more striking is the change sometimes brought about in the child's moral nature. Even little children of eight or nine years may become centres of moral infection, which may involve a group of playmates or even a whole school."

In his "**Handbook for Mothers and Nurses**," Professor Holt says :—

"**What is Masturbation?** It is the habit of rubbing the genital organs with the hands, with the clothing, against the bed, or rubbing the thighs together. Sometimes the child sits upon the floor, crosses its thighs tightly and rocks backward and forward. Many of these things are passed over lightly and are regarded for months as simply a 'queer trick' of the child. It may be seen at any age, even in those not more than a year old, and in both sexes.

"**How should such a child be treated?** Masturbation is the most injurious of all the bad habits, and should be broken just as early as possible. Children should especially be watched at the time of going to sleep and on first waking. Punishments are of little avail, and usually make matters worse. Some local cause of irritation is often present (e.g. tight or adherent foreskin) which can be removed. **Medical advice should at once be sought.**"

Professor Cotton of Chicago says :—"All possible causes of local irritation should be relieved. Vigilant, intelligent surveillance, with tireless self-denial, may be necessary on the part of the mother or nurse to divert the little victim from his newly-found enjoyment."

Writing of 39 cases occurring in his own practice among young children, **Dr. Still, Professor of Children's Diseases at King's College, London**, says that 31 were girls, and in 25 the habit began before two years of age—in 8 cases before seven months. He continues :—

"One great factor in the treatment of this habit is early recognition. If only masturbation is detected in infancy it is seldom difficult to stop, but when it has been going on several years there is usually great difficulty in breaking the habit."

CIRCUMCISION.—Largely on account of an impression that Circumcision tends to lessen the tendency to Masturbation in boys, this operation is much in vogue nowadays, and parents are greatly exercised about the question.

In the writer's opinion there are not sufficient data to warrant the conclusion that circumcision should be practised as a mere matter of routine—indeed, there are reasons for regarding the normal foreskin rather as a protection and safeguard than as necessarily a source of danger. On the other hand, there is no question that a tight, too long, or adherent foreskin is objectionable, as being uncleanly, a source of local irritation, and an incitement to bad habits. If the foreskin can be readily drawn back in infancy there need be no anxiety, but if it cannot, a doctor should be consulted without delay.

When an infant has pain or difficulty in passing urine a probable cause is tightness of the foreskin. Consult a doctor without delay.

THE FORESKIN.—During the first few weeks of infancy gentle daily drawing back of the foreskin should be carried out at bathing time.

At birth the foreskin usually entirely covers the "glans" (the acorn-like end of the organ), but is easily drawn back in the majority of cases. However, in quite normal babies some weeks of gradually increasing daily retraction may be needed before the glans can be completely uncovered.

Daily drawing back of the foreskin at bathing time and cleansing of the parts (before the dawn of definite consciousness shall have rendered the manipulations objectionable), carried out in all cases, and particularly where there is any tendency to tightness, is a most important part of the nurse's duty to male infants.

A troublesome condition present at birth, in perhaps ten or twenty per cent of male babies, is the existence of "adhesions" between the foreskin and the glans. In these cases on attempting retraction it is found that here and there the inner surface of the foreskin is more or less "glued" to the glans, or is definitely united to it by little fibrous bands or attachments, which have to be ruptured (often causing bleeding) before the foreskin can be properly drawn back. The dealing with conditions of this kind by means of an oiled probe and the fingers is often undertaken nowadays by nurses on their own initiative; but, except in hospital, the writer is of opinion that in all but the simplest cases a doctor should be consulted, and any steps decided on should be primarily carried out under his directions.

The need for proper supervision is clearly conveyed by the following statement:—

"Time and again, after having stretched the foreskin and broken the adhesions myself, I have had the case returned in a few weeks with the adhesions and contractions as bad as before, the nurse or mother, timid or neglectful, having failed to follow my directions" (*Diseases of Children*, by Dr. C. G. Kerley, New York, 1909, page 371).

English doctors record similar experiences. The late Dr. Henry Ashby, of Victoria University, Manchester, speaking of the care and attention needed after breaking down the adhesions, said:—"Daily retraction and cleanliness for a week or two to get rid of further trouble, occasional drawing back and washing, are all that is afterwards required."

OBJECTIONS TO ROUTINE RETRACTION OF THE FORESKIN.—Before the dawn of consciousness the daily retraction of the foreskin by the mother or nurse at bathing time is a proper procedure; but, after the first month of life, the less the organ is meddled with by the child or its elders the better.

There is an unfortunate modern tendency to advocate elaborate meddlesome attentions to various parts of the organism which would be better left alone. Wiping out the mouth and routine obtrusive handling of a baby's "privates" are cases in point. Dr. Kerley goes so far as to say:—

"The daily retraction of the foreskin and bathing of the part is one of the best means of teaching the child self-abuse. The sensations produced by the retraction and washing are not unpleasant, and the child may soon learn to produce them himself, through leg-rubbing, handling, etc."

One can only regret the well-intentioned but misguided advice that mothers are apt to have conveyed to them nowadays as to what is euphemistically called the "toilet of the genitals." The natural parental instinct to chide or slap a child for "fingering the privates" is sounder and more wholesome.

The inner surface of the normal foreskin is no more in need of washing and fingering than the baby's toothless mouth, and the natural soft, whitish, creamy, soapy secretion underlying the foreskin is no more in need of removal than is the soft, semi-fluid, protective wax lining the interior of the tube leading to the drum of the ear. Both secretions fulfil a natural and useful purpose, and the fact that occasionally either may become abnormally hard and dry, and therefore need attention, is no excuse for daily meddling with the parts. In general external washing suffices.

A moment's reflection on the frequency with which little children are "tampered with" by their elders, of either sex, should prevent developing human frailty in this direction by daily subjecting nurse-girls to the very conditions best calculated to lead both them and their charges astray.

Consumption and Adenoids.

"Every year the world loses 5,000,000 of people through the scourge of tuberculosis. Remember that figure. **A London perishes annually from one disease—TUBERCULOSIS.**"

This was said by John Burns in his opening address at the Tuberculosis Exhibition, held in London in 1909.

The speaker inveighed against the blocked fireplaces of the people, the windows "never open," and the loss of air-space for children due to the farce of keeping up an almost unused show-room:—"If the fetish of the 'best front-parlour' were broken up, it would add 25 per cent to the breathing space of every workman's home."

Though existing "City-tenements" can be improved, they cannot be made ideal; but wherever feasible every new country cottage should be built with a good "living-room" facing the sun, so that mother and child may truly "live" in light and air and cheerfulness, and not be left to languish in the chill gloom of the back of the house. An ample living-room should serve during the morning as kitchen and dining-room, and as a place for the children also when the weather is too wet and windy for them to be outside or under the verandah. In the evening this room should be convertible into a sitting-room or parlour by merely shutting off the small recessed kitchen-portion by means of a light sliding screen about 6 feet wide. A double French-window should open on to a verandah. This type of cottage is rather cheaper to build than where a separate "best front-parlour" is provided, and is very economical because it affords a comfortable, ready-warmed sitting-room, instead of having an entirely separate parlour, which can only be rendered cosy in cold weather by lighting a special fire some hours beforehand.

The usual covering of floors with carpets is a dirty, wasteful, most unhealthy modern custom. Linoleum and small rugs are much better.

"Now I come to another practical remedy for Consumption: that is the abolition of the 'Comforter' and the 'Soother.' I believe the comforter has killed its tens of thousands of little children. What is more, doctors tell me that it subjects the baby's mouth and throat to malformations and is a special cause of bad teeth. . . . Further, the comforter is said to be responsible in many cases for Adenoids. . . . I would endure the charge of being a bureaucrat with pleasure if with one order I could make the comforter a public nuisance, and schedule it as a dangerous instrument."

"My last word, my summing-up is this: **Consumption is a house disease, almost a bedroom disease, and preventable. The best, simplest, cheapest remedy is to open your windows day and night.**"

"Sir William Broadbent [the great London physician] said to me shortly before he died:—'**Mr. Burns, if windows were kept open day and night, if many of the simple remedies were carried into effect, Consumption might be stamped out in a generation.**'"

Adenoids.

"Adenoids is an affection of great importance, and may influence in an extraordinary way the mental and bodily development of children. The establishment of 'mouth breathing' is the first symptom that attracts attention. At night the child's sleep is greatly disturbed; the respirations are loud and snorting, and there are sometimes prolonged pauses, followed by deep, noisy inspirations. The pulse may vary strangely in these attacks. Night terrors are common. The child may wake up in a paroxysm of shortness of breath. There may be paroxysmal cough.

"When mouth-breathing has existed for a long time, definite changes are brought about in face, mouth, and chest. The expression is dull, heavy, and apathetic, due in part to the fact that the mouth is habitually left open. In long-standing cases, the child is very stupid-looking, responds slowly to questions, and may be sullen and cross. The lips are thick, the nasal orifices thin and pinched-in looking, and the roof of the mouth narrowed and raised. The commonest deformity of the chest is 'pigeon breast.' Mouth-breathing is often associated with stuttering. The hearing is impaired, owing to blocking of the air-tubes to the ear.

[Stephen Paget says that from 80 to 90 per cent of cases of earache in children are due to Adenoids, and more than half of all cases of deafness are attributed to this disease.—Author.]

"Taste and smell are much impaired. Headache is by no means uncommon, general listlessness, and an indisposition for physical or mental exertion. The influence upon the mental development is usually striking. Mouth-breathers are usually dull, stupid, and backward. There is more than a grain of truth in the aphorism, 'SHUT YOUR MOUTH AND SAVE YOUR LIFE,' the title of Captain Catlins' celebrated pamphlet on 'Mouth-breathing,' to which cause he attributed all the ills of civilisation.

"The treatment of Adenoids is of the greatest importance, and should be thoroughly carried out. Parents should be frankly told that the affection is serious—one which impairs the mental not less than the bodily development of the child."

WM. OSLER, M.D., F.R.S., Professor of Medicine, Oxford University.

Condensed Extract from Article on Adenoids, 1909.

Adenoids may be induced even in early babyhood by the use of the "dummy," the "long-tube feeder," or any system of bottle-feeding where baby passively imbibes his food, or keeps the teat too long in the mouth. The disease is predisposed to by lack of attention to any of the "Essentials for Health" summarised on page 1. Later on in babyhood the great cause is limitation to soft food. Dr. Harry Campbell, writing on "**The Evils resulting from Inefficient Mastication,**" says:—

"It is to pap-feeding that I attribute the frequency of adenoids among the children of civilised communities. . . . A child whose nasal apparatus and naso-pharynx are well grown and habitually bathed in a stream of pure blood and lymph, this stream being periodically accelerated by an ample and vigorous use of the masticatory muscles, is unlikely to contract adenoids. On the other hand, a child in whom these parts are ill-developed, and at the same time bathed in an habitually sluggish stream of tainted blood and lymph—one, *i.e.*, that is not only poisoned but also rarely, if ever, hurried along its lazy course by due exercise of the muscles of mastication—such a child runs great risks of contracting the disease. . . .

"THIS THEN IS MY EXPLANATION OF THE TRULY FEARFUL PREVALENCE OF ADENOIDIS AMONG THE MODERNS: IT IS ESSENTIALLY A DISEASE OF PAP-FED PEOPLES."

Every baby should be TAUGHT successively to suck at a normal rate, to chew thoroughly, and to eat slowly. Painstaking practical training and judicious checking is needed if a child tends to take his food too rapidly and greedily, either as a nursling or after the first year; but the first point to attend to is to ensure that the feeding-apparatus, or the food-materials, are of a character which will compel the child to work for his living from the outset. All efforts at training will be in vain if the artificial teat has a large aperture, permitting an

easy, passive flow of milk, or if at a later period the baby is given simply "mush" instead of dry, hard, or tough food. Dr. Campbell says:—

"The way to develop the masticatory instinct in a child is to give him from an early period food which obliges him to masticate. . . . Many doctors are under the mistaken impression that if the young child is given solid food he will be likely to choke, but of this there is no danger if he is given hard things from the beginning. It is only when by pap-feeding his normal masticatory instinct has been kept in abeyance, and the habit of bolting his food has been acquired, that any danger is to be apprehended on this score. Even then it is but remote, and can readily be overcome by judicious handling.

"When [by the use of bones to gnaw, tough crusts, crisp toast, hard plain biscuit, etc.] the baby's 'instinct to masticate' has had proper opportunity to develop, we may allow a certain amount of soft starchy food, such as porridge, boiled potatoes, milk pudding, etc., and these he will now be likely to subject to something approaching adequate mastication, which will tend to mitigate the evils associated with such food."

However, the more a child takes of materials needing active mastication, and the less he has of soft mushy food, the better it will be for his teeth, jaws, and digestive organs, not only in childhood but throughout life.

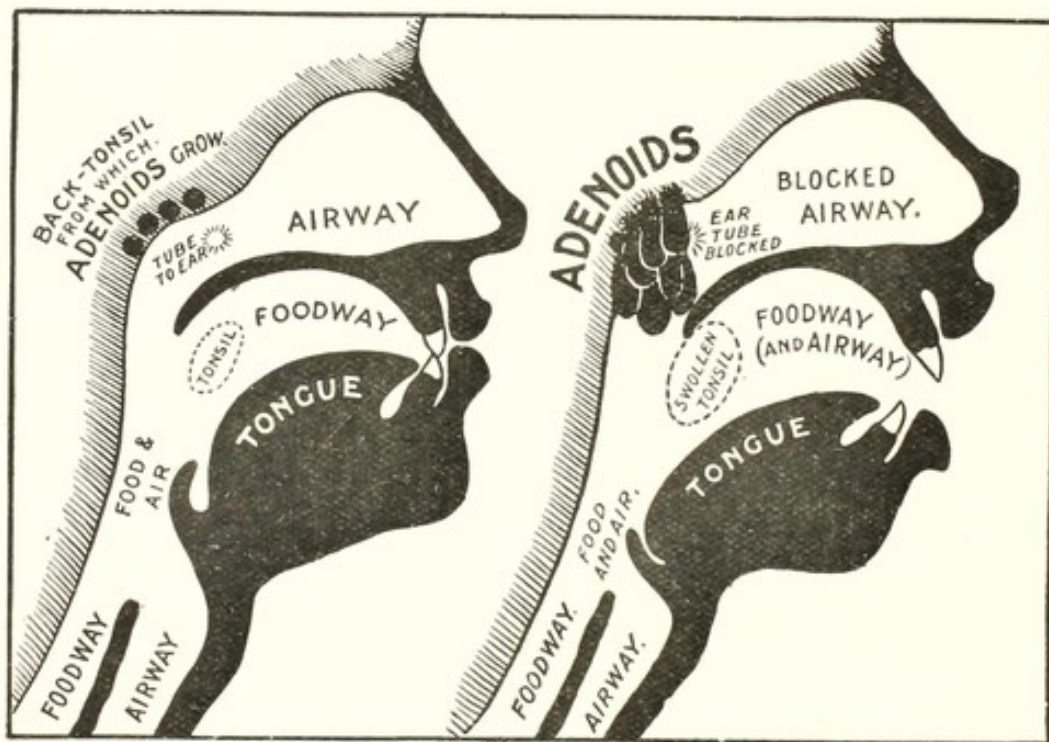


FIG. 51.

Section of Normal Nose, Mouth, and Throat contrasted with state due to Adenoids.

In addition to the primary blocking of the nose and throat above, note the secondary narrowing of the air-way below the back of the tongue. The effect of these changes is in some respects similar to what the mother brings about temporarily when she puts a handkerchief over the baby's face—but Adenoids deprive the child of fresh air day and night. A double barrier in nose and throat is set up across the highway into the chest. This prevents the child from ever getting a full supply of oxygen into his lungs, however pure the air may be, and however perfect the ventilation. Chronic inflammation and degeneration of the lining membranes of nose and throat ensue with stagnation and accumulation of secretions; and the nasal chamber and adjacent parts become breeding-grounds for microbes, which spread thence to the lower food and air passages, and poison and injure the whole system.

The above diagram should enable any one to realise how grave must be the direct and indirect consequences of narrowing and shoaling the very guard-ports of the body (nose, mouth, and throat) through which all supplies for the rest of the body must enter, and through which alone the poisonous exhalations from the lungs can escape.

The immediate result is limitation of the supply of oxygen and hindrance to the escape of carbonic acid gas and other waste-products. Stunting of the chest and of the whole organism is the inevitable sequel.

What are Adenoids ?

This name is applied to an abnormal growth of tissue blocking the air-way behind the nostrils. It is the commonest and gravest disease to which children of all classes are equally liable. Precise data as to the prevalence of Adenoids are not available, but the observations of six authorities, cited by Dr. Finkelstein of Berlin, go to show that from 20 to 60 per cent of German children are victims. Judging from the statements of practising doctors elsewhere, these figures probably represent about the average range of incidence. No place is free from Adenoids, and in some districts it is estimated that half the children suffer from the disease. The nature of the growth is very similar to the enlargement of tonsils so often seen in the throat—indeed, the two conditions are generally associated.

There is no common disease of children which at the same time does so much local damage and strikes so directly and gravely at the health and vitality of the whole organism as Adenoids. Further, there is practically no disease to which Adenoids do not predispose the individual, and no disease which is not rendered much graver by the presence of these obstructions.

The reader may not unnaturally exclaim, "**But what about tuberculosis : what about consumption ?**"

Adenoids and Consumption.

Adenoids and the factors which give rise to them are the parents of Tuberculosis and of most other diseases. Tuberculosis is not a primary condition, but due to a secondary invasion from without: our enemies, the tubercle bacilli, could not form large colonies, and gain a mastery over the cells of the human organism, if we reared our children properly and kept them in good physical form. If we saw to the health and fitness of girls and mothers, and trained them to give the baby proper air, food, and exercise—especially proper exercise for the growing and shaping of mouth, jaws, and teeth, instead of letting milk passively dribble down the throat, and instead of perversely moulding the growing structures in deformity—if we did these things aright, there would be no reason for anxiety as to tuberculosis, or any other such disease. Man was never meant to be the inferior of microbes either in vitality or fighting power. We are too fearful of our enemies and take too little pride in our own fitness. Microbes batten on cells "unmanned," debilitated by feeding on imperfectly aerated sluggish blood, just as "Blight" swarms and thrives on a starving turnip-field, but leaves a flourishing, well-fed crop unassailed.

Sir Felix Semon, the earliest great English authority on Adenoids, writing 15 years ago, said: "It is quite certain that the pharyngeal tonsil, when in a condition of chronic hypertrophy and degeneration (that is, when it has changed into **Adenoids**), like all tissues of low vitality, has lost its power of resisting the invasion of pathogenetic (disease-producing) microbes, and is a ready portal of entrance for tubercle bacilli." Tubercle bacilli have been found on examination of adenoid tissue to be actually present in a large proportion of cases.

Nicholl, in an analysis of 500 cases of enlarged cervical glands (glands of the neck), believes 80 per cent of them are due to tuberculous infection from the tonsils and naso-pharyngeal

mucous membrane. The practical and far-reaching importance of such observations cannot be overestimated.—*Diseases of Ear and Throat*, by Herbert Tilley, B.S., London; F.R.C.S., England. Surgeon Ear and Throat Dept., University College Hospital, London: 3rd edition, 1908.

Tubercle germs may be inhaled straight into the windpipe and tubes of the lungs; but, in a considerable proportion of cases, they first settle in the tissues of the nose and throat which have been weakened by Adenoids, etc., grow colonies there, and then spread to glands, lungs, and other internal organs.

Landing-places of Disease.

"Nose-and-throat specialists" and the leading dentists insist on the overwhelming importance of the rôle played by unhealthy conditions of the mouth, nose, and throat as the essential harbours and landing-places of disease.

These views are confirmed in all directions. Thus, the senior surgeon of the Metropolitan Hospital, London, in an able address on "*Diseases of the Orifices of the Body*," shows how **most diseases—including almost every form of insanity—are due to colonies of microbes which establish themselves in and around the "ports" of the body.**

"It is the thousand and one illnesses which we cannot label, and the many small lesions which precede the invasion of the body by such master-bacilli as the typhoid and tubercle bacillus, which perform the pathological spade-work whereby such well-defined bacteria are able to invade the body and successfully thrive in its organs and tissues. . . .

"In dealing with my subject, I would do so in the spirit which holds when, in referring to finance, we say: '**Take care of the pennies, the pounds will take care of themselves.**' The diseases I particularly wish to direct attention to form the pennies of ill-health, the typhoids and tubercloses the pounds."

In other words, **the invasions of microbes associated with common colds, sore throats, decaying teeth, indigestion, diarrhœa, etc., prepare the soil for tuberculosis, typhoid, appendicitis, etc.**

A hostile army cannot establish itself in Australia except by effecting a landing, say, at Melbourne or Sydney, and defeating the local forces there—it cannot dump itself down in the heart of the country—and the same applies to microbial diseases in relation to ourselves. **The internal organs are virtually safe if the harbours which alone give access to the interior have been strongly and capaciously constructed with a view to free access and defence, and are kept garrisoned with properly fed, sturdy, active, energetic troops** (see pages 1 and 2).

What would be the position of Australia if its supplies had to come solely from without, as is the case with the human body?—how would Australia then fare if, in addition to general neglect of the health and defensive fitness of its young men, steps were actually taken by its rulers to shoal and block its ports in such a way as to prevent entry by its own ships, while leaving them freely open to effective hostile small-craft!

Yet this is precisely what we do, in relation to our children, when we so feed and treat them as to ensure more or less contraction of mouth, jaws, nose and throat, and overcrowding and decay of teeth—**we block our own commissariat, while offering all facilities to the enemy.**

Is the Modern Child doomed before Birth to Bad Teeth and Adenoids ?

Many people imagine that the children of our present-day civilization inherit stunted, defective jaws and teeth, and that many babies are born either with Adenoids or with a destiny that makes the disease inevitable from the start of life. Let every one dismiss such absurd ideas at once. It takes at least many generations for acquired defects of particular organs in the parents to be transmitted as such to offspring—though weak, feeble parents do tend to have all-round weakly progeny. **Bad teeth and Adenoids are certainly predisposed to by lack of health and strength in parents, as all weaknesses in offspring are predisposed to by this factor.** But the special and alarming degeneracy of mouth, jaws, teeth, nose, and throat, which is sapping the health and strength of so large a proportion of the rising generation, is due to defective care and attention with regard to very simple matters during babyhood and childhood, and is easily preventable. The farmer has just as much reason to regard "foot-rot," which formerly ruined flocks of sheep, as inevitable (a view which he often took in the past) as we have to regard decay of teeth or "tooth-rot" as unavoidable in ourselves. The diseases are analogous, and both are easily stamped out.

Effects of Mouth-Breathing on Lower Animals.

Experiments recently carried out with dogs, rabbits, and guinea-pigs show that nutrition, resistance to microbes, and general health suffer in proportion to the degree and completeness of nasal obstruction, and the animals tend to succumb more or less rapidly to chest affections, etc.

Blocking of even one nostril was found to cause grave disturbance, and most of the rodents so treated died within a month; when both nostrils were kept closed the rodents survived only about a week. Dogs held out longer, "but they all suffered from general lack of nutrition, etc., though supplied with an abundance of good food."

Report of Experimental Study of the Effects of Nasal Obstruction upon the Respiratory Organs and General System, by **Dr. W. S. ANDERSON**, Archives of Pediatrics, Vol. XXVII., January 1910.

Leading Dental Authorities on Adenoids, etc.

In an address given in 1905 before the "British Throat, Nose, and Ear Society" (to Anglicise the name), Dr. Sim Wallace, speaking on the prevalence of "Mouth-breathing," said:—

"Nasal-obstruction is now quite a common disease, although but a few generations ago it was practically unknown. This can be easily proved, because Nasal-obstruction and Mouth-breathing give rise to a characteristic deformity of the jaws, and to an easily recognisable irregularity of the teeth. The mouth-breather's jaw is absent in all but recent collections of skulls. What change has taken place which will account for the increased prevalence of Nasal-obstruction and Mouth-breathing?"

Dr. Wallace recognises the prejudicial influence on the organism in general, and on the mouth, nose, and throat in particular, resulting from living in close, stuffy, unventilated, germ-laden rooms, and in passing from such poisoned, heated places into the cold air, etc., etc.

Pap-Feeding.

Having considered such factors, Dr. Wallace next devotes his attention to what he holds to be the special cause of the prevalence of mouth-breathing and Adenoids in the present day—viz. **the unsuitable food and feeding-habits imposed on babies and young children.**

"Instead of being gradually weaned and given food which will demand gnawing and insalivation, the baby is cheated into gulping down bread soaked in milk, porridge and milk, milk puddings, and potatoes and gravy.

" . . . Hence the modern child falls into a state of **Chronic Indigestion**, and often develops Nasal-obstruction. . . . 1. Indigestion causes a tendency to congestion and inflammation of parts of the mouth, nose, and throat, especially enlargement of tonsils (front and back). 2. Indigestion causes emaciation and general lack of strength, and this, along with deficient exercise for all masticatory muscles, resulting from pap-feeding, leads to imperfect growth of the tongue—the organ which under natural conditions specially moulds and broadens the soft and growing jaws and palate. Thus we get the air and food passages gravely narrowed.

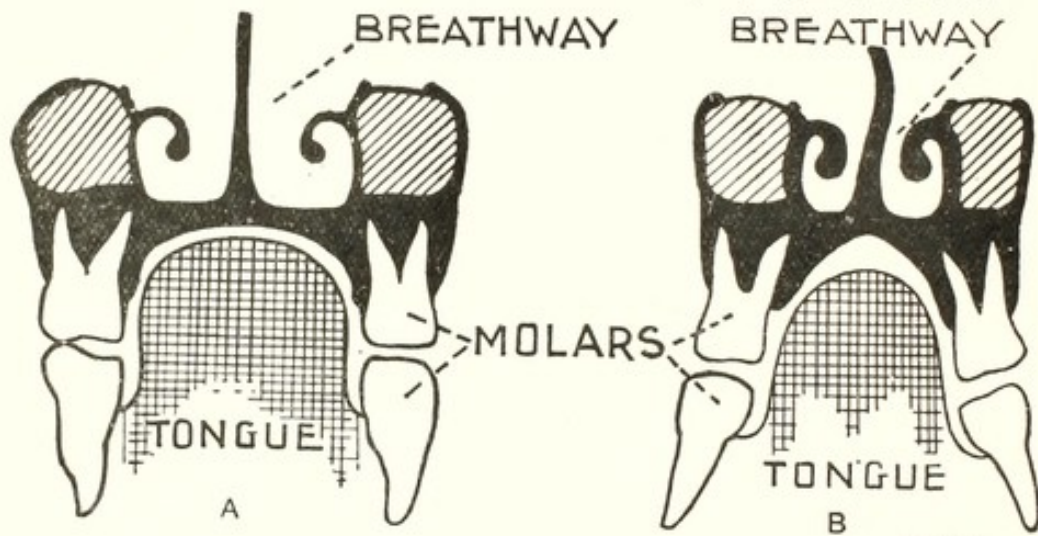


FIG. 52.

Section of Mouth and Nose showing Form of Palate and Position of Teeth when—
 (A) Tongue, jaws, etc., have been normally worked and developed during babyhood.
 (B) Mouth has been given but little work to do.

Note how in B the tongue has remained small during development of palate, and has been incapable of broadly moulding roof of mouth while the parts were still plastic. This comes of allowing a lazy, passive inflow of milk through a "long-tube feeder," and subsequent "pap-feeding." Pressure of "rubber teat" or "dummy" further thrusts up the narrow, ill-formed roof, buckling the mid-partition of the nose. The weakened tissues, now chronically congested, make the airway still smaller (see diagram)—a source of blocking familiar in the temporary "stuffing-up-of-the-nose" in common "colds." Then come **Adenoids**, which may complete the blocking—microbes swarm, stagnating secretions gather, and further irritation and swelling ensue. Thus a vicious action and reaction, each aggravating the other, becomes chronic—all following on lazy, improper feeding of baby.

"We must protest against the iniquitous system of feeding children almost entirely on soft milk-soaked foods. This pap system causes lifelong suffering. **It begins by producing the wholesale ruin of the teeth, together with many consequent troubles. It leads to ADENOIDS and all the unfortunate sequelae. Finally, it almost necessarily begets gastric insufficiency, malassimilation, and malnutrition, together with the general wreck of physical well-being which these derangements ultimately produce.**"

In an address delivered in 1904 on **Physical Deterioration in relation to the Teeth**, Dr. Wallace quotes the following, with approval, from the *Dental Annual* :—

"There has been of late a remarkable consensus of opinion as to the superiority of early mastication, the use of hard and resisting food, and the general exercise of the jaw muscles . . . as compared with soft-feeding and artificial cleansing of the mouth."

Dr. Wallace continues : "Surely the time has come when we might advocate something which would really prevent caries of the teeth and those other diseases which are at present doing so much to ruin the national physique. . . . Dental caries is preventable, and we know enough to explain how this may easily be done. We know also quite enough of the physiology of digestion to warrant us in condemning the pap system of feeding children. . . ."

"In conclusion I would remind you that **it is not only a dental question, it is not only a medical question, it is not only a national question, but it is probably the most important of all questions affecting the physical well-being of humanity throughout the length and breadth of the civilized world.**"—J. SIM WALLACE, M.D., D.Sc., L.D.S.

Dr. Pickerill, Professor of Dentistry at Otago University, confirms Dr. Sim Wallace's views. Speaking from his own experience in England and New Zealand, he finds that deformities of the jaws and palate and caries of the teeth are even more prevalent in the Dominion than at Home. In addition to the factors already mentioned, Dr. Pickerill regards the excessive consumption of sweets by colonial children, due to their parents being on the whole better off, as a very grave local evil. He says that narrow, deformed jaws and palate are really becoming our "normal" type.

Effects of Soft Foods on Lower Animals.

Special attention has been given of late to the effects on jaws and teeth of feeding animals with foods not demanding mastication. Whether the animal be herbivorous or carnivorous, jaws and teeth fail to develop properly, and the teeth soon decay if hard tough food is withheld.

Dog fanciers have observed that if pups are not given tough, hard, or dry foods, such as raw meat, bones, dog biscuits, etc., but are restricted to cooked meat, milk, mush, etc., their jaws and teeth show defective growth and the latter soon decay and blacken. Careless feeding causes toothache to be quite a common affection among dogs improperly reared in cities.



(A) Teeth of a Healthy Cow.

(B) Teeth of a Cow fed on Slops. This shows the need of eating food that requires the use of the teeth.

(C) Human Teeth: Healthy sockets.

(D) Sockets Injured by Tartar. Germs grow in tartar and attack the teeth, so it should be kept away by brushing. (From *Elements of Physiology*, by W. M. Coleman, A.B., published by Macmillans "for the use of schools"—an excellent text-book.)

The following is taken from Coleman's Health Primer for little children, which every mother should have—she might learn much herself :—

WHAT HAPPENS TO THE UNGRATEFUL.

There is no part of the body that is useless. Every part has its duty to perform. Suppose your father gave you a knife and you laid it on a shelf and did not use it; suppose you did not even keep the dust and rust off. Do you not think it would be right for him to

take the knife away and give it to your brother who would make good use of it and keep it clean and bright?

Some children will not eat anything hard. They do not like hard crusts of bread. You would almost think they had false teeth and were afraid of breaking them by eating anything hard or tough. Gums would do as well as teeth for the food they eat. They do not use their teeth. **So the teeth decay and are taken away from them.**

Dummy or Comforter.

The Society for the Health of Women and Children has been making strong efforts to bring about the abolition of the "Dummy," and has drawn the attention of the Legislature to the extent and gravity of the evils resulting from its use. Doctors and dentists are at one on this matter. Every year the journals of both professions teem with references to the evils of the "**Dummy Habit.**" The abomination was scathingly denounced at a recent Dental Congress, and the following extracts from a letter since received by the Society from the President of the New Zealand Dental Association, Mr. T. A. Hunter, need no comment:—

"In reply to your note [concerning the 'Dummy'], speaking from a Dental point of view, there can be no doubt as to its evil effects. . . .

"During early childhood the bones are soft and easily moulded, so the use of any such appliance as the 'Dummy' is highly injurious. By its use the bones of both mouth and nose are involved. It is the cause, in most cases, of the contracted, or what we call the 'V'-shaped arch, interfering with proper dentition, causing the teeth to erupt irregularly and to be misplaced, one of the most frequent types being protrusion, which in turn induces mouth-breathing with its train of ills, such as adenoids, enlarged tonsils, etc., thereby lowering the vitality of the child and rendering it more susceptible to disease of any and every kind. . . .

"I have said enough from the Dental point of view alone to warrant the authorities in taking steps to abolish the use of such contrivances as the 'Dummy.' I fail to see any argument in its favour, especially when we consider that the habit is an acquired one."

Some years ago, Dr. T. F. Pedley, M.D., published a remarkable article in the *British Medical Journal*, giving the results of his experiences in the Far East and his researches in England as to the baleful influence of the "Dummy" or "Comforter," and of the unduly prolonged use of the ordinary rubber teat.

Regarding the "Comforter," Dr. Pedley said:—

"It is commonly placed in the baby's mouth immediately after it has been fed from either the breast or the bottle, and is sucked for hours, day or night, until a habit is contracted which is most difficult to break. On the slightest sign of restlessness, or without any reasonable pretext, the dummy is pushed into the infant's mouth; often it is picked up from the floor and given to the child, or hung round its neck so as to be handy. Sometimes it is dipped into sugar or smeared with jam to render it more acceptable. Apart from its mechanical effects upon the jaws and teeth, its use, to my mind, is obnoxious and uncleanly, for it introduces into the child's mouth dirt and micro-organisms, and causes an abnormal secretion of saliva, detrimental to digestion. . . .

"Where both teat and 'comforter' have been long used, the damage is, I believe, irreparable. With multitudes of young children in Europe, the size and shape of the palate varies with the extent to which such influences have been brought to bear upon the plastic and growing tissues. . . .

"Of course, the 'comforter' must be abolished and forbidden; its use is injurious, and if resorted to after warning, should be deemed an indictable offence.

Postscript, London, September 1906.

"Returning to England, I am intensely interested to find that these questions are now deeply engaging the attention of the profession and practical philanthropists. [Dr. Pedley evidently refers to the series of enquiries instituted in England to get at the bottom of the causes underlying the alarming evidences of **physical deterioration.**]

"I have visited many parts of the country. Wherever I go the extraordinary prevalence of the use of the dummy has astonished me. In the streets or travelling by rail, I meet this thing; the children playing on the sands have it in their mouths. **In tens of thousands the mischief has been done, they are shamefully disfigured for life. It seems to me that the arrest of this evil is as deserving of the attention of our legislators as many of the subjects to which they devote so much time and energy.**

"What great responsibility rests upon us as a profession in regard to all these matters! Let us endeavour to act up to our responsibilities, and with a united and decided voice denounce the many preventable causes of disease, which are doing so much to sap the vigour and to impoverish the blood of the splendid race so envied of all the world."

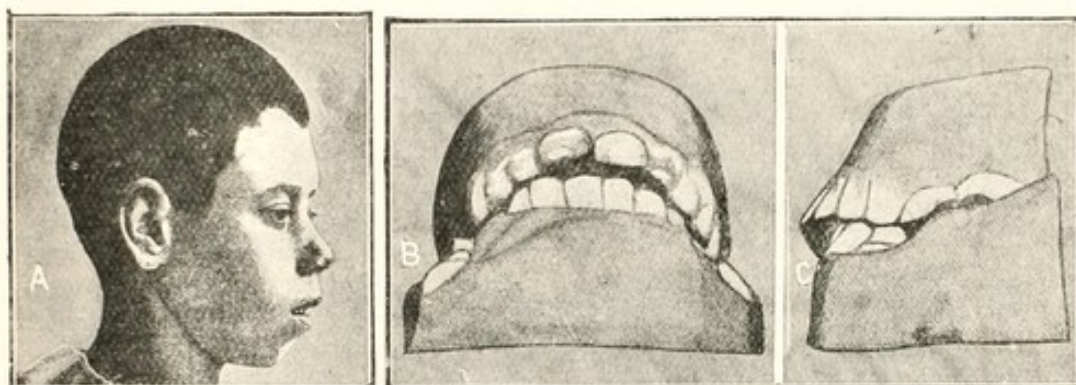


FIG. 54.

(A) **Typical Profile of Boy with Adenoids.** Note open mouth, protruding upper teeth not covered by lip, small retreating lower jaw, and vacant expression. (This illustration is taken with kind permission from *Diseases of Children*, by Pfaundler and Schlossmann, 1908.)

(B, C, D, E) **Typical Effects of using the "Comforter" during Babyhood.** Note projection of upper central teeth and space formed for itself by the "Comforter," which gives rise to "mouth-breathing" and Adenoids. In D and E the narrowing of the jaws and crowding of the teeth is specially well seen. This gives rise to a weak, "rabbit-like" expression. These illustrations are taken from an article

by Dr. Pedley, who gives the following account of the cases:—"Figs. B and C are from a boy ten years of age. Figs. D and E from his brother, aged 12. These are two English boys whom I have known from birth. They were bottle-fed after the first two or three months. The devoted parents, deaf to my entreaties and predictions, gave them the 'dummies' at an early period, and their use was continued until after the temporary teeth had all been cut. So confirmed did the habit become, that there was no peace in the home if the children were deprived of their 'pacifiers.' Subsequently these models were taken, and I found that **my predictions that the permanent teeth would follow the lines of their protruding predecessors had been fulfilled.** The parents, an elder son, and a younger daughter are free from any such deformity. Neither of the latter used the dummy."

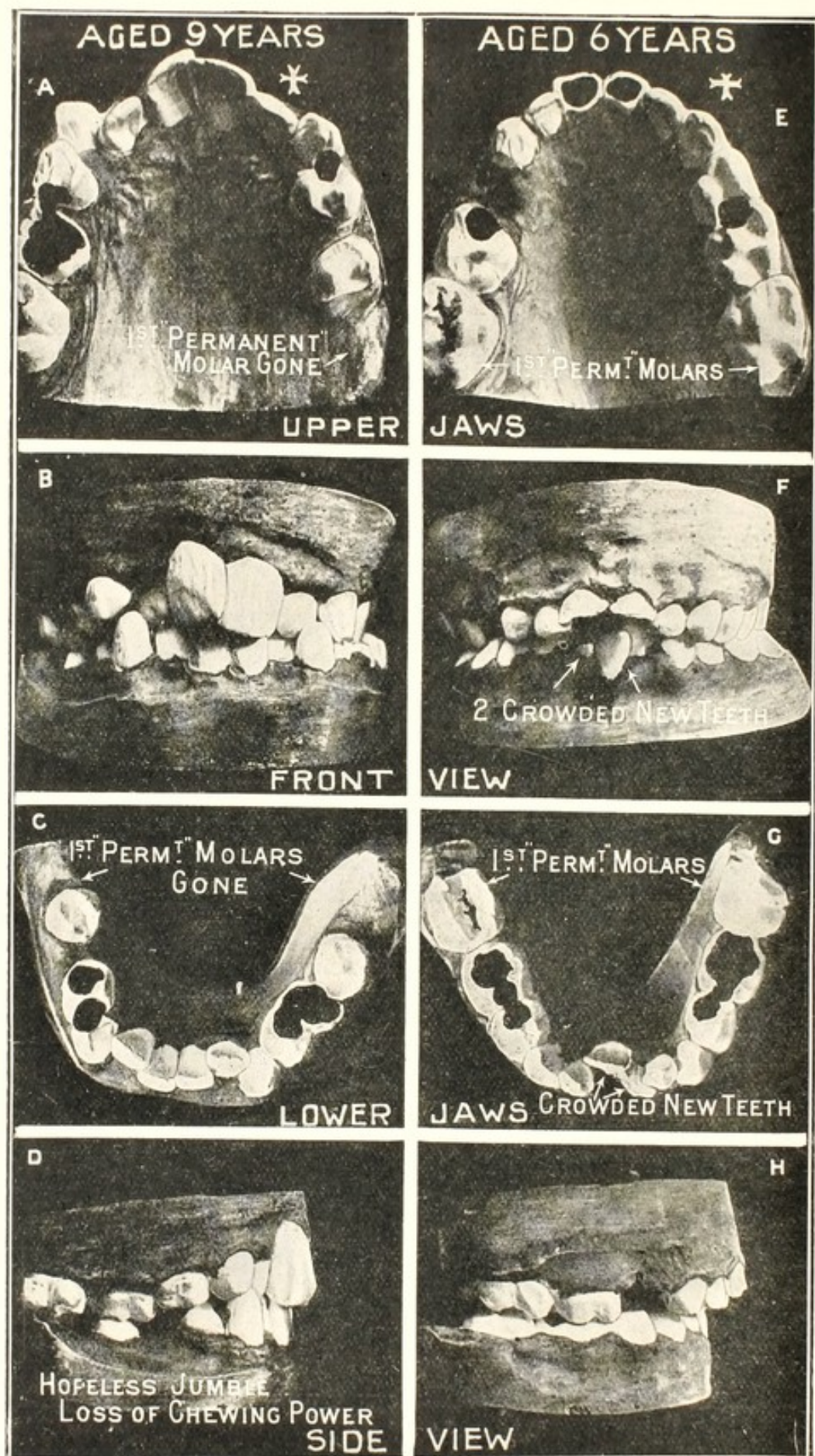


FIG. 55.

Life-size Casts of Jaws of two bottle-fed country children, of same family. Both used "Long-tube feeder" and "Dummy"—(see full particulars on opposite page). There are four children in the family—(see casts marked with crosses similar to the above on succeeding pages).

Note narrow jaws ; crowded, jumbled, irregular teeth ; decay spreading from tooth to tooth, and ugly protrusion of upper front teeth, thrust forward by continued pressure of teat and dummy.

Note that the teeth **overlap** one another and **interlock** when the jaws are closed, preventing all power of "grinding" or side-to-side movements essential for proper mastication. Mere up-and-down, chopping movement is not enough—**food should be ground.** If in an adult we find the teeth not worn, we may be sure he has not been in the habit of masticating properly.

The six-year-old child has half his teeth decayed (12 out of 24). The nine-year-old child has eight teeth decayed out of twenty-two, and has lost three out of four permanent molars.

The teeth of the younger child, aged 6 years, are all "milk teeth," except the two extreme back ones in each jaw, and the two central front teeth in the lower jaw which have just come crowding in.

In the child aged 9, the four front teeth in each jaw belong to the second set, but three out of the four permanent molars are missing—having been extracted for decay.

The permanent molars come up during the sixth year close behind the "milk molars." Even when they are sound the mother often asks to have them pulled out, if there is any aching in their neighbourhood. She takes them to be "merely milk teeth," which she thinks are "better out of the way to make room for the new set." This is quite wrong, but to sacrifice a big back permanent molar is a thousand times worse. If the slightest sign of decay appears in such teeth they should be saved at any cost by immediate "stopping"; their loss renders the opposite teeth in the other jaw useless. The loss of a permanent grinder is the loss of a very important part of the living being—something which cannot be bought—something beyond diamonds and rubies—something for the restoration of which many a martyr to indigestion would gladly pay thousands of pounds. A good set of teeth is a better dowry than money!

Dr. Angle, M.D., D.D.S., a high dental authority, says that while all the teeth are needed, the first permanent molars are by far the most important because they are the largest and strongest grinders.

"Further, they regulate the position which shall be taken up by the newcomers behind and in front of them. They are the fixed starting-points for arranging the new set: without them there will be an unsightly jumble of the permanent teeth, and the child's face will not develop in its natural harmony and beauty." (See D.)

Dr. Angle is strongly opposed to "pulling out teeth to make room," if avoidable. He shows how jaws which had failed to develop properly have been made to grow in a marvellous way by coaxing or forcing the jostled teeth into the "working line."

The way to make stunted jaws grow is to give them, through the teeth, enough work to do—the stimulus of extra work inducing increased blood-supply and extra growth of bone. In infancy the mother has the golden opportunity for building model jaws, by giving the child bones to munch and gnaw, and dry, hard, or tough food to eat. Even the jaws of lads entering the Navy used to become bigger as the result of having "hard tack" (ship's biscuits, etc.) to work on. I have seen a small boy quite toothless owing to starchy foods, little fat or flesh-formers, and no hard food.

STRIKING CONTRASTS.

We have been considering three of the members of a family of four country children living under potentially ideal conditions for healthy growth and

development. Here are three children permanently disfigured and gravely handicapped for life. These three used the "Long-tube feeder" and "Dummy" for eighteen months or more, and the resultant damage is found to vary with the inveteracy of the evil habits—the degree to which they were carried and the length of time for which they were persisted in. All four children, after weaning, were fed on the usual soft foods, demanding little masticatory effort. Further, the general hygiene, or lack of hygiene, in the home has been alike for all.

Now let us compare the fourth child, a girl aged $3\frac{1}{2}$ years, with the immediately preceding boy aged 6 years. Both were bottle-fed from the start by means of the "Long-tube feeder," and both were given the "Comforter"; but whereas the elder (the boy) became a slave to the two vices, the girl wouldn't take the "Dummy," and gave up bottle-feeding before reaching eighteen months. Turn to the illustrations of the jaws of these children. Those of the elder are shown in Fig. 55, E, F, G, H, and Fig. 57, B. The deplorable condition of his jaws and teeth has been fully described on the previous page.

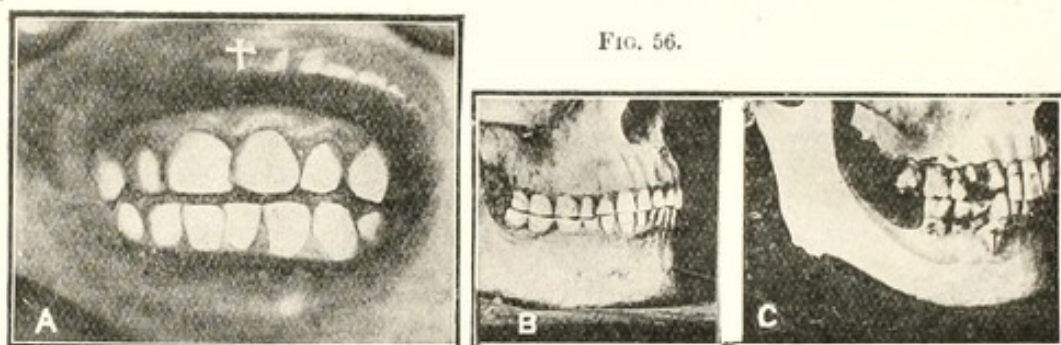


FIG. 56.

(A) **Photo of mouth of child aged $3\frac{1}{2}$ years.** Out of a family of four children, this is the only one whose teeth are not bad, and she wouldn't take the "Dummy." The photos of the rest of the family can be identified by their being all marked with Maltese crosses. Unfortunately this child used the "Long-tube feeder" for nearly eighteen months, and has had the usual more or less soft foods ever since. These facts account for the jaws being slightly narrow, the growth of bone not having been quite active enough to separate the milk teeth from one another, in preparation for the larger permanent teeth. How the growth of jaws can be stimulated and developed sufficiently, in the course of the next few years, is fully explained on the next page.

(B) **Jaws and teeth of old Maori.** Note the perfectly-developed jaws and beautiful, well-worn teeth, without a speck of decay. This is attributable specially to normal breast-feeding, and the healthy daily task of masticating fern-root, dried fish, etc. Any hard, tough, or dry foods would do.

(C) **Jaws and teeth of degenerate European.** Defects probably due mainly to wrong feeding in infancy, and avoidance of hard, dry, or tough foods afterwards. Note the shrunken jaws and crowded, long, unworn, ugly, decayed teeth—the jaws and teeth of local idleness. (Further details and illustrations of jaws are given on pages 44 to 46.)

Which of the above do you prefer for your baby? You can give him either!

A photograph of the mouth of the girl, displaying between the parted lips a regular and even set of teeth, is shown above in Fig. 56, A. Compare this with Fig. 57, B, on the opposite page. The contrast could scarcely be greater, and it applies to the whole of the teeth, not merely to the front ones. Unfortunately the younger child would not let us take a cast of her mouth. However, none of her teeth have decayed, though there are several points of slight discoloration, indicating the need for care and attention. Further, the palate is arched above the normal and the jaws are slightly narrowed, owing mainly, no doubt, to the use of the "Long-tube feeder" and subsequent "pap-feeding." Note the consequent tendency to slight crowding of the teeth. This shows also that the jaws have not been growing sufficiently during the last two years, otherwise there would be some separation of the milk teeth by this

time. While this child is not so strong and big as she should be, the defects she shows are merely such as we should expect from feeding by means of the long-tube feeder (the food used being modified cows' milk and water, supplemented by some bread sops), soft-feeding after weaning, and indifferent all-round hygiene. While "it is always too late to be what one might have been," there is nothing to prevent this child from being brought to grow and develop fairly satisfactorily by judicious care in future. Her mother ought to give her now what she should have had all along, viz. "What every baby needs" (see page 1).

How are her jaws to be made to grow so as to provide ample space for the much larger permanent teeth when they push through the gums only two and a half years hence?

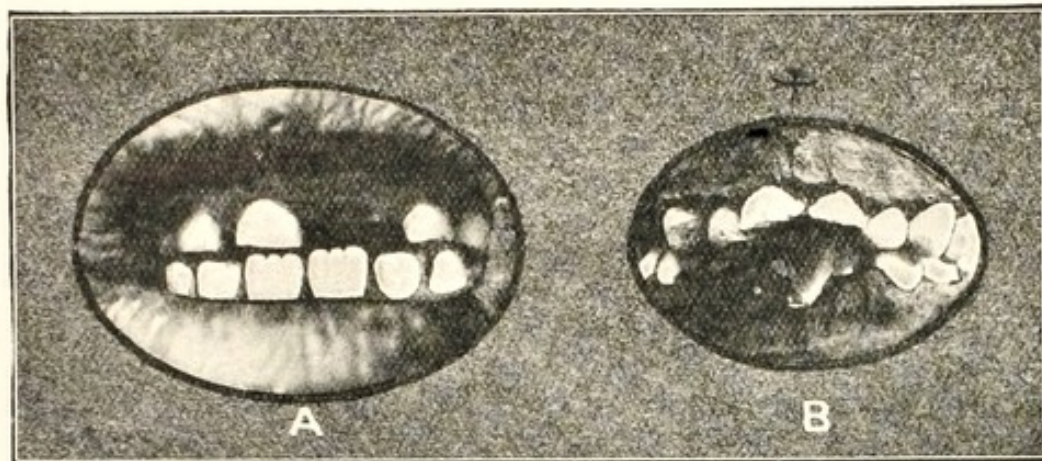


FIG. 57.

(A) **Mouth of healthy normal 6-year-old child**, originally delicate and artificially-fed from birth. By the use of bones, hard tough food, etc., the jaws were caused to grow actively and thus separate the "milk teeth," which were at first a little crowded. She is shedding the first front milk teeth, which show well worn. The two lower mid-incisors are already replaced by the saw-edged permanent teeth. Note that the space in the upper jaw has been left by the shedding of a single milk tooth (see scar on gum) and there is ample room for its successor.

(B) **Cast of jaws of 6-year-old child**. This child also was artificially fed from birth. Note that he too has both the lower mid-incisors replaced by permanent teeth; but the space left for them by the shedding of the two milk teeth has not been large enough for more than one successor. Hence the new arrivals are seen jostled obliquely out of position. The same crowding and jostling will take place with the rest of the new teeth when they push through the gums. This stunting of jaws and consequent crowding of teeth is due to the use of the "Long-tube feeder" and "Dummy" for 2½ years, feeding on condensed milk, and otherwise defective hygiene. This case is fully dealt with above and on pages 134 and 135.

The answer is provided in Fig. 57, A, above, showing the front teeth of a child aged six years belonging to another family. She also was reared artificially from birth, and she was small and delicate in early infancy. A few years ago her teeth were close together, but they have been steadily and surely separating month by month through the use of plenty of hard, dry, tough foods, raw apples, etc., and by systematic training in thorough mastication. In addition, she has enjoyed all the advantages of the simple hygienic regimen outlined on page 1. Her first teeth are in excellent condition, she has had no toothache, and the eruption of new teeth gives no trouble. That there is ample room for them will be realised by noting the perfect placing of the two lower central permanent teeth, identifiable as new arrivals by their natural saw-like, cutting edges. Further, note the wide space provided by the shedding of one of the upper teeth. The scar left on the gum shows the site for the new tooth.

Now compare this six-year-old child, who may be regarded as normal, with the other child of same age (see Fig. 55, E, F, G, H, and Fig. 57, B), who was fed on condensed milk and used the "long-tube-feeder" and "dummy" for two and a half years. The parents of the weakling are bigger and more robust than those of the strong child.

Normal Child.			Child Wrongly Fed, etc.		
Height	.	4 feet	Height	.	3 ft. 9 in.
Weight	.	50 lb.	Weight	.	39 lb.

The contrast is equally striking throughout the whole being. The one child is rosy, radiant, firm, muscular, well-developed, and heartily enjoys chewing her food. She is brimming over with life and energy, is happy as the day is long, and sleeps soundly all night.

The other child is "ricketty," pale, pasty, soft, wanting in bone and muscle, feeble, nervous, timid, and cannot chew his food properly owing to defective teeth, and the pain due to half of them being carious. This causes him to frequently choke whilst eating, and naturally prevents proper digestion and nutrition. At night he snores on account of **Adenoids**, is beset by terrifying dreams, and starts out of his sleep with the cry of nightmare—and **this child is typical of thousands of others, brought to the same estate by the fact that modern "Civilisation" has crushed out or let slip many of the maternal potentialities, or protective instincts and customs, of more primitive times, and has taken no account of the need to train and fit its women for home-life and motherhood. It is a strange fact that the last half-century has invented five previously unknown CURSES OF BABYHOOD—the "Long-tube-feeder," the "Dummy," Condensed milk, Dried milk, and Patent foods—three of which were prime factors in inflicting lifelong damage on the child above referred to. How were the parents to know that these much-vaunted, much-paraded things were highly injurious? The fault has lain with society for leaving the mothers untaught—an easy and most pitiable prey to ignorance, greed, and specious quackery.**

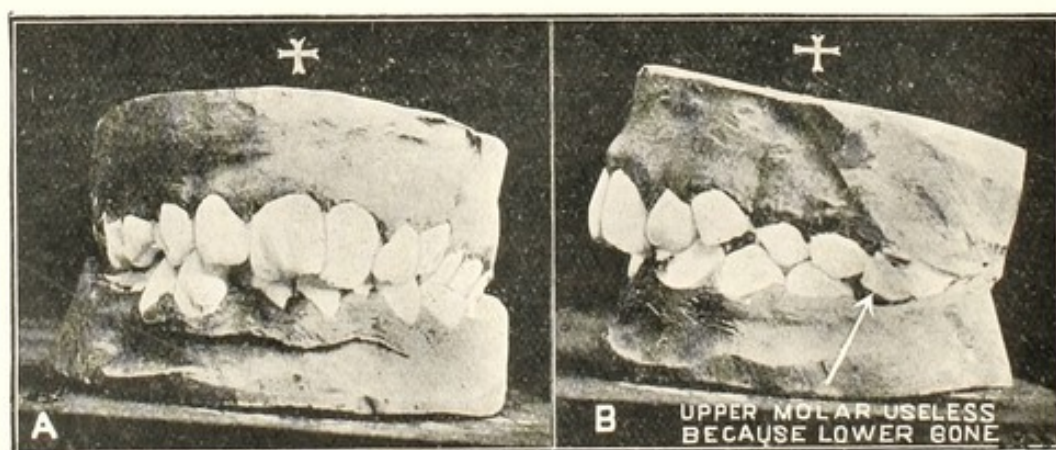


FIG. 58.

Jaws of boy, aged 11 years. When a baby was mainly breast-fed, but was given some Patent food, also "Long-tube feeder" and "Dummy" were used for eighteen months. Three out of four molars gone; nutrition and growth extremely defective; weight 10 lb. below average. The fact of being mainly breast-fed for 10 months did not save him from very grave defects, largely attributable to use of "Long-tube feeder" and "Dummy."

Rickets.

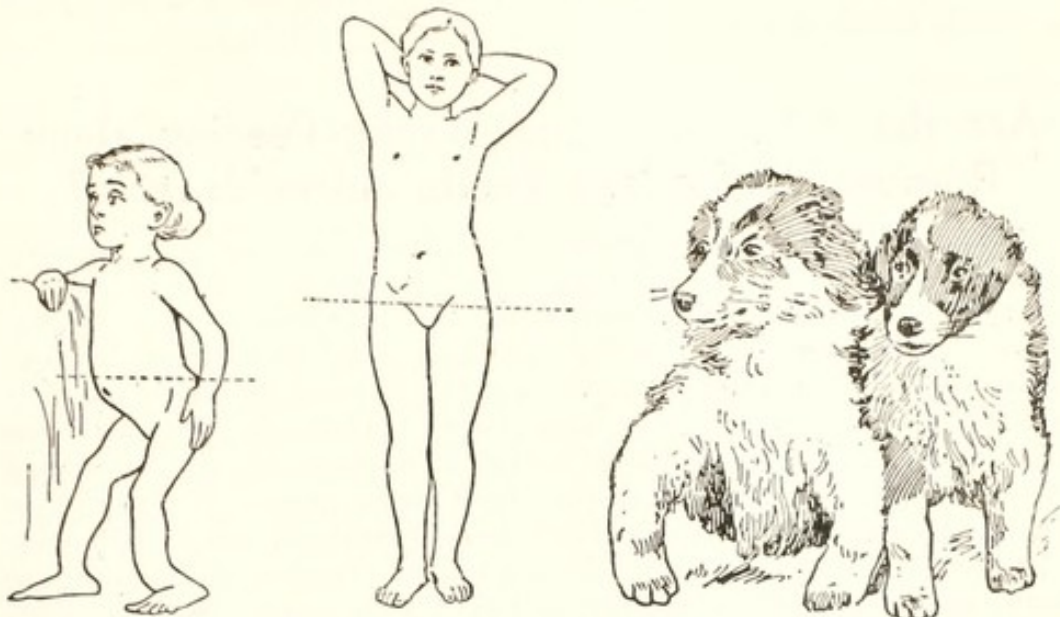


FIG. 59.

The central figure shows a normal child seven years of age. The left figure shows a child of same age with Rickets. The illustration of the puppies is taken from an article on Rickets by Dr. Leonard Findlay, and shows the crooked limbs of one deprived of exercise, contrasted with the straight limbs of a normal animal.

Rickets is a very grave but easily avoidable disease of early childhood, and has other points in common with adenoids.

It is essentially "a disease of infants characterised by impaired nutrition of the entire body and alterations in the growing bones." No tissue or part escapes, the whole suffers, and the damaging effects are lifelong, just as with adenoids. What specially attracts attention are the outward and visible results of mal-nutrition—the bending of the softened bones; the stunting of the entire body, especially of the lower limbs, which tend to be crooked and "bandy" (note in the illustration, where the mid-line falls in the normal child and in the rickety one); the square head, the shrunken chest and pot belly, the pallor, the sweating, and the look of pain.

In some quarters the majority of children have Rickets more or less, and "in Vienna and London from 50 to 80 per cent of all the children at the Clinics present signs of Rickets. . . . Mild grades of it are often overlooked in the families of the well-to-do."—Osler. Extreme Rickets, as figured above, is rare, though not unknown, in the Dominion: minor degrees are quite common, and probably do more harm to young children than any other disease except Gastro-intestinal affections and Adenoids—indeed, these conditions are frequently present in the same child. We have referred to the association of mouth breathing and Adenoids with decay of teeth, indigestion, chest affections, convulsions, etc. The same applies to Rickets. A disease which stops the nutrition of bone naturally stunts and spoils jaws, teeth, and all things dependent on them.

Dr. Findlay contends that the one essential cause of Rickets is lack of muscular exercise—want of "work." He says that if puppies are kept idle they develop Rickets in spite of fresh air and good food. However, improper feeding (especially the use of patent foods and condensed milk) and lack of sunlight, lack of fresh air, etc., are most important factors, and operate along with lack of exercise.

Breast-fed babies are not immune if general hygiene is neglected. Whether

breast-fed or bottle-fed, no baby will develop Rickets who is given "What Every Baby Needs" (see page 1). Congenital Rickets, like congenital Adenoids, is almost unknown, but the delicate child of unhealthy parents is specially prone to develop Rickets if he does not get "his rights" after birth.

Are the "Dummy" and Wrong-Feeding alone Responsible for Bad Teeth, Adenoids, etc.?

The whole lesson conveyed throughout this book must have been singularly misunderstood if the reader can imagine that any one factor is to be regarded as the sole cause of human degeneracy in any direction whatever. The first page shows the broad essentials for health—the fundamental needs without which no human organism can grow up complete and perfect in all its parts—indeed, in any of its parts. Good pure blood is essential for the formation of perfect bones and teeth, just as it is essential for the formation of a sound brain and nervous system. But there cannot be good pure Blood without suitable Food and proper Feeding Methods; abundance of Fresh Air and Sunlight, adequate Exercise, Play, Rest and Sleep. Further, there must be no Cramping of feet, limbs, or body; and there should be Regularity of Daily Habits, proper "Mothering," etc.

Summary of leading factors which tend to induce Nasal Obstruction, Mouth-Breathing, Adenoids, Defective Jaws and Teeth, and the whole train of evils to which these conditions give rise.

- (1) **Failure to breast-feed the baby.** Normal suckling supplies the ideal food and the ideal form of exercise—especially for developing the mouth, nose, jaws, teeth, and all adjacent parts.
- (2) **Use of the "Dummy."** This moulds jaws, palate, etc., in deformity, and gives rise to defective, irregular teeth (see illustrations), besides upsetting the digestion by inducing constant sucking and dribbling of saliva.
- (3) **Use of Wrong Feeders or Wrong Feeding Methods—**
 - (a) **The use of any feeder not necessitating much work on the part of the baby.** The long-tube feeder is the worst type, because there is nothing to tug at; but any teat with a large hole is harmful, because it permits of easy passive imbibition of milk instead of calling for active sucking. A hard-worked, well-grown tongue moulds the roof of the mouth, the nose, and the jaws on broad lines, and thus insures spacious highways for food and air, and plenty of room for teeth.
 - (b) **Allowing any artificial teat to remain long in the mouth.** Practically speaking, no feeding should occupy more than twenty minutes. The bottle should be held throughout each feeding.
- (4) **Failure to give work to jaws and teeth—"Pap-feeding"—e.g. failure to give baby a bone (say, from six months of age onwards), followed by "pap-feeding" after weaning.** This is a very grave mistake. The baby's early natural instinctive tendency to exercise his jaws, followed (when he has cut some serviceable teeth) by a liking for hard, tough, or dry foods, such as crust of bread, toast, etc., should be gratified and encouraged.
- (5) **Failure to supply food of the proper composition for tissue-building** (including the building of bones and teeth). Normal mother's milk is the standard type for a baby's food during the first year, and if the infant cannot have this he is entitled to the nearest approach to it—viz. humanised milk.
- (6) **Defective General Hygiene.**—(See "What Every Baby Needs," page 1.)

The woman who has once grasped the full significance of the foregoing would not say—as many a mother does when spoken to about the injury that the "Dummy" is insidiously though imperceptibly doing to her bright active baby with rosy cheeks and shining eyes—"Well! the 'Dummy' hasn't done him much harm so far—now, has it?"

It is amazing that so many mothers speak in this way, and act accordingly. They are quite prepared to persist in a wrong course until they can see actual definite harm. Women constantly say: "I know such and such a child who had a dummy, and his teeth are all right." They don't realise that the child's

jaws, teeth, airways, digestive apparatus and whole organism and faculties would have been still better had no dummy been used, and that for one case where they can see no damage there would be a dozen cases where the evil effects would be clear even to themselves, if pointed out by some one with more knowledge as to the proper structure and shape of jaws, teeth, mouth, nose, etc.

The fact is that defective jaws and teeth and indigestion are **PREDISPOSED TO** by weakness of the mother and by artificial feeding, as well as by neglect of any of the factors making for good health, such as fresh air, exercise, regularity, etc.; but the more **IMMEDIATE EXCITING CAUSES** of mouth and teeth defects and adenoids are the use of the "dummy," the long-tube feeder, and subsequent pap-feeding. If the last three were avoided, and reasonable care were exercised by mothers with regard to the hygiene of themselves and their offspring, we should hear little more about bad teeth and adenoids—little more, indeed, about most of the diseases of children. It is not suggested that because a particular child used the "dummy" that he must therefore show obvious defects and deformities of mouth, teeth, etc.; but that the great majority of children so treated do show such defects more or less—and these will be aggravated by neglect of care and attention in regard to any of the prime factors making for health. The most deplorable cases are seen where all the adverse factors are brought to bear in the case of a particular child who has been delicate at birth; whereas a child exceptionally robust at birth, subjected to only one harmful influence—say, for instance, the use of the "dummy"—may escape, not really "scot free," but to outward appearance undamaged, and actually more normal than the average child of civilization. **However, he will not be what he might have been.**



FIG. 60.

Mouth-Breathing and Adenoids.
Typical Appearance.

Note the narrow jaws, open mouth, projecting upper teeth, vacant face, round shoulders, arrested development, and poor nutrition.

This illustration is taken from Rose and Carless's *Surgery*, by kind permission of the publishers, Messrs. Baillière, Tindall, & Cox.

There is no lack of such children in our midst, but it would be manifestly unfair to display them as victims of disease and defect, brought on by ignorance and faulty rearing. With growth of knowledge the truth will dawn on our children quite soon enough, and the time is not far distant when many of them will be calling their parents to account, and saying: **Why did you cause or allow us to become so cruelly disfigured and handicapped for life?**

When and Where do the Teeth come through?

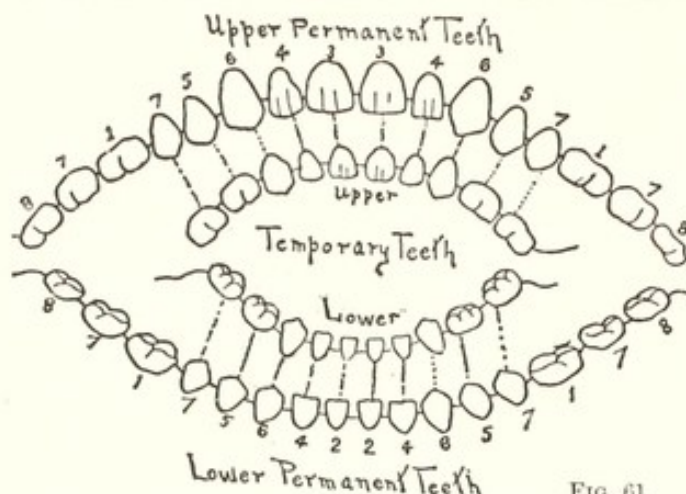


FIG. 61.

Parents should carefully study the diagram.

Diagram showing the complete sets of 20 "Milk Teeth" and 32 "Permanent Teeth." The dotted lines show how the "second set" need ample space to be provided by active growth of the jaws throughout babyhood and childhood, in order that the big permanent teeth may find ample room for themselves in the spaces vacated by their small predecessors.

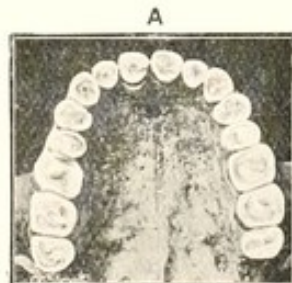
(From Coleman's *Elementary Physiology*. Published by Macmillans.)

The milk-teeth normally begin to appear in front between the seventh and twelfth month, and the set of 20 should be through the gums towards the end of the second year and not later than two and a half years of age.

The first arrivals of the "permanent" set come up behind the "milk-teeth" about the sixth year, just before the front central "milk-teeth" begin to be shed.

At twelve years of age four more permanent molars should come up behind the first arrivals; behind these again at eighteen to twenty-five should come the "wisdoms"—completing the set of 32 teeth, forming perfect arches and accurately fitting one another as shown in the jaw of the elderly Maori (Fig. 62). With forethought, there are few mothers who could not similarly endow their offspring, especially if they would start by properly regulating their own health and habits long before the birth of the child—also giving him his simple rights afterwards.

(A) Upper jaw of elderly Maori, showing ideal arch and perfectly fitting well-worn teeth without a speck of decay.



(B) Rough diagram to show what the same Maori would have had, say at 13 years of age, if soon after the coming through of the second series of his permanent set he had allowed his first permanent molars to be extracted.

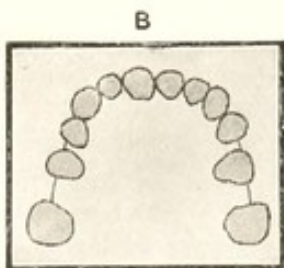


FIG. 62.

The adjacent teeth, no longer kept in position by the big fixed molars, would begin to separate and the grinding power would become very ineffective—isolated teeth being more or less useless. See Fig. 55 (D). Ten years later, when the "wisdoms" should be all cut, matters would be somewhat better, but still extremely ineffective compared with the normal. Moreover, defective masticatory power persisting for ten years, is likely to prevent the individual from working his jaws properly by the use of plenty of hard dry tough food. The result of this would be indigestion, malnutrition of the jaws and teeth, and in all probability extensive decay.

The mother who has grasped the full significance of all that has been said in the last half-dozen pages must surely realise that the physical destiny of her child is in her own hands to make or mar. But bodily fitness largely determines mental and moral capacity and the success as well as the happiness of life.

"Though it is possible for the individual, especially if he has a considerable income, to be good and clever and sickly, this is not possible for a family living under the conditions which affect the lives of ninety-nine hundredths of the community. For the ordinary family lack of physical health and strength means unemployableness and morbid thought and feeling; and unemployableness and morbid thought and feeling mean loafing, vice, crime."—HORSFALL.

IS IT NECESSARY TO CLEAN THE TEETH?

In an able book on the "Care and Preservation of the teeth" by two leading English Dental Surgeons (Dr. R. D. Pedley, Dental Surgeon to the Evelina Hospital for Sick Children, London, and Dr. Frank Harrison, Lecturer on Dental Surgery, Sheffield University), this question is discussed as condensed below. The sentences in brackets have been added.

"In animals living under natural conditions, the friction of the food [raw food, be it remembered] during mastication is sufficient to cleanse the teeth and to keep them clean, with the aid of an abundant supply of saliva [and with the further help of a natural 'tooth-brush' in the form of a tongue kept firm, rough and effective by very active use.]"

Does the natural cleansing process not suffice for healthy children?

Long experience in London and Sheffield has convinced Drs. Pedley and Harrison that British children have neither the kind of food nor the strength of teeth to enable decay to be withstood by natural means alone; and they show that there is a vast amount of disease in the first set of teeth, which they hold can only be prevented by adopting artificial cleansing.

Note that the above conclusion is based on children fed, like all moderns, on wrong principles in infancy and onwards. **Would not proper attention to feeding and hygiene throughout infancy and childhood alone suffice to establish good jaws and teeth for the next generation?** This question cannot yet be finally answered, but the author is of opinion that the ultimate solution of the problem lies mainly in:

(1) The healthy upbringing of girls with a view to parenthood; and later on proper hygiene during pregnancy and nursing. (2) Normal breast-feeding, or where this is impossible, the best artificial feeding. (3) Attention throughout infancy and childhood to all the simple essentials for health (see page 1), especially in the way of ensuring full activity of the sucking and masticatory functions.

"THE APPLE-RULE." Thorough mastication of self-cleansing food, such as raw apple at the end of a meal, is more important and effective than a tooth-brush.

If, early in the second year, a child is given a whole ripe apple, of which say a third has been peeled, it will delight in sucking, nibbling, rubbing, and bruising off the pared surface of the fruit with lips, tongue, teeth, and gums. He works hard, but at first he does not secure much material! However, he gradually learns to eat more and more; by the time a normal baby is between 18 months and two years of age he should be benefited by eating a whole apple every day.

However, parents must also drill their children in the use of the brush as a daily habit, necessary for assisting to preserve the teeth until the ways of the race have become much simpler, more primitive, and more healthful, especially in the direction of "preparation for parenthood," suckling, and mastication.

(1) Dental Caries is essentially a disease of childhood and adolescence: keep the teeth sound until maturity; and then, if brushed, they tend to last for life.

(2) N.B.—The Japanese soldiers took their tooth-brushes with them as a necessary part of their small outfit for the arduous Russian campaign.

When to Commence Cleansing Baby's Mouth and Teeth.

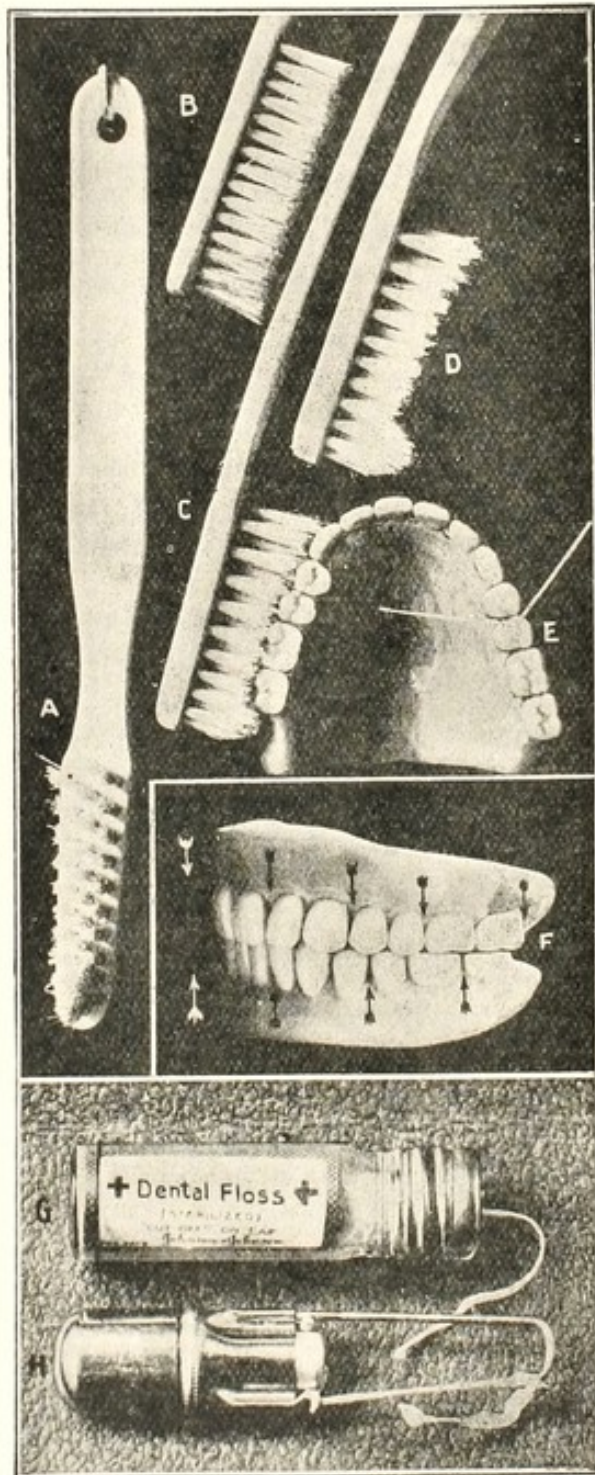
Don't resort to the nasty, meddlesome practice of wiping out baby's mouth before he has cut any teeth. Saliva keeps it clean.

Opinions differ as to when the brushing of the teeth should be commenced. Some authorities say that the teeth should be regularly brushed almost as soon as the first teeth appear through the gums, but the end of the first year is generally soon enough. Indeed, unless there is some special reason for starting earlier, the author is inclined to advise delay, until, say, eighteen months, when most of the "milk-teeth" should be cut. However, in some cases decay appears soon after the first-comers appear. A watch should always be kept for such possibilities, and if there is any doubt a dentist should be consulted.

Cleansing the Teeth—Practical Instruction.

It is not enough for the mother to know that her child's mouth and teeth should be regularly cleansed—she must know also how to set about it.

First use a soft "Tom Thumb" baby's brush of the correct form (see Fig. 63). Later, a brush with somewhat stiffer bristles may be used, but great care should be exercised, both in brushing and "silking," not to injure the delicate gums. The handiest and one of the best all-round substances to use as a dentifrice for babies is common baking soda (bicarbonate of soda). Unlike soap, it is not unpleasant; on the other hand, the taste is not attractive and the child tends to spit it out. Some dentists prefer a mild acid, as tending to cause a free flow of saliva. It is better not to use a sweet aromatic dentifrice for an infant, because children tend in any case to suck the tooth-brush and swallow the water and "brushings." Do not allow this bad habit to be formed.



(A, C, D) **Best form of tooth-brush.** Note the saw-like profile of the bristles (adapted for entering the crevices between the teeth), the end tuft for going behind the back molars, and the curved handle.

(A) **The brush should be hung up to dry as shown.**

(C) This (called the "Youth's size") is better adapted for children than the adult size (D). Still smaller brushes, called "Tom Thumbs," are made for babies or very young children, but these are not everywhere procurable except in the incorrect smooth-surfaced form (as shown for adults in B). The notching of the surface of the bristles and provision of an end tuft are as important for infants as for adults.

(B) **The smooth surface, presented by this the ordinary form of brush, prevents the proper tooth-pick action of the bristles, and causes such brushes to merely polish the free surfaces of the teeth (where there is no risk of decay) instead of clearing food particles and bacteria out of the crevices where decay always starts.**

(F) Shows by means of arrows the **proper directions of movement of the tooth-brush.** Brush the upper teeth "downwards," and the lower teeth "upwards."

(E) **"Silking,"** effected by passing a piece of the finest ordinary "Filoselle" embroidery silk between the teeth, the ends of the silk being held between the fingers. Note the food particles adhering to the silk.

(G, H) This shows the easiest and pleasantest means of silking. The apparatus (H) (known as the "Floss-pick") is shown the natural size. It is admirably adapted for cleaning between a baby's teeth, and is much more effective and convenient, even for adults, than a strand of silk held between the fingers. By means of the Floss-pick the mother can rapidly cleanse between the teeth at bedtime, and if there is a special tendency to decay anywhere she can put a little of some suitable antiseptic dental paste on the silk when using the pick in the doubtful region. The special sterilised "Dental-floss" is softer and better than Filoselle. The hooking and fixing of the thread to the metal "bow" takes only a moment.

FIG. 63.

Example Necessary.

"Nothing is more objectionable to a child than to have a tooth-brush put into its mouth. If, however, the parents will set the example, they awaken a desire, not to clean truly, but to imitate. Such imitation leads to an invaluable habit, which, when early adopted, will seldom be abandoned. Example will tell for good or ill through life, but if a child has never seen its parents clean their teeth, it can scarcely understand that instructions to use a tooth-brush are of any value: so on every possible occasion its use is avoided."

Brushing and Silking.

The greatest care has to be bestowed upon the removal of food and debris from between the teeth. It is best to use a brush with bristles cut to conform to and enter the crevices as shown on the previous page.

In use the brush should not be allowed to pass to and fro from the front to the back teeth only, but should be moved with short pressing sweeps from the gum to the cutting edges of the teeth. Thus, the stroke in the upper jaw is "from the gum downwards," while in the lower jaw it is "from the gum upwards." The proper action is indicated by the arrows in Fig. 63, *F*. The inner surfaces and the crowns of the teeth must also be well brushed.

Silking.

"An excellent adjunct to the above, and a great protection against decay of the teeth, consists in silking, that is, passing a strand of silk eight or ten inches long, held taut between the index finger and thumb of each hand, between all the teeth, and drawing it for about an inch in such a manner as not to hurt the gum. If the silk is cut or frayed in passing between the teeth it is most likely that decay is present requiring immediate treatment."

Care of Teeth.

The care of the teeth is of supreme importance, and the following rules should be strictly attended to:—

1. **Do everything to maintain good health.** (See "What Every Baby Needs," page 1.) Teeth are built out of blood.
2. **To ensure good, sound, well-enamelled, lasting teeth, the food and means of feeding must be such as to compel ample exercise for mouth and jaws** throughout babyhood and childhood. "Bring up a child in the way he should go, and when he is old he will not depart from it." The habit of slow chewing once firmly established will tend to be maintained for life.
3. **The composition of the food must be suitable**—that is, adapted to the perfect building up of the structures of the body.
4. **Avoid the use of long-tube feeder and dummy,** and make sure that baby "works for his living."
5. **Give baby a bone to munch from six months onwards.** This serves to promote the development and growth of the jaws and teeth, and helps the eruption of the latter. **After nine months give tough crusts, toast, etc. In the second year and onwards a fair proportion of the food should be dry, firm, hard, or tough**—*e.g.* crusts, crisped bread, toast, and raw, ripe apple. (See "The Apple Rule," page 143.) Later (when the child has been trained to masticate thoroughly), oatcake, etc., may be given. (See "Far-reaching Effects of Masticatory Exercise," p. 146.) The exercise develops the jaws and teeth, and thus tends to prevent decay, overcrowding, and irregularity.
6. **Teach baby to chew his food vigorously and thoroughly, taking sufficient time over his meals.** Don't allow him to bolt any of his food, whether

solid or liquid, but, on the other hand, don't encourage mere dawdling. At the end of a well-chewed meal the jaws should be comfortably tired, the flow of saliva should be ceasing, and there should be a feeling of healthy satisfaction. This constitutes the normal check against over-eating and ensures the highest nutritive results from the food taken, while at the same time developing jaws and teeth for future work.

7. Hard or tough food, if well chewed, helps to make good teeth and to keep them sound ; it also helps to cleanse them. This applies especially to raw, ripe apple and to all kinds of firm, fibrous fruits and vegetables.

8. Soft foods cling to the teeth and tend to cause decay ; therefore cakes, sweets, ordinary biscuits, chocolates, etc., should be avoided habitually and should on no account be given at bed-time. All decay commences on the outside of the teeth, never from within ; it starts in crevices in the crowns, or between two teeth.

9. The tongue is not primarily for "talking," but is a "masticatory organ," and should do a large proportion of the work in eating—squeezing the moistened food out between the teeth and forcibly crushing it against the hard, roughened roof of the mouth. **Further, it is practically a kind of tooth-brush** which, if properly exercised and developed, does much to cleanse the mouth. A clean mouth ensures sweetness of breath.

10. The teeth should always be brushed night and morning, all the surfaces being carefully cleansed. The first or temporary teeth, as well as the permanent ones, should be brushed and carefully watched for signs of decay. In any case, the child should be taken to the dentist periodically if possible.

If the first teeth decay early there is a poor chance for the second ones, but they may be saved by unremitting care and attention.

Teething.

"Teething is commonly placed under the heading 'infantile ailments,' but this is wrong. The whole process is, properly speaking, a natural one, and should be accomplished without the manifestation of constitutional disturbance, beyond at most fretfulness on the part of the child, with slight swelling of gums and increased flow of saliva. If any reflex irritation occurs during absorption and the coming through of the teeth it is reduced to a minimum by the fact that the teeth are cut in groups with intervals of rest between, instead of appearing about the same time. This arrangement is decidedly in favour of the child." A healthy, well-cared-for infant runs practically no risk from teething, and usually suffers little or no pain, but a delicate child whose mother has ignored "What Every Baby Needs" (see page 1), and whose mouth and jaws have not been properly exercised, is specially liable to "catch cold" or contract any other illness during teething. To counteract such tendencies the mother should do her best to make up for wasted opportunities, and should be doubly careful to see that in future everything conducing to health receives the most scrupulous attention—especially when teeth are about to come through the gums.

Far-reaching Effects of Masticatory Exercise.

Again we must insist that perfect capacious jaws and sound, beautiful teeth cannot be built without fulfilling all the simple and universal requisites for health throughout babyhood and childhood—especially ample daily exercise of the mouth organs.

The mouth is indeed a great primal "DRIVING-STATION," whence the Nerve-fibres carry impulses to the Nerve-centres, which quicken the life

and activity of every tissue of the body. When the jaws are doing natural, honest, hard work the whole of the rest of the organism is impelled to activity—the heart pumps quicker and more forcibly, the pressure of blood in the arteries rises and its stream flows more rapidly, even in the very finger-tips: at the same time the digestive juices are poured out freely, not only into the mouth, but also into the stomach and bowels, as the result of messages transmitted from the mouth to the Nerve-centres and out again when we are busily engaged in Mastication.

Apart altogether from the consideration of the building of the teeth and jaws, active "mouth-exercise" is thus necessary for the nutrition, growth, and health of every organ of the body. **"Feeding-exercise" is the most primitive, fundamental, and essential of all forms of exercise.** A horse fed mainly on hard dry food (and reasonably treated in other respects) becomes the ideal of strength and "fitness." Feed the same horse with soft mashes, made from similar food-materials, and he will become soft and "out-of-condition," simply because his whole organism will then lack the primary stimulation of daily, normal, active exercise which formerly he had to devote to crunching the oats, etc.—activities which are not called forth when dealing with food provided ready ground and softened—food on which the work has been already done by millstones and mashing outside the animal body. The same applies to ourselves—particularly to the young, who are always nearest to Nature. **We need the exercise of active mastication, and the only effective means of ensuring this is to start training at the dawn of life. Never let a healthy infant take a meal on which he is not compelled to do active work in the form of sucking or chewing.** We must begin with the baby and foster his natural tendency to masticate, instead of doing everything to make the function die out by disuse.

The mother should banish from her mind the idea that "pap-feeding" or "mince-feeding" is natural for a child who has teeth. Even milk should be used sparingly after 18 months—a pint a day being ample, perhaps more than is desirable. Diluted with water, milk should then be used as a nutrient drink at the close of meals, not as a fluid in which to soak food which would otherwise need chewing and insalivating. No doubt the children of the poor are often unduly stinted with regard to milk, but children in general tend to be given too much milk and cream—too much ready-made fluid food which merely drains into the stomach—to the exclusion of cruder materials on which work would have to be done, suited to the natural tendencies and activities of infancy.

Drs. Pedley and Harrison would exclude all "pap-food" from the baby's diet when he has reached two years of age. They say:—

At two years of age only solid food should be given at meals in order that the teeth may thoroughly chew. The stomach should also be allowed time to digest one meal before another is given (no "pieces" between meals). Suppose, however, that the parents continue to provide a child with food in a fluid or semi-fluid condition, the child, having nothing to chew, simply swallows its food. The habit of "Bolting" is formed—a habit not easily overcome—and the parents, who have never given the matter a thought, wonder why!

The custom of giving children porridge with milk, bread soaked or boiled in milk, milk with patent cereal foods, is unnatural, in so far as these foods afford no use for the teeth, nutritious as they are in other respects. Oat-cake or whole-meal bread to masticate, followed by milk and water to drink, are equally nutritious, and will satisfy the requirements of a child far better.

—**Our Teeth: How Built Up: How Destroyed and How Preserved.**

By Drs. R. D. Pedley and Frank Harrison. Blackies. London, 1909.

Dr. Pickerill, Professor of Dentistry at Otago University, in his authoritative book, "The Prevention of Dental Caries" (Churchills, London, 1912), scathingly condemns the "Dummy," and advocates the use of hard, fibrous, and dry foods, as the rational means of combating what he rightly regards as the gravest disease of the day. As he says, a disease which more or less seriously handicaps over 90 per cent of our population is a national menace calling for State consideration—especially in the way of instruction in Primary Schools.

Parents who once grasp the fact that the more exercise a child can be given for mouth, jaws, and teeth the more he will tend to thrive, will not be at a loss to find means by which the carrying out of what is needed can be ensured. Further, they will not let the tyranny of hide-bound custom or conventional propriety stand in the way of the health and development of their offspring. Thus, the small allowance of meat that a child may have is best given in the form of a bone, from which he can gnaw and tear off with his teeth what is eatable. The more extensive the bone surface to which the meat is attached the better, but even the remains of a small mutton chop, eaten in this way—especially if it happens to be somewhat lean and “wholesomely tough”—will **afford a considerable amount of very healthy, stimulating, and enjoyable recreation. Fortunately, the hands and lips are not unwashable!**

Some of the modern dry cereal foods, made specially with a view to ensure thorough chewing and insalivation, are excellent as an occasional change from bread-crusts, toast, oat-cake, or hard biscuit; an objection to patent prepared cereals is that, though not more nutritious than ordinary whole-meal, they are decidedly expensive.

The foods we have referred to as capable of affording proper exercise for jaws, teeth, and digestive glands can be added to indefinitely—especially in the direction of raw, ripe fruits, nuts, etc. Hydatids are so common in the excreta of dogs that raw salads are generally risky

Effects of Baby-Ailments on the Teeth.

During illness of any kind all work in the direction of building and repair is imperfectly done. Hence it is that the nails are always marked by a groove after fever—the bottom of each groove consisting of the portion of the nail which was formed during the illness. For the time being all the nails are thus locally thinned, but this matters little since nails are constantly growing and being cut off. Not so with the enamel of the teeth. **Enamel is formed once for all**, in infancy and childhood, and if there are thin portions, due to attacks of diarrhoea, etc., during the time when the enamel is in course of formation, the teeth will tend to decay wherever there has been an inadequate deposit of the necessary protective covering.

Dental surgeons are always telling us that nowadays the coating of enamel is exceedingly thin—often indeed almost absent in places. Can we wonder at this, seeing that few children enjoy uninterrupted good health during their early and most important growing years! The mother who wants to ensure her baby sound, long-lasting teeth must see to it that he is kept as healthy as possible throughout.

Every illness should be regarded as at least a temporary victory for the microbes—a defeat which retards the growth and development of the whole human organism, and renders it an easier prey to most other germs in the future. Pitched battles waged with microbes are a waste of time and energy precious to the growing child, and leave his tissues weakened, not strengthened, by the fight. Yet as soon as the baby has “recovered” from any illness, the mother thinks the results of her mistakes are at an end, but this is not so—more or less of lifelong damage has been done.

A check sustained in early life always leaves a permanent impress on the organism, whether plant or animal. Farm crops which have been blighted in the seedling stage may flourish afterwards and give a good yield, but not so good as if the plants had gone straight ahead. Trees which have been transplanted or diseased in “infancy,” though they may afterwards grow “remarkably well,” do not attain the ultimate stature or perfection of trees whose progress has been subjected to no such temporary interruption.

MAKE HAY WHILE THE SUN SHINES.

The mother should never forget that the destiny of her baby (bodily and mental) is mainly determined in the first years of life.

1. In the first year the baby's brain should gain more than a pound in weight—actually more than it will gain in the next twenty years.

2. In the early months baby's daily gain in weight should be as great as the weekly gain a few years later.
3. Baby should treble his weight in the first year, yet when he has reached two years of age it actually takes four more years to only double his weight.

Nature has specially marked out the first twelve months of life as the appointed time for growing the body, and even more emphatically for growing the brain, of the human being. If the mother fritters away this one golden opportunity instead of making the most of it and doing the best possible for her baby, no after care can make up for her mistakes or neglect. **"Make hay while the sun shines"—it never shines again for the baby as it shines in the first twelve months of life. Everything in after years depends on uninterrupted healthy growth during infancy.**

Forming a Character.

OBEDIENCE in infancy is the foundation of all later powers of self-control; yet it is the one thing the young mother nowadays is most inclined to neglect. Instead of gently, wisely, and firmly regulating her baby's habits and conduct, she tends to allow him to have his own way and to rule her and the whole household. Not so the wiser so-called "lower animals." The dog and the cat carefully train their progeny in necessary habits of regularity, cleanliness, etc., from the start, and as has been pointed out by Long, Seton-Thompson, and others, they chide, cuff, and punish them when necessary rather than allow the formation of bad and irregular habits which would exact far greater penalties later on. All this is done by instinct; and the human mother, with the stronger love and the greater wisdom which should be hers, would have no difficulty in guiding her child aright by firmness and consistency alone, without resorting to punishment, if she would but start at the beginning. The establishment of perfect regularity of habits, initiated by "Feeding and Sleeping by the Clock" (see pages 35, 36), is the ultimate foundation of all-round obedience. Granted good organic foundations, truth and honour can be built into the edifice as it grows.

"Building the Teeth" and "Forming a Character" are parts of construction of the same edifice—standing in the relationship of the underground foundations of a building to the superstructure.

Our dentists tell us that nowadays when they insist on the eating of crusts and other hard food, the mother often says **"Our children simply won't!"** simply "won't" comply with Laws which have a higher sanction and greater antiquity than the authority of man himself! Such children merely exemplify the ineptitude of their parents—parents too sentimental, weakly-emotional, careless, or indifferent to fulfil the primary laws of Nature. The "can't-be-so-cruel" mother, whose baby cries half the night and frets all day on account of the mother's failure to fulfil one of the first of maternal duties, should not blame Providence or Heredity because her progeny has turned out a "simply-won't" in infancy, and will become a selfish "simply-can't" in later childhood and adolescence. Power to obey the "Ten Commandments," or to conform to the temporal laws and usages of Society, is not to be expected of **"SPOILED"** babies when they reach adult life. The plain meaning of the word "spoiled" is worth some reflection. Every one grasps the full significance of spoiling a dress or spoiling a dinner, but the spoiling of a child is regarded more lightly!

Unselfishness and altruism are not the natural outcome of habitual self-indulgence. Damaged health and absence of discipline and control in early life are the natural foundations of failure later on—failure through the lack of control which underlies all **weakness of character, vice and criminality.**

Dr. and Mrs. Fitz, in a book dedicated "**To those Parents who deem the Training of their Children their Supreme Privilege and Duty,**" say :—

Even as the child's **CONSTITUTION** (however weak or strong through heredity) may be markedly changed by fresh air, suitable feeding, proper clothing, and an abundance of sleep and exercise, so the child's **CHARACTER** (whatever the inherited tendencies) may be transformed for good or for bad by **TRAINING**.

The child at birth has a brain which is the physiological foundation of the adult brain. . . . The child's character roughly fashioned by heredity begins to be moulded for good or ill on the day on which he is born.

There are few sights more pathetic than that of the weak mother not daring to lay her child down because he will cry for the snuggling warmth of her arms, which in the few days of his apparently unintelligent existence he has learnt can be had for the crying. **Critically to watch a baby "work" his mother is truly enlightening, because his physical helplessness makes it seem so incredible.** . . . And when the mother has yielded during the first few weeks to the demands of her child's cries, the chains of her slavery are curiously hard to break.

Far-reaching Effects of Infantile Ailments.

In a profound and masterly book, *The Causation of Disease*, published in 1889, Dr. Harry Campbell wrote as follows :—

The cruelty practised on infants year after year is a blot on our civilization—nay, it is so serious that it almost tempts one to ask: Has such civilization any justification?

Some children die of scarlatina, diphtheria, and so forth, but **the chief number die of improper feeding.** The unhealthy bowel is no longer able to properly act upon the food, which, therefore, decomposes, causing flatulent distension of the belly and foul-smelling motions. No wonder, then, that the child should get thin and die, or that, if it survive, it should grow up puny and delicate. At a time of life when every cell in the body is craving for food, the tissues are being both starved and poisoned: starved by the non-conversion of food into blood, poisoned by the absorption of abnormal intestinal products.

The first question in almost every disease in children should be, "WHAT ARE THE MOTIONS LIKE?"

If we could keep the motions always normal, we should have few or no delicate children.

Digestive disorder in infancy plays a fearful part in the destiny of man. . . . Those who survive its ravages are not only temporarily affected. Their whole future is influenced thereby. If among a large family the majority are strong and vigorous, while two or three have been delicate from infancy, the chances are a hundred to one that a history of chronic intestinal trouble can be elicited as the cause of the delicacy.

And thus also it is with many other diseases. **Owing to the mutual dependence of the different tissues, it is impossible to localize a trouble: the effects ramify throughout the entire body.**

After dwelling on the profound influence of local disorders, such as enlarged tonsils, Dr. Campbell goes on to say :—

My object in citing this case of **ENLARGED TONSILS** is to show how a **small local change in children is capable of causing a serious upset in the developmental processes of the whole body.**

See how **far-reaching** may be the effects of **CHRONIC CONSTIPATION** during the period of development, say, in a boy of six to ten years. Owing it may be to a slight error in diet he suffers from constipation. Catarrh of the rectum ensues: thread-worms soon infest the lower bowel, and cause an intolerable itching. The sexual system is sympathetically excited; there is a kindling of sexual desire. Now, the feelings control the thoughts. Unhealthy sexual thoughts will rage in the brain of this young child; soon the vice of **masturbation** is contracted, and practised, it may be, for years. This interferes with proper cerebral evolution, and the entire individual is thereby altered.

See, then, what a simple constipation may bring about: it may produce effects which shall be felt throughout the body even to the end of life. And this constipation and unhealthy state of mucous membrane may result from an error in diet, and thus an apparently slight error is capable of moulding the organism into a distinctive shape, and no power of ours can subsequently put it right—cast it into its true natural mould.

Speaking of the influence of the body on the mind, Dr. Campbell says :—

The best minds, like the best bodies, have undoubtedly grown up under a favourable physical environment. Occasionally we see a strong brain in a weak body, but in such cases the cerebral result would have been better if circumstances had permitted the free growth of the body. Pope would have been a greater man if his body had grown to greater perfection.

Such being the potency for evil of faults in early surroundings and upbringing, we must, I repeat, most religiously see to it that our children are placed under a proper environment, and OUR CARE SHOULD BE GREAT IN PROPORTION TO THE YOUTH OF THE CHILD. A SERIOUS AFFECTION IN A CHILD MUST INFLUENCE ALL THE DEVELOPMENTAL PROCESSES OCCURRING AFTER IT. A similar disease in a full-grown man is infinitely less damaging, for in him development has come to a standstill.

For this reason, too, we should be prompt in our efforts to cut short every malady, no matter how slight, occurring before the period of complete maturity; for, while the malady is present, there must be an interference with proper development, and, if that interference lasts long, the individual will lose ground which he cannot afterwards recover.—*The Causation of Disease*, by HARRY CAMPBELL, M.D., F.R.C.P., London, 1889.

The truth and the enormous practical significance of the above reflections by Dr. Campbell, published over twenty years ago, is beginning to dawn on the world in general, and every year sees some new aspect of its universal applicability announced by leading thinkers of the day. One of the most striking confirmations of the **transcendent importance of proper care and uninterrupted health throughout infancy** is contained in a recently published Italian work by Professor Lugaro—a remarkable book, concerning which Dr. Clouston says :—
“We Britons needed such a clear, logical, and illuminating treatise. It is wider in its scope and more philosophical in its methods of treating the subject than any book of our own.”

After dwelling on the widespread havoc wrought in the brains of children by parental alcoholism and syphilis—generally regarded as the leading scourges of the nervous system—Professor Lugaro says :—

“The infections which arise in the first years of life, and especially the inflammation of the stomach and bowels—the result of unsuitable feeding during lactation—are the most important factors in determining the majority of cerebro-pathies (‘brain maladies’), and in this way a crowd of idiots, imbeciles, and epileptics is produced, who encumber asylums, and are an enormous drain on the internal economy of the country, as also on public charity.”

. . . **“Slight but chronic lesions of the kidneys can cause stupidity, temporary loss of speech, and violent attacks of confusion and agitation.”**

Yet there are still to be found people who defend the use of unmodified cows' milk for babies, which entails burthening the delicate growing kidneys with from two to three times their proper work—and this overburthening is permitted and advocated in spite of the fact of recent proofs that the kidneys of babies almost invariably suffer and become more or less overmastered even during attacks of ordinary diarrhœa, showing how near to the “breaking-strain” is the habitual working of the kidneys in babyhood. “Dilution” is in a sense no “modification” at all, because it simply means that more fluid must be given.

It is now generally agreed that a large proportion of cases of so-called “born idiocy” or “congenital imbecility” are really due to injuries inflicted during delivery, or to illnesses arising after birth, and I can only repeat now, with added conviction, what I wrote eight years ago :—

If women in general were rendered more fit for maternity, if instrumental deliveries were obviated as far as possible, if infants were nourished by their mothers, and boys and girls were given a rational education, the main supplies of population for our asylums, hospitals, benevolent institutions, gaols, and slums

would be cut off at the sources: further, a great improvement would take place in the physical, mental, and moral condition of the whole community. . . .

Civilization is tending everywhere to undermine humanity, and we have no reason to be proud of the fact that, apart from dairy calves (which we treat rather worse than our own offspring), there is no young creature in the world so ignorantly and cruelly nurtured as the average infant. A generally diffused knowledge and recognition of infant requirements and maternal duties would save an enormous number of lives, and would more than correspondingly increase the strength and vitality of the rest of the rising generation. . . . Yet careless bottle-feeding is still resorted to by the majority of women. In the face of such facts, one could wish seriously that, as Zangwill suggests, infants should be allowed the privilege of selecting their parents; then, as he says, "When children begin to be fastidious about the families they are born into, parents will have to improve or die childless. . . . In their anxiety to be worthy of selection by posterity, parents will rise to heights of health and holiness ('wholeness') of which our sick generation does not dream. If they do not, woe to them! They will be remorselessly left to die without issue."—*The Feeding of Plants and Animals*, by F. TRUBY KING, M.B., B.Sc. (1905).

Parenthood and Race Culture.

"At the bottom of Infant Mortality, high or low, is good or bad motherhood. Give us good motherhood and good pre-natal conditions, and I have no despair for this or any other country."—The Rt. Hon. JOHN BURNS, M.P., as President National Conference on Infant Mortality.

The following extracts from *Parenthood and Race Culture*, by Dr. C. W. Saleeby, should be pondered over by every parent; indeed, the whole book should be read by all who are interested in Eugenics.

"Our prime assumption from beginning to end is that **'there is no wealth but life.'** . . . We have been considering man from the point of view of what is transmitted to offspring by parents. But a word must be said as to the other factor which, with heredity, determines the character of the individual—and that factor is the **environment**. I wish merely to note the most important aspect of the environment of human beings, and to observe that historians hitherto have wholly ignored it; yet its influence is incalculable. I refer to **MOTHERHOOD**.

Heredity gives Potentialities, Environment develops these Potentialities, and turns them to good or evil account.

"One might have the most perfect system of selection of the finest and highest individuals for parenthood; but the babies whose potentialities—heredity gives no more—are so splendid, are always, will be always, dependent upon motherhood. What was the state of motherhood during the decline and fall of the Roman Empire? This factor counts in history, and always will count so long as **three times in every century, the only wealth of nations is reduced to dust, and is raised again from helpless infancy. . . .**"

The following is an extract from an address given by the author in 1909:—

The decadence of nations is threatening many lands. France, with its declining birth-rate, has already become a second-class Power. Ancient history teaches the same lesson. The decay of Greece and Rome was not primarily due to a falling-off in the prowess of the Phalanx and the Legion, but to increasing luxury, lessened exertion, lessened contact with the open air, a growing cost in the standard of living, and an increasing selfishness, which expressed itself in a **disinclination for the ties of marriage and parenthood. Normal home life was shirked, and decadence and sterility led to the fall.** Speaking of Greece, Professor Seeley remarked that there arose a general repugnance to marriage, and a reluctance

to rear large families, caused by an extravagantly high standard of comfort. In Rome he showed that a similar principle of decay asserted itself. The Roman of Imperial times came to prefer celibacy to marriage, and thus was ushered in a period of sterility or barrenness in human beings—the human harvest was bad. We hear much nowadays about national defence, but we must not put our whole trust in the “reeking tube and iron shard.” The safety of nations is not a question of the gun alone, but also of the man behind the gun, and he is mainly the resultant of the grit and self-sacrifice of his mother. If we lack noble mothers we lack the first element of racial success and national greatness.

THE DESTINY OF THE RACE IN THE HANDS OF ITS MOTHERS.

To-day our historians and politicians think in terms of regiments and tariffs and Dreadnoughts: the time will come when they must think in terms of babies and motherhood. We must think in such terms, too, if we wish Great Britain to be much longer great. Meanwhile some of us see the perennial slaughter of babies in this land, and the deterioration of many for every one killed outright, the waste of mothers' travail and tears, and we recall Ruskin's words:—

Nevertheless it is open, I repeat, to serious question, whether among national manufactures, that of Souls of good quality may not at last turn out a quite leadingly lucrative one. Nay, in some far-away and yet undreamt-of hour I can even imagine that England may cast all thoughts of possessive wealth back to the barbaric nations among whom they first arose; and that while the sands of the Indus and adamant of Golconda may yet stiffen the housings of the charger, and flash from the turban of the slave, she, as a Christian mother, may at last attain to the virtues and the treasures of a Heathen one, and be able to lead forth her Sons, saying:

“These are MY Jewels.”

Had all Roman mothers been Cornelias, would Rome have fallen? Consider the imitation mothers—no longer mammalia—to be found in certain classes to-day—mothers who should be ashamed to look any tabby-cat in the face; consider the ignorant and down-trodden mothers amongst our lower classes, and ask whether these things are not making history. . . .

My attention has been called to the following passage, not irrelevant here. It is from the *Attic Nights* of Aulus Gellius, Book xii., chap. i., written about A.D. 150:—

A ROMAN ON MOTHERHOOD.

Once when I was with the philosopher Favorinus word was brought to him that the wife of one of his disciples had just given birth to a son.

“Let us go,” said he, “to inquire after the mother and to congratulate the father.” The latter was a noble of senatorial rank. . . .

Favorinus having embraced and congratulated the father sat down and inquired how his wife had come through the ordeal. And when he heard that the young mother, overcome with fatigue, was now sleeping, he began to speak more freely.

“Of course,” said he, “SHE WILL SUCKLE THE CHILD HERSELF.” And when the girl's mother said her daughter must be spared and nurses obtained in order that the heavy strain of nursing the child should not be added to what she had already gone through “I beg of you, dear lady,” said he “ALLOW HER TO BE A WHOLE MOTHER TO HER CHILD. Is it not against Nature, and being only half a mother, to give birth to a child, and then at once to send him away—to have nourished with her own blood and in her own body a something that she had never seen, and then to refuse it her own milk now that she sees it living, a human being, demanding a mother's care? Or are you one of those who think that Nature gave a woman breasts, not that she might feed her children, but as pretty little hillocks to give her bust a pleasing contour? Many, indeed, of our present-day ladies do try to dry up and repress that sacred fount of the body, the nourisher of the human race, even at the risk they run from turning back and corrupting their milk, lest it should take off from the charm of their beauty.

“But it makes no difference—for as they say—so long as the child is nourished and lives, with whose milk it is done.

“Does he who says this, since he is so dull in understanding Nature, think

it is also of no consequence in whose womb and from whose blood the child is formed and fashioned! For is there not now in the breasts the same blood which was before in the womb? And is not the wisdom of Nature to be seen in this, that as soon as the blood has done its work of forming the body down below, and the time of birth has come, it betakes itself to the upper parts of the body, and is ready to cherish the spark of life and light by furnishing to the new-born babe his known and accustomed food?

"And so it is not an idle belief that, just as the strength and character of the seed have their influence in determining the likeness of the body and mind, so do the nature and properties of the milk do their part in effecting the same results. And this has been noticed not in man alone: in the case of timber and fruit trees, too, the qualities of the water and soil from which they draw their nourishment have more influence in stunting or augmenting their growth than those of the seed which is sown, and often you may see a vigorous and healthy tree when transplanted into another place perish owing to the poverty of the soil.

"Is it, then, a reasonable thing to corrupt the fine qualities of the new-born man, well endowed as to both body and mind so far as parentage is concerned, with the unsuitable nourishment of degenerate and foreign milk?"

"... And besides these considerations, who can afford to ignore or belittle the fact that those who desert their offspring and send them away from themselves, and make them over to others to nurse, cut, or at least loosen and weaken, that chain and connection of mind and affection by which Nature attaches children to their parents!"

Influence and Responsibility of "Parenthood" viewed in the light of To-day.

If the foregoing enlightened and lofty reflections on the rights of the child, coming to us from the old Roman world and based on the claims of ideal citizenship and patriotism, leave the parents of to-day unmoved, one can scarcely hope that any higher appeal will be of much avail. However, it may not be out of place to remind those mothers who now take the duties and privileges of parenthood lightly—who do not realise that they should be the virtual **CREATORS** of their offspring in the highest and most responsible sense—not their mere **pro-creators**—it may not be out of place to say again that it lies almost entirely with the mother to make or mar not only the jaws and teeth of her offspring, but, along with the health or debility of the whole body, to determine largely the intellectual, moral, and spiritual destiny as well. **"For are not your bodies the temples of the Holy Ghost?"**

The Archbishop of Canterbury, speaking some years ago at a meeting of the National Health Association in London, said in effect that the time had gone by when truly religious people could narrowly ignore the claims of the body—that no one nowadays should fail to realise how **the spiritual potentialities of humanity are conditioned and limited by the bodily state—that no one can expect to reach full mental, moral, or spiritual stature without due attention to the rightful claims of the body.**

As for the children themselves, G. W. Steevens, the great war correspondent who died at the siege of Ladysmith, said most forcibly:—

"Children ought to be taught to be proud of being well, not of being ill; to be taught that sickness is not a source of interest but a badge of inferiority; that to be healthy (whole) is the prime condition of all things desirable in life. Such an education might be trusted to breed healthy bodies controlled and mastered by healthy minds."

Finally, we may point to words of the greatest wisdom, used by our late King in reference to Consumption—words equally applicable to nearly all the ailments and disabilities of child-life:—

"IF PREVENTABLE, WHY NOT PREVENTED!"

Appendix.

ADDITIONAL RECIPES.

The best ways to make Humanised Milk are given on pages 23 to 26, but thick bought cream (separator cream) may be used (see below). However, "Bought Cream" is more liable to be impure and contaminated than Bought Milk, as machine separation drives an undue proportion of microbes into the cream, and chemicals are often added to keep it sweet. Sometimes it is subjected to freezing; if this has been the case, granules of butter tend to rise on Humanised Milk made with such cream. Where possible get good milk and set it for "Top Milk" rather than use bought cream.

HUMANISED MILK. To make a pint and a half, take :—

New milk	.	.	.	.	.	7 oz.
Thick Bought Cream ("30 to 40 per cent cream")	.	.	.	.	.	1½ to 2 "
New-milk Whey (must have been heated to 155 deg. F.)	.	.	.	.	.	15 "
Lime water	.	.	.	.	.	1½ "
Sugar of milk	.	.	.	.	.	1 "
Boiled water	.	.	.	.	.	5 "

Cover loosely, heat to 155 deg. F., cool rapidly, and keep in a cool safe.

* As strength of bought cream varies, use only 1½ ounces at start; in course of a few weeks work up to 2 ounces. It is well to have the Humanised Milk tested for fat (see page 24): 3 to 4 per cent is best.

N.B.—Heat the whey to 155 deg. F. to kill rennet before mixing the whey with other ingredients. If this is not done, the Humanised Milk will curdle.

HUMANISED MILK No. II. To make a pint and a half, take :—

New milk	.	.	.	.	.	11 oz.
Thick Bought Cream ("30 to 40 per cent cream")	.	.	.	.	.	2 "
Lime water	.	.	.	.	.	1½ "
Sugar of milk	.	.	.	.	.	1½ "
Boiled water	.	.	.	.	.	15½ "

Treat as above.

MEMO.—Consult the Plunket Nurse as to the best recipe to use in any particular locality or circumstances.

MOTHERHOOD AND HALF-MOTHERHOOD IN HOT CLIMATES.

There is a common idea that European mothers ought not to nurse their babies in very hot countries—indeed, that it would be exhausting to themselves and enfeebling to their offspring to attempt to do so. This is sheer nonsense. No doubt natural motherhood seems wellnigh impossible to delicate, pale, flabby, listless, self-indulgent Europeans, leading an easy, luxurious, idle life in the East, or even to the naturally strong woman who gives herself over to the stress of an irregular, nerve-racking Anglo-Oriental society existence. But women who realise the sacredness of the trust, responsibility, and privilege of motherhood may achieve the highest ideals for themselves and their offspring under almost any climatic conditions, provided they do their best to maintain a high standard of health and fitness by bathing, exercise, rest, regular habits, and sensible moderation as to food, drink, etc. Strict attention to the rules for healthy living (see the first section of this pamphlet), with a view to normal motherhood, is even more important for women whose lot is cast in hot climates than for those living in more temperate regions.

One has seen an ideal family of half a dozen robust children reared on the breast by a European in Hong-Kong, who told the author what protests her fellow-women had raised against the folly of attempting to be a real, complete, and "natural" mother in the burning East. These artificial "unnatural" women could conceive only two ways of rearing "white babies"—viz. Chinese wet-nursing, or bottle-feeding.

To provide for cases where artificial feeding has to be resorted to in very hot climates or elsewhere in the absence of fresh cows' milk, the following section is given :—

HUMANISED MILK FOR THE TROPICS, ETC.

At the outset we must repeat emphatically that Human Milk cannot be made outside the human body. Nothing can rival milk drawn direct from the breast into the baby's stomach—pure, fresh, living, blood-warm and uncontaminated by germs. In hot climates, where fresh cows' milk is unobtainable, where noxious germs increase with amazing rapidity, and the risks of feeding children artificially are therefore greatly increased, it is incumbent on every prospective mother to fit herself to be a true mother and feed her child as Nature intends.

Where good, clean, reliable milk can be obtained, Humanised Milk may be prepared in the ordinary way in hot climates, except that the milk set for "Top Milk" should be allowed to stand for a shorter time if no ice is available.

If ice is available, the prepared milk can of course be cooled down and kept safe in an ice chest.

Where ice is not to be had, instead of cooling down the Humanised Milk, it should be transferred directly it has been prepared (and while still at a temperature of 155 deg. F.) to a Thermos Flask, which has just been cleansed and heated with hot water. The milk must not be allowed to fall below 130 deg. F. If the temperature of the milk falls to 130 deg. F. it should be reheated without delay to 155 deg. F., and replaced in the cleansed and heated Thermos Flask as before. Germs grow and multiply with fearful rapidity in blood-warm fluids, but their vitality is checked by any wide departure from a temperature of 100 deg. F., and ceases, or falls to practical insignificance, when the temperature of a fluid is maintained below 40 deg. or 50 deg. or above 125 deg. F.

Note that a rise of 20 deg. above blood-heat checks germ-life more effectively than a fall of 50 deg. below it—hence it is that in the tropics keeping a fluid **hot** may afford a far readier and more economical means of preventing injurious changes in milk than keeping the fluid **cool**.

When feeding-time comes round shake the flask well to mix the cream thoroughly, and pour the required quantity into the feeding-bottle. Cool the Milk to 100 deg. F. before giving it to the baby.

In many parts of Australia and the East, and in some places even in the British Isles, cows' milk is either not procurable, or may at times be too stale or impure for use when delivered at the home. Naturally this is specially liable to be the case near the Equator or at Midsummer. What the milkman delivers, though not sour, may be near the turning point, and may be thus quite unfit to stand for even a few hours in order to obtain Top Milk.

The reader may say, "In such cases why not resort to the recipes where 'separator cream' is used and no standing is necessary?" If good, clean, reliable "separator cream," made from fresh milk, is procurable, this is recommended, but "bought cream" tends to be more impure than "bought milk," and contains

more microbes, unless their increase is kept down by the use of injurious anti-septics, such as boracic acid, or by freezing the cream. Unfortunately, cream which has been frozen is not suitable for making Humanised Milk, because the fat tends to separate out in little granules or droplets in the feeding-bottle.

Owing to one or more of the above causes, it sometimes happens that babies who cannot be suckled are also precluded from having the advantage of Humanised Milk prepared from fresh cows' milk. What is the safest course to pursue in such cases? The following emulsion, which has to be diluted with sixteen ounces of Boiled Water, is the simplest and best all-round substitute for Standard Humanised Milk, where the latter cannot be made:—

RECIPE.

Sugar of Milk	1 oz.
Dried Milk (which has been kept in a hermetically sealed tin)	1 "
Cod Liver Oil	$\frac{1}{2}$ "
Boiling Water.	Add sufficient to make the mixture up to 4 oz.

This forms a creamy emulsion, one measure of which, shaken with four measures of boiled water, makes a milk equivalent in strength and composition to Human Milk, or to Standard Humanised Milk.

N.B.—Dried Milk is often put up in tins with unsoldered lids, which merely need to be prised up and which do not absolutely prevent access of air. We have occasionally found a tin of such milk partially decomposed. Any milk put up in this way must therefore be regarded as unsafe for use in preparing baby food.

It is best to use only a quarter of the above quantity of Cod Liver Oil in making up the emulsion for a baby who is about to receive the food for the first time. A week or even several weeks may elapse before the full allowance can be reached; indeed, in some cases it will be found better not to increase the oil beyond a quarter of an ounce to the pint. Be guided on this point by the results. Increase the oil gradually day by day. If there is constipation some Olive Oil may take the place of an equal quantity of the Cod Liver Oil, as Olive Oil tends to be more laxative.

If the prepared milk does not agree satisfactorily, a reduction of the Sugar of Milk to $\frac{3}{4}$ ounce in the above Recipe may be tried.

METHOD OF PREPARATION.

Thoroughly scald a thick breakfast cup so that it may retain as much heat as possible. Put in 1 ounce of Sugar of Milk and 1 ounce of Dried Milk. Mix thoroughly in the dry state, and then pour on between 2 and 3 ounces of boiling water. Stir quickly and beat up into a paste with a perfectly clean, scalded fork. Add the Cod Liver Oil. Beat this with the other ingredients. Add boiling water to make up to 4 ounces and beat into an emulsion. Cool rapidly in running water, and keep loosely covered in a cool safe.

To know how much water to add to make up to 4 ounces, the best way is to pour into the breakfast cup, before starting, a measured 4 ounces of water, and then to make a mark or scratch on the inside of the cup to show the proper level. Another plan is to notch a little slip of wood so that when the notch rests on the edge of the cup the end of the stick will just reach the 4-ounce level. Use this as the measuring-stick. A still simpler method is to use a ready-graduated enamel measure instead of a cup.

The whole process is extremely simple, and the food for 24 hours can be readily made up in about 10 minutes.

DILUTING THE EMULSION FOR USE.

One part of the emulsion has to be mixed with four parts of Boiled Water at the time of feeding. The Boiled Water must have been allowed to partially cool before mixing, because otherwise some of the oil would tend to separate and float.

N.B.—When feeding a baby for the first time with this preparation it must be diluted two or three times as much as for permanent use. Turn back to what is said in the earlier part of the book as to starting the use of ordinary Humanised Milk (page 31).

Before feeding see that the temperature is 100 deg. F., and give the feeding-bottle a good shaking, so as to ensure as fair and complete a mixing of the Oil as possible. Shake again several times during the feeding.

HOW TO COUNTERACT THE EFFECT OF OVERHEATING.

A practical objection to the above preparation is the fact that the Dried Milk has been subjected to excessive heating instead of being fresh. If feeding with such overheated milk is continued beyond a month or so at longest, the baby's strength and resistiveness to disease will surely suffer, and he will be liable to break down with "scurvy-rickets" or some other malady associated with defective nutrition.

Can this tendency be counteracted in any way? Fortunately it can. Fresh fruit juice supplies more or less the qualities dissipated by superheating, and there is no objection to beginning its use at any time after the first month (see page 40). There is nothing to warrant us in saying that any superheated Humanised Milk can be made as wholesome a food as one which has not been so heated, and therefore, if a baby has to be bottle-fed, the mother ought to use the Standard preparation made with fresh milk whenever and wherever she can.

MIXED FEEDING.

Where the mother partially suckles her baby a Humanised Milk made as above with Dried Milk, Cod Liver Oil, etc., is extremely convenient. While the use of some fresh fruit juice is to be recommended in such cases, it is not obligatory, because the portion of natural milk drawn direct from the mother probably supplies sufficient of the living principles needed for proper nutrition.

Practical Hints as to Nursing, etc.

How to Nurse.—The mother should be in as comfortable a position as possible when nursing. She should take the nipple between the first and second finger and can then easily regulate the flow. At the same time she should push back the surrounding parts of the breast with the other fingers so as to prevent the baby's nose being pressed on: the child cannot suck properly unless there is a perfectly free entry for air to the nose.

Painful cracking of Nipples is due to want of care and cleanliness. Nipples that are not at once washed and dried after nursing—especially during the first week—tend to become softened and cracked. Another frequent cause is allowing baby to dawdle too long at each suckling—particularly during the first few days; and, worst of all, letting the baby go to sleep with the nipple in his mouth. Where the milk leaks and is allowed to soil the clothing, it “goes bad” and tends to cause cracking and poisoning. In all such cases as the above, it is a wise precaution to cleanse the breasts with boracic lotion after nursing, instead of using plain boiled water, and the greatest care must be given to drying thoroughly.

Directly a crack is noticed, apply a slight smear of Friar's Balsam with a tiny piece of cotton-wool. This should be done after each nursing, subsequent to thorough cleansing and drying, and at least one application should be made during the night. Very tender, painful, or cracked nipples should be further safeguarded by getting the baby to suck through a “Nipple Shield” for the time being.

Dabbing with spirit and water after each cleansing is beneficial where the nipples tend to be unduly soft and spongy; this applies also to leaking nipples.

Nipples may leak even when the supply of milk is quite deficient. The mother must improve her general health by fresh air day and night, outing, exercise, etc., and brace up the breasts by bathing and massaging them morning and evening—using hot, followed by cold, water. Avoid too much warm covering over the breasts.

Abscess of the Breast is nearly always due to uncleanness, dampness of nipples, and cracking; even where abscess does not result, cracks cause much pain, upset the mother, and may stop her milk supply. This easily avoidable trouble is a main cause of women giving up nursing. If cracks do not quickly heal with simple attention, consult a doctor.

Nipple Shield.—If the baby won't suck the nipple shield, tempt him by squeezing a little milk into it, and wet the surface of the artificial nipple with milk. Scrub the shield before and after use, and boil it once a day.

Breast-pump.—This is used where suction by a baby is not available, or where it is necessary to suddenly stop suckling, either temporarily or permanently.

Manipulating the Breasts.—A skilled nurse can often coax out the milk by gently pressing and squeezing the region of the nipple, and the dark circle around it, with slightly oiled fingers, carefully avoiding cracks and fissures, while at the same time she deftly manipulates the whole breast. This is often more effective than a breast-pump, but needs more skill.

Engorgement and Caking of Breasts.—This is specially liable to occur in the first week owing to the milk-tubes being more or less blocked at the start,

and the baby taking very little until after the third or fourth day, though active secretion has set in. All goes well if we can tide over the first week.

The hard portions of breasts tending to "cake" can be softened by gently working at the lumps or "knots" directly they begin to form, stroking them from the base towards the nipple, using warmed oil; but if this is not done gently, abscess may result.

Temporary reduction of fluid taken by the mother, free action of the bowels, and comfortable support all tend to relieve distended breasts.

How to Make Baby's Bed.

For contrast in photographing, a grey blanket was selected for enveloping the bed. Note:—

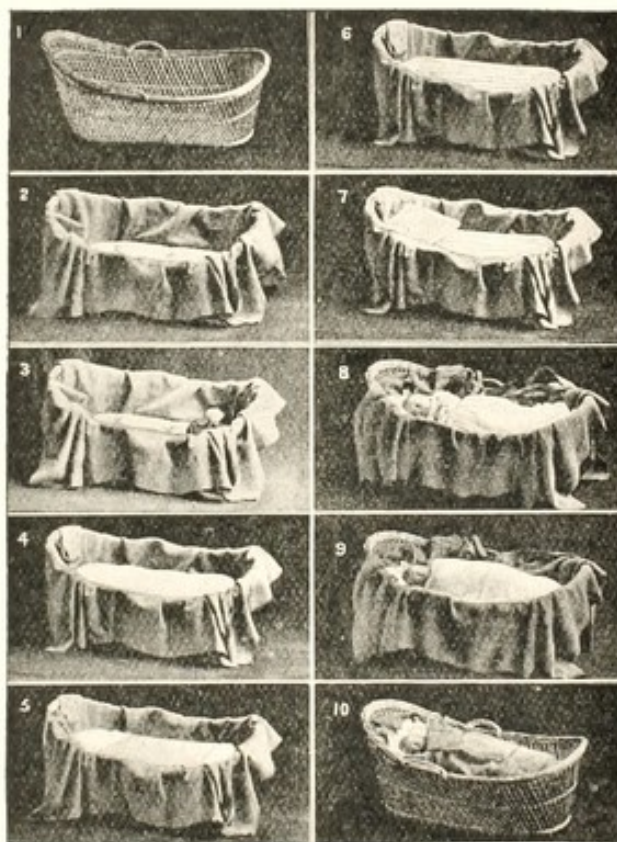


FIG. 64.

1. A wicker cradle.

2. Enveloping blanket, with mattress resting on it.

3. Hot-water bottle in place. If a baby needs a hot bottle (see page 85) this is the safest and best place to put it—viz. sandwiched between the mattress and a shakedown, ensuring mild, lasting, uniform warmth, without risk of burning baby.

4. Loose, chaff "shake-down." This can readily be washed and renewed if soiled; further, the baby snugly nestles down into the chaff.

5. Square of mackintosh.

6. Piece of old blanket.

7. Pillow in place.

8. Baby with old-fashioned long swaddling clothes. Short clothing is much better.

9. Loose, fluffy, honeycombed shawl.

10. Blanket brought across, turned up at the end, and secured with safety-pins, so as to form a cosy sleeping-bag.

Merely glancing at the final stage one might imagine that the baby was not free enough to move and kick, but he is really unhampered: the enveloping blanket is not tight, though it looks so in the picture; further, it becomes quite slack as baby settles down.

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Babies' Rights.

NO PERFECT SUBSTITUTE FOR SUCKLING BY A HEALTHY MOTHER.

The last as well as the first thing to impress on mothers is that in the matter of feeding they alone can do true justice to their offspring. The natural food direct from the mother's breast is the child's birthright. If this cannot be supplied, or if it disagrees, the next best thing is a healthy wet-nurse; or the mother may be able to improve her own health and suckle her baby more or less completely. There is something in milk direct from the living being which no other form of nutriment can equal, and if only a small portion of each meal is mother's milk it will be much better for the baby than complete restriction to artificial feeding. Where mixed feeding is resorted to it is found that babies nearly always "put up" some food, because the mothers tend to give them too much, forgetting that they must allow for what they supply themselves. Hence in these cases the baby must always be weighed before and after suckling from time to time, so as to make sure how much is being drawn from the breasts. This is the only way to find out how much such a baby needs to be given by the bottle after each suckling (see "Weighing before and after Suckling," page 57).

It cannot be said that artificially-fed children necessarily flourish less perfectly than breast-fed ones (though such is usually the case), but medical statistics show that a grave disease called "scurvy rickets," to which breast-fed infants are practically immune, is liable to arise in children fed for long on any form of food subjected to a high temperature. The majority of cases of this disease have been traced to the use of patent foods, but a large number have arisen in children fed on condensed milk, dried milk, or sterilised or boiled cows' milk. It is found that heating milk to the boiling-point injures or destroys something essential to the perfect nutrition of babies if the use of such food is prolonged, though it may be desirable temporarily—for instance, in hot weather or for diarrhoea.

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