

mild elevations of temperature occurred May 1, 4, 6 and were accompanied by paroxysms of hemoglobinuria and albuminuria. They were of short duration and can not be said to be characteristic of either variety of malaria. The maximum temperature was 100.8. No chills occurred. Recovery was good.

**Blood:** April 27, stained smear negative for plasmodia; April 28, hemoglobin, 75 per cent.; May 1, stained smear negative for plasmodia; May 2, hemoglobin, 60 per cent. (not confirmed and doubtless erroneous); May 5, hemoglobin, 60 per cent. (confirmed); R. B. C., 2,900,000, color index, 1.04; May 7, hemoglobin, 55 per cent.; May 8, hemoglobin, 54 per cent.; R. B. C., 2,872,000, color index .94; May 11, hemoglobin, 54 per cent.; R. B. C., 2,900,000, color index, .93+.

**Urine:** An albumin curve has been constructed, and positive and negative tests for hemoglobin indicated. Separate specimens were examined. No red blood corpuscles were observed, and the urine was similar otherwise to other hemoglobinuric urines reported. On May 1, urination was painful and in the urine were found twelve small black particles. Under the microscope these were seen to be bullet-shaped; they were black in mass, brown when crushed, rather friable; they did not yield hemin crystals. Darling found that they did not dissolve in nitric acid, but were changed to a green color by the reagent. The particles were about 1 mm. long by .5 mm. broad. Their nature was not determined. They were responsible probably, for the painful micturition.

In this case, on May 4, I had the only opportunity offered me of examining a hemoglobinuric urine early in the paroxysm. The specimen voided at 11:30 a. m. was pale red in color, contained no sediment, albumin was 11 per cent., and hemin crystals were readily obtained. The next specimen voided at 2:40 p. m. was the color of dark port, contained a heavy, brownish-red sediment, and albumin was 46 per cent.

**Quinin.**—(See chart.) The intramuscular injections of quinin bihydrochlorid caused less irritation than the bimuriate with urea; neither caused much discomfort. The following points are worthy of note: (1) It seems very probable that the patient had had hemoglobinuria on the day before admission, before any quinin had been received. (2) Though quinin was administered continuously, the hemoglobinuric and albuminuric paroxysms occurred only when there was a synchronous elevation of temperature, and they ran parallel to the febrile paroxysms. (3) It seems certain that the quantity of quinin was not large enough to destroy the etiologic agent of hemoglobinuria, and thus to prevent repeated recurrence. (4) It is interesting that the first portion, 150 c.c. of the retained urine contained only 5 per cent. albumin and was lighter in color than the second portion, 1,350 c.c., voided 5 hours later. It seems probable that during this time, a small quantity of highly albuminous urine, possibly containing hemoglobin, was discharged into the already distended bladder. The hemoglobin could have been so diluted by the urine previously in the bladder that the sodium chlorid and glacial acetic acid test failed to detect it.

**CASE 14.**—May 2, 1906, No. 12,653, American, aged 25, residence Empire; on Isthmus of Panama 6 months. Admitted 2:30 p. m.

**Past History.**—Malarial fever three times, no blackwater. Patient lives in barracks with about thirty other men; he knows of three who have had malarial fever, none of whom have had blackwater. One who lives in the next house has had blackwater (Case 12). The patient lived two years in the Philippine Islands, returned to the United States and lived five years in Kansas before coming to the Isthmus of Panama.

**Present Illness.**—Onset April 30, with chill, fever, sweat, headache, backache, vomiting. Similar paroxysm occurred May 1, when his urine was dark but nothing like blackwater. Bowels regular. The patient has taken some quinin, but does not know exact quantity.

**Physical Examination.**—Large, well-nourished, strong-looking young man. Scleræ clear, mucous membranes good color, tongue thickly coated. Heart and lungs clear. Spleen just palpable below costal margin. Marked urticarial rash over face, body and limbs.

**Blood:** Stained smears negative for plasmodia.

**Course of Illness.**—Urine was clear on afternoon of admission and on morning of May 3, when the temperature was nor-

mal and patient in good condition. The rash had almost disappeared. At 6 p. m. a severe chill occurred and temperature rose to 104.5 at 7:30 p. m. The paroxysm was accompanied by vomiting, headache and backache, and the conjunctivæ were much injected. On May 3, the scleræ and the skin of the body were jaundiced. The temperature reached normal by 8 p. m., the curve of the paroxysm was estivo-autumnal in character. There was no posthemoglobinuric fever. Jaundice cleared rapidly. There was a slight elevation of temperature on May 6. The patient felt quite comfortable after the first paroxysm, and made a good recovery.

**Urine:** The urine voided at 6:20 p. m. on May 3, 20 minutes after the initial chill, was the color of port with a heavy brown sediment, albumin 50 per cent. Many hemin crystals were obtained from the supernatant urine. The microscopic examination presented the usual picture, no red corpuscles were found; other examinations were similar. It appeared that the hemoglobin liberated in the blood during the paroxysm continued to be excreted through May 4 and 5. Hemoglobinuria was absent on the morning of May 6, but was found one time afterward corresponding to the slight elevation of temperature that afternoon. Hemoglobin persisted in the sediment after the supernatant urine failed to give the reaction. The minimum quality of albumin with which a positive test for hemoglobin in the supernatant urine was associated was 32 per cent.; the sediment yielded hemin crystals with 28 per cent. albumin. In the albumin curve the spaces represent 10 per cent. instead of 5 per cent., as in former curves.

**Blood:** May 2, stained smear negative for malarial plasmodia; May 3, 7:30 p. m., smear negative for malarial plasmodia; hemoglobin, 95 per cent.; May 4, 10 a. m., smear negative for malarial plasmodia; hemoglobin, 95 per cent., R. B. C., 4,200,000, color index, 1.13+; May 5, a. m., hemoglobin, 86 per cent., R. B. C., 3,900,000, color index, 1.10; May 7, a. m., hemoglobin, 76 per cent.; May 9, a. m., hemoglobin, 65 per cent., R. B. C., 3,550,000, color index, .915. The fact that hemoglobin estimations were the same on the night of May 3 and morning of May 4, can be explained by the vomiting, which probably caused a concentration of blood that counterbalanced the hemoglobin excreted during the night.

**Quinin.**—(See chart.) The intramuscular injections of quinin bihydrochlorid caused less irritation than those of the bimuriate and urea; neither caused great discomfort.

(To be continued.)

## VALUE OF SMALL QUANTITIES OF HUMAN MILK IN THE TREATMENT OF INFANTILE ATROPHY AND THE INFECTIONS OF INFANTS.\*

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Recent additions to our knowledge of the differences between human and cows' milk as a food for infants seem to show that the superiority of mothers' milk depends in part on the action of substances which are of the nature of ferments. As ferments are bodies "which are themselves unaffected by the changes which they produce" and which "can work on indefinitely, provided the products of their action do not accumulate too much,"<sup>1</sup> it follows that the benefits of human milk, in so far as they are dependent on the action of ferments, will not be proportional to the amount that is given, but effects may be expected from relatively small amounts.

It is the purpose of this paper:

1. To discuss recent investigations in regard to human milk, and to show that artificial feeding fails in just those conditions in which the action of ferments is

\* Read in the Section on Diseases of Children of the American Medical Association, at the Fifty-seventh Annual Session, June, 1906.  
1. Schaefer: Text-book of Physiology, 1898, vol. 1, p. 317.

thought to play an important part, namely, in infantile atrophy and in bacterial infections.

2. To report my own results in the use of small amounts of human milk for therapeutic purposes in these conditions.

3. To suggest means of obtaining small amounts of breast milk.

4. To discuss the use of breast milk in infant hospitals, where this subject is of the greatest practical importance.

#### LIMITATIONS OF ARTIFICIAL FEEDING.

As a result of the work of the past twenty years in the modification of cows' milk for infant feeding, it is now possible to give an infant an artificial food which, as far as experiments in the test-tube show, is nearly, if not quite, as digestible as human milk. Mortality records show that infants seldom die on account of their inability to digest a properly modified cows' milk. They die on an exclusive artificial diet because, *a*, they have disturbances of assimilation of which infantile atrophy is an extreme type; and *b*, they can not resist bacterial infections. These are the limitations of artificial feeding, and it is along these lines that advances must be made to reduce infant mortality still further.

At first sight, it seems as if the power of breast milk to aid the assimilation of food and to increase the resistance of the infant to infections, were two functions wholly different from each other. It is only necessary, however, to remind one of recent theories in regard to immunity, especially those of Ehrlich, to realize how close is the relation between the digestion and assimilation of food on the one hand, and the effect of toxins, the production of antibodies, and the destruction of bacteria within the body, on the other. It is therefore to be expected that if substances which aid assimilation can pass from mother to child through the milk, those which increase the resistance of an infant to infection can also be transmitted.

#### HUMAN MILK IN INFANTILE ATROPHY.

We know very little of the etiology of infantile atrophy, or of the mode of action of human milk in the cure and prevention of that condition. There is, however, a growing belief among those who have made a special study of the subject that human milk is of value in these cases through the action of ferments.

In a recent article Wentworth<sup>2</sup> reviews the literature, gives the results of his own metabolism experiments, and offers the suggestion "that human milk contains special ferments that stimulate the activity of the digestive glands."

At the Thirteenth International Medical Congress, Paris, 1900, Escherich<sup>3</sup> advanced the theory that infantile atrophy was a disturbance of intermediary metabolism and was caused by a deficiency of those ferments of the "internal secretions," which regulate and control the nutrition and growth of the tissues (*Stoffwechsel-fermente*), and which are the products of the so-called ductless glands. He believed that ferment-like bodies of the internal secretions are taken out of the blood by the mammary gland, that they are absorbed with the food by the infant, and so pass into its body fluids, where, as in the mother, they aid metabolism and make good the deficiency of these ferments in the infant.

Escherich offered these ideas only as a hypothesis which needed to be proved. For support of this view,

he points to the results obtained in mixed feeding, and in the use of very small amounts of breast milk, when the effects are not at all proportional to the amount given.

Marfan<sup>4</sup> and Concetti<sup>5</sup> have advanced theories in regard to infantile atrophy which are very similar to that of Escherich. Escherich's hypothesis has stimulated the investigation of milk along biologic lines and a number of ferments have been found in human milk, which probably have their origin in the maternal blood stream. Moro<sup>6</sup> says it is doubtful whether these ferments which have been demonstrated have any significance in the nutrition of the infant, but they show that ferment-like substances are excreted from the maternal blood in the milk, and the inference is justifiable that other ferments, those that concern metabolism, but which can not as yet be demonstrated, will also be excreted in the same way.

#### RESISTANCE TO INFECTIONS OF BREAST-FED INFANTS.

The artificially fed infant is more susceptible to every form of infection than the breast-fed infant. The infections of the gastrointestinal tract are the most frequent, because digestive disturbances make these organs a *locus minoris resistentiæ* and because the infectious agents often gain access in the food.

The resistance of breast-fed infants to infections probably depends on the marked bactericidal power of their blood as compared with that of infants artificially fed. In this connection, the investigations of Moro<sup>7</sup> in regard to the bactericidal power of infants' blood are most instructive. Using the plate method, he found that the average of a large number of tests made under exactly similar conditions showed that:

	Per cent. of bacteria.
Maternal blood (placental) killed .....	58.9
Blood of older children killed .....	46.3
Blood of artificially fed infants killed .....	33.4
Blood of breast-fed infants killed .....	77

The bactericidal power of the infant's blood at birth corresponds very closely with the placental blood. Following the breast feeding there is an increase, so that it is considerably greater than that of the mother's blood, while on an artificial diet there is a rapid falling off.

Tests of the bactericidal power of the blood of the same infant while being nursed and then after being weaned were also instructive. The tests in this case showed:

	Per cent. of bacteria.
Mother's blood (placental) killed .....	56
Infant's blood, after being nursed for two weeks, killed ..	72.9
Same infant's blood, two weeks after being weaned, killed ..	40.7

It might be supposed that the greater bactericidal power of the blood of the breast-fed infant was merely an expression of its better health and more flourishing condition. Moro found, however, that even in weak and delicate breast-fed babies, those that were not doing well, the blood showed greater bactericidal power than in the most healthy and flourishing bottle babies.

It is not possible to discuss here the various theories in regard to bacterial immunity. It can only be stated that it is generally accepted that the destruction of bacteria within the body depends on the action of certain substances, the *alexins*, or the *complement* of Ehrlich. These substances are destroyed by a temperature of 55 C. and are almost certainly of the nature of ferments. These alexins can not be demonstrated in the milk, and

2. THE JOURNAL A. M. A., vol. xiv, 1905, pp. 579 and 771.

3. Wien. klin. Wochschr., vol. xlii, 1900, p. 1083.

4. Presse med., vol. ix, 1901, p. 13.

5. Arch. de Méc. des enf., vol. v, 1902, p. 129.

6. Jahr. f. Kinderhik., vol. lvi, 1902, p. 391.

7. Wien. klin. Wochschr., vol. xiv, 1901, p. 1073.

milk itself has practically no bactericidal power. Moro reasoned, however, that inasmuch as the bactericidal power of the infant's blood increased after birth if it was nursed, so that it was even greater than that of the mother, the alexins must come over in the milk and that they were probably there combined with the casein molecule in such a way that their presence could not be demonstrated.

In a different way Wasserman<sup>8</sup> explains the greater bactericidal power of the breast-fed infant's blood. The soluble albumin of human milk can pass unchanged from the intestinal canal into the circulation of an infant, while the albumin of cows' milk, being the albumin of a different species of animal, can not so pass, but has to be transformed by the action of ferments in the intestinal wall. Wasserman believes that the ferments which transform the foreign albumin in the wall of the intestines are identical with those ferments which destroy bacteria in the body, namely, the alexins, or Ehrlich's complement. According to him, therefore, the bactericidal power of the artificially fed infant's blood

call forth the secretions of those glands whose ferments are concerned in the assimilation of food and in the destruction of bacteria in the body.

From what has been written it is obvious that there is a good deal that is obscure, and, at best, pure theory in regard to the mode of action of human milk in infantile atrophy and bacterial infections. It would seem, however, that we were justified in assuming as a working hypothesis, that the benefits of breast milk in these conditions depend in part on the action of ferments, and it would therefore be rational to expect to get effects from relatively small amounts.

#### RESULTS IN THE USE OF SMALL AMOUNTS OF BREAST MILK IN INFANTILE ATROPHY AND IN INFECTIONS.

My own experience in the use of breast milk has been chiefly at the Massachusetts Infant Asylum, where for some years it has been the custom to have a few wet nurses. The nurses have their own babies with them, which they nurse alternately with the sick ones. As there are usually not enough wet nurses to be found,

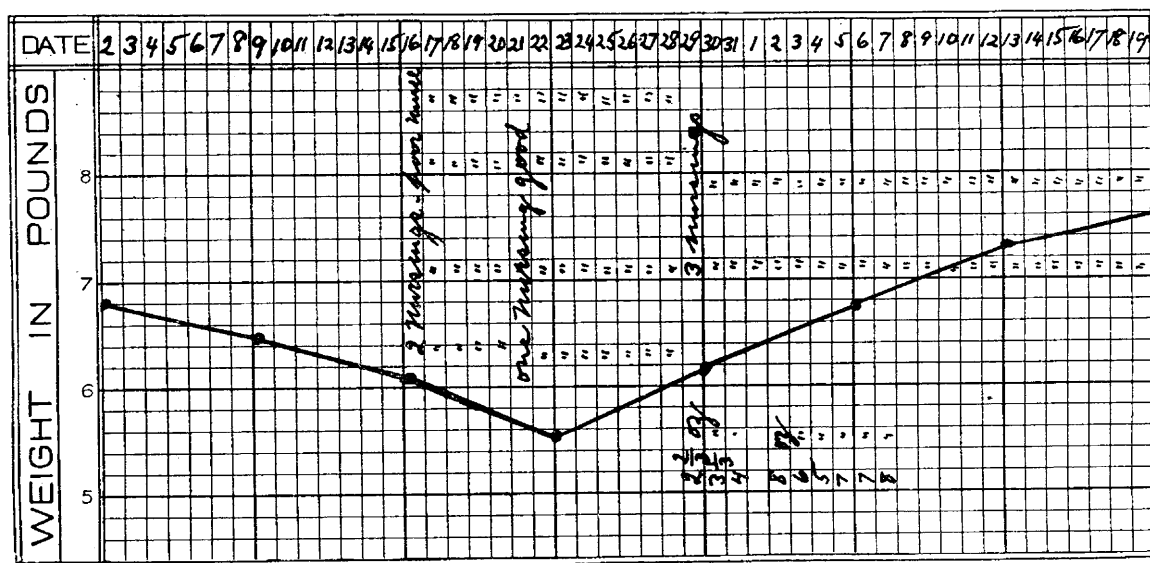


Fig. 1.—Weight chart of Case 1.

is low, because these ferments are wholly employed or used up in transforming the cow albumin of the food into human albumin of the infant.

#### HUMAN MILK MAY CONTAIN SUBSTANCES WHICH BRING FERMENTS INTO ACTIVITY.

To support the theory that the benefits of human milk in infantile atrophy and bacterial infections depend on the action of ferments, it is not necessary to suppose that the ferments themselves are in the mother's milk. It is possible that the milk contains substances which bring these ferments into activity, for which theory the chemistry of digestion offers several analogies. Thus there is now known to be a wholly new class of ferments whose function is to activate other ferments, as *enterokinase*, which has the function of activating the trypsinogen of the pancreatic juice. There is also *secretin*, a substance not itself a ferment, secreted by the cells of the duodenum, which is absorbed and carried by the blood stream to the pancreas. The minutest quantities of secretin in the blood suffice to call forth a copious flow of pancreatic juice. It is possible that human milk contains substances in the nature of secretin which serve to

only the most sickly babies are nursed, and of these the great majority are either atrophic cases or infants suffering from some infection. As a rule, the sick babies are given three nursings and three or four bottles in twenty-four hours, occasionally only two nursings.

It has been my experience, as it must have been of every one who has made use of mixed feedings in this way, that often the sick infants show almost immediate improvement when put on the alternate breast feedings. It is exceptional not to see improvement within a week. At first sight, such results do not seem remarkable, for one might expect to get improvement if half the infant's food is human milk. As a matter of fact, however, a sick, bottle-fed infant when first put on the breast with alternate bottle feedings gets much less than half of its food from the breast. It is probably seldom over a quarter, and more often an eighth or a tenth. Keller<sup>9</sup> and others have called attention to the very small amounts of milk which are taken by a bottle-fed infant when first put on the breast. He found that often only 20 to 30 gm. (one ounce or less) at a feeding were taken, perhaps only 100 to 150 gm. in twenty-four hours when wholly nursed.

8. Deutsch. med. Wochschr., vol. xxix, 1903, p. 16.

9. Jahr. f. Kinderhik., vol. liii, 1901, p. 59.

In a few cases in which I have had the babies weighed before and after nursing, the amounts taken by the bottle baby when first put on the breast have been very small, very similar to Keller's figures, and it has also seemed that when the baby was on mixed feedings it was very much slower in learning to take a reasonable amount.

To repeat what has just been said: The atrophic infants and those suffering from some infection often show prompt improvement when put on alternate nursings, and inasmuch as they take very small amounts from the breast at first, it follows that the improvement which results has been brought about by the addition of these small amounts of human milk to the infant's food. It is true that after a time the sick infant will take more from the breast, but if improvement has begun when only the small quantity was obtained, it will usually continue even if the amount of breast milk is not increased, and often it can be slowly reduced.

These in general are the results of the use of small amounts of breast milk for therapeutic purposes. The three following cases will serve to illustrate what has been the experience with a large number of cases of the same kind.

CASE 1.—Atrophic type. H. F., male, 14 weeks, admitted to Massachusetts Infant Asylum, Sept. 29, 1905; had never been very vigorous or strong. Previously he had had some digestive disturbances, but none recently. There was no vomiting, and the stools were normal. The infant, however, had been losing weight. Physical examination at entrance negative except for emaciation. During the first three weeks at the Asylum the

CASE 3.—Infectious type. Baby D., aged 10 months, seen in private practice, never nursed. July 21, 1905, a severe prolonged ileo-colitis began. The stools contained a large amount of mucus with a little blood. The temperature at times reached 103. Occasionally there were short periods of slight improvement, but there were repeated relapses, each one leaving the baby weaker than before. The case was seen twice by Dr. J. L. Morse in consultation, and I believe that everything was done for the child in the way of treatment that was possible on an artificial diet.

On September 11, when the baby had been sick about seven weeks, its condition was very alarming. Temperature 102, pulse 160, eyes sunken and frequently rolled up; there were eight to twelve movements a day, copious and composed almost wholly of mucus. Breast milk seemed to offer the only hope, but no wet nurse could be found, and it is improbable that a sick baby almost a year old who had never been nursed would have taken the breast.

On September 12, I called on a neighbor, a nursing mother, and begged her to draw off some of her milk with a pump. That evening she sent in an ounce of her milk, the next morning another, and a third in the afternoon. This breast milk was given to the baby diluted 1/3 with water, in addition to the whey and rice water which he was already taking.

On the evening of September 13, when only three ounces of the breast milk had been taken, there was a marked improvement. The baby was brighter, stronger and seemed hungry, the temperature was lower, and from that time on he continued to improve.

After having this child under observation for seven weeks without ever seeing any decided improvement, one could feel very sure that the baby received something in

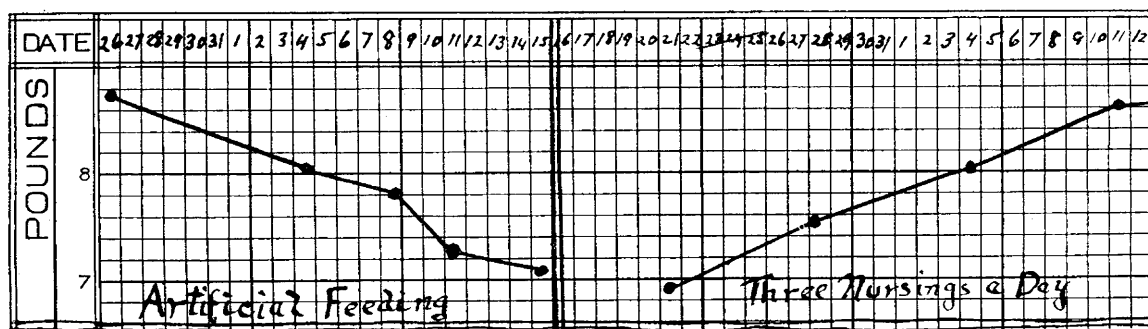


Fig. 2.—Weight chart of Case 2.

infant did not gain on the usual mixtures of modified milk, although the digestion appeared to be all right (Fig. 1).

October 16 to 21, the baby was given two nursings a day in place of two of the bottles. The wet nurse was a pale and chlorotic girl whose own baby did not gain and she was discharged.

October 21 to 28, the baby had one nursing a day from a good nurse, and on October 29 he was given three nursings a day. The amounts of breast milk taken each day are given in Figure 1. Slight improvement began on one nursing a day from the good nurse, and was marked on the three nursings, although the baby received only two and two-thirds to four ounces per day during the first three days.

CASE 2.—Atrophic type. E. D., age four months, was sent to the Massachusetts Infant Asylum on Aug. 16, 1905, from the Floating Hospital.<sup>10</sup> Diagnosis: Infantile atrophy. The infant had been losing weight steadily at the Floating Hospital, as shown by the chart, and on the recommendation of Dr. J. L. Morse it was sent to the Asylum to be wet nursed. With three nursings a day and four bottles there was almost immediate improvement. Unfortunately the amounts of breast milk taken by this infant were not determined, but judging from our experience with other cases this infant took only from three to five ounces a day during the first week (Fig. 2).

10. I am indebted to Dr. R. W. Hastings for the records of this infant at the Floating Hospital.

those three ounces of breast milk which enabled it to resist the effects of the infection.

If no more than the two ounces a day had been given, I believe the improvement would have continued. However, in order to make the cure a certain one, I visited three other nursing mothers and induced them to contribute some milk. For five weeks the baby was given breast milk (together with its other food) in amounts varying from one to sixteen ounces a day. In all twelve quarts of breast milk were so obtained. I believe that one or two quarts would have been sufficient to save the baby's life, and the remaining ten or eleven quarts might have been used to save the lives of other sick babies.

My experience in the use of small amounts of breast milk in infections has been almost wholly in the infections of the gastrointestinal tract. As the breast-fed infant shows an equally strong resistance or lack of susceptibility to infections of the respiratory tract and to suppurative conditions, there is reason to believe that small amounts of breast milk would also be of value there.

#### DANGERS OF BREAST MILK.

The importance of securing breast milk from healthy women, free from tuberculosis, syphilis, or other con-

tagious disease, is sufficiently emphasized in the text-books. Of course this is equally important where only a small amount of breast milk is used. It must also be remembered that in the early stages of infections of the gastrointestinal tract there are times when it is dangerous to give milk in any form. Breast milk itself has no bactericidal power and probably furnishes as good a medium as cows' milk for the growth of bacteria. The giving of breast milk to an infant who has an infection with organisms producing toxins in milk may result in the death of the infant, as in the cases reported by Salge.<sup>11</sup> Human milk, however, can be started earlier in gastrointestinal infections than cows' milk, because if the first effects are not too serious it gives the infant increased resistance to the infection from which it is suffering.

#### CHANGES ARE NEEDED IN THE PRACTICE OF WET NURSING.

The leading text-books of pediatrics discuss the subject of wet nursing as if the only way to secure breast milk for a sick baby was to find a woman who would abandon her own child. Such a course is poor practice and I believe never justifiable. To take away a vigorous healthy child from its mother, and put in its place a sick baby who will at first take only a few ounces a day, is to invite disaster. Stasis will often result and colostrum corpuscles appear in the milk, which rapidly deteriorates. Moreover, the psychologic effect of the presence of the mother's own child, as well as its vigorous nursing, is of great value in securing a normal secretion of milk.

The welfare of the wet nurse's own child must be considered. It might be right for a poor woman to wean her own child if this were absolutely necessary to save the life of a sick baby, but it is not justifiable when it is for the interest of the sick baby also that the mother continue to nurse her child a few times a day. If the statistics quoted by Holt<sup>12</sup> are correct that only one wet nurse's baby in ten survives, then wet nursing as it has been practiced in the past has cost more lives than it has saved.

It is often difficult to secure good wet nurses, at least in Boston, among the class of persons usually employed. This is especially true for families of moderate means and for institutions. A sufficient amount of breast milk can be obtained if we make use of the tenement house mothers, women who would continue to live in their homes.

I have recently tried a plan at the Massachusetts Infant Asylum which has seemed to be satisfactory. A woman came to the asylum at 9 a. m. and nursed two sick babies; at 11:30 she nursed them again, and then returned to her own home in time to get dinner for her other children on their return from school. She nursed her own baby at 3 p. m. and at 5 p. m. returned to the asylum to nurse the two sick babies. The babies were weighed before and after nursing and the woman was paid so much an ounce for the milk she furnished.

The advantages of this plan are obvious. The milk of such women is better than that of the wet nurses whom we are obliged to employ; it is not necessary to take the wet nurse into the household, always an unpleasant feature of wet nursing; and there is no expense for her keep.

The advantages to the poor mothers are equally obvious. Too frequently they have to wean their babies and leave them at the day nurseries in order to go to

work at a time when they are unfit to do so. The opportunity to earn a little money by nursing a sick baby would be much appreciated by them, as it was in the case cited. If poor women could have more of such opportunities, the practice of wet nursing would result in saving the lives not only of the sick babies but of the nurses' own babies as well, who would otherwise have to be weaned.

The plan is applicable for private homes as well as for institutions. The practice of weighing babies before and after nursing is of great advantage and is insisted on by Schlossman in all cases in which sick babies are on the breast. It takes very little time, as the baby need not be undressed. It enables one to see just what the baby is getting, and if the nurse's compensation is made dependent on the amount of milk she furnishes, it does away completely with the criticism often made that the nurse will favor her own child at the expense of her foster child.

If a baby can not be nursed, it is often possible to obtain breast milk which has been expressed or drawn with a pump, as was done for Case 3.

#### NEED OF BREAST MILK IN INFANT HOSPITALS.

The causes of high mortality in infant hospitals have been carefully studied by Huebner,<sup>13</sup> who found that the high death rate resulted from the fact that infants who recovered from the disease for which they entered were stricken down by some infectious process, gastrointestinal disease, bronchopneumonia, etc., to which they often succumbed; so that the mortality of an infants' hospital is the mortality of the diseases for which the infants entered, plus the mortality of the secondary infections which they contract there. In the same way the mortality was high in surgical and lying-in hospitals before the days of antiseptics, on account of the deaths resulting from the secondary infections of wounds.

That these secondary infections can be largely prevented in infant hospitals by giving the babies alternate feedings of breast milk has been demonstrated for many years at the Massachusetts Infant Asylum, and Schlossman<sup>14</sup> has recently reported the same results at Dresden, where he had a mortality of 25.6 per cent., as compared with 58.5 per cent. at the Charité, where no breast milk was given.

Thanks to Moro's<sup>7</sup> work on the bactericidal power of the infant's blood, we can now understand the results of the use of breast milk in infant hospitals. The mucous membranes of the breast-fed infant, owing to the marked bactericidal power of its serum, are not a favorable soil for the growth of pathogenic bacteria. The mucous surfaces of the artificially fed infant, however, with its serum of low bactericidal power, offer slight resistance to the growth of the pathogenic bacteria which are inevitably present in hospitals. The mucous surfaces in the artificially fed infant become just like an open wound, furnishing favorable conditions for the growth of bacteria. Unlike a wound, however, it is not possible completely to protect the infant's mucous surfaces from infection by means of asepsis and disinfection. Something may be done along these lines as Heubner has shown, but only at an enormous *per capita* expense for nursing.

The only way to prevent a high mortality in infant hospitals and institutions is to add a sufficient amount of human milk to the babies' diet to make them resist-

11. *Jahr. f. Kinderhik.*, vol. lviii, 1903, p. 641.

12. "Diseases of Children," 1900, p. 159.

13. "Säuglingsernährung und Säuglingsspitaler." Verlag von Aug. Hirschwald, 1897.

14. *Arch. f. Kinderhik.*, vol. xxxiii, 1902, p. 177.

ant to the infections to which they are constantly exposed. Alternate mixed feedings are sufficient to give them this resistance, and the smallest quantities of breast milk are better than none at all.

In view of this knowledge, it is as unjustifiable to keep infants in hospitals or institutions without giving them breast milk, as it would be to conduct a surgical or obstetrical hospital without the use of antiseptic and aseptic methods. The breast milk is just as necessary as the antiseptic methods to prevent the secondary infections. Those in charge of infant hospitals should realize that if they give their infants no breast milk, they are not only failing to give them the best therapeutic measure to hasten their recovery, but they are also exposing them to very serious risks of contracting infections to which they may succumb, even if they recover from the primary disease.

#### SUMMARY.

1. The chief causes of failure of an exclusive artificial diet are, *a*, disturbances of assimilation, of which infantile atrophy is an extreme type; *b*, a diminished resistance to bacterial infections.

2. The benefits of human milk in these conditions probably depend on the action of ferments, and it is therefore rational to expect to get results from the use of small amounts of human milk.

3. Good results are obtained by the addition to the infant's diet of two to five ounces of human milk a day.

4. Discretion must be exercised in giving breast milk in the early stages of a gastrointestinal infection.

5. It is poor practice and unjustifiable to have a wet nurse abandon her own child in order to nurse a sick baby.

6. Much can be done with breast milk obtained from poor mothers, women living at home, who come to the hospital or house a few times a day. The amounts obtained at each nursing should be determined by the nurse's compensation made proportional to the quantity furnished.

7. It is unjustifiable to keep babies in hospitals or institutions unless a sufficient amount of breast milk is added to their diet to render them resistant to hospital infections.

It is not claimed that small quantities of human milk will accomplish all that larger quantities can, or that every case which improves when wholly nursed, will improve on a small amount. It is always better to nourish a sick baby wholly on the breast, but when we are unable to do this, much can be accomplished by the use of small amounts. As physicians we are not doing the most for our patients if in every case of infantile atrophy, or infectious disease, in which the life of the infant is threatened, we do not make an earnest effort to secure for it at least a small amount of human milk.

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**Treatment of Corns.**—According to J. F. Palmer, in the *Clinical Journal*, Aug. 15, 1906, a corn should never be cut, since the cutting merely removes the superficial hardened epidermis, while the essential part of the corn, the plug of epidermis, which presses into the corium, is untouched. The author says that any uncomplicated corn can be cured if its owner will only permit it. An attack of typhoid fever is a sure cure, as the patient lies in bed and the corn has time to get well. In most cases, however, he states, that it is only necessary to soak the part with water or glycerin during the night and to protect it during the day by a soft perforated plaster of spongiopiline, the perforation of which may be filled with glycerin. Soaking the feet in water containing sodium carbonate, night and morning, may suffice. A corn complicated by suppuration should be treated like any other abscess.

## A PLEA FOR A SQUARE DEAL FOR THE WET NURSE.

WET-NURSING OF FOUNDLINGS A PERNICIOUS PRACTICE AND SHOULD BE ABANDONED.\*

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BALTIMORE.

In Baltimore the care of foundlings devolves on the Board of Supervisors of City Charities. This board is composed of our best citizens, and its personnel will, I am sure, compare favorably with that of any similar board in this country. It is guided only by the best of motives. In matters medical they will, I have no doubt, be glad to act on the opinions of the medical profession and will welcome any light that may be shed on the subject of wet-nursing city babies by its discussion here.

I wish it understood that I am not criticising the board of charities, but only the practice of wet-nursing foundlings which it adopted in good faith, a practice which is in vogue in certain New York institutions on whose boards are some of the leading members of this Section.

*A Case in Point.*—About a year ago Mrs. M., a wife of a mechanic, gave birth to twins. One died immediately; the other lived three weeks. After the death of the second baby the Baltimore board of supervision of city charities solicited Mrs. M. to take a "city baby" to nurse. For this she was to be paid 40 cents a day. On July 4, 1905, she took the city foundling to raise. The baby was said to be six weeks old. It was a child of a prostitute. The baby was apparently healthy except for a rash about the anus, which soon disappeared.

In August the baby developed "snuffles," which interfered with nursing and sleeping. This lasted six weeks or more. Coincident with the snuffles a fissure appeared near the middle of the upper lip and bled at times when the baby nursed. In October a discrete papular rash appeared over both buttocks. Notwithstanding these symptoms the baby gained in weight and strength, and by November 8, when I first saw it, was on the whole a rather healthy looking infant. Shortly after this date it was returned to the city and is now apparently in very good health.

The members of the board were aware that the wet-nursing of foundlings was fraught with danger to the nurse; they knew that this infant was the offspring of a prostitute. They hoped that, by sending an inspector to see the baby once a week or so, if syphilis developed in the baby, the latter could be removed in time to prevent infection. They put on their medical inspector an impossible task.

No warning was ever given to Mrs. M. that the baby might be a source of contagion. On November 8 I was called to the M. household. On the left nipple of Mrs. M. I found a chancre the size of a quarter and on the lower lip of her 9-year-old daughter a chancre a trifle larger. The mother's infection came from nursing, the daughter's from kissing the infant.

*The Situation in the M. House.*—The havoc wrought by the board of supervisors of city charities in Mr. M.'s home is unspeakable. It has been converted by the city nursing into a pest house where physical suffering and mental anxiety prevail. Mr. M. and his boy of 4 years must ever be on the alert not to be in close contact with Mrs. M. and the girl of 9. They must not use the same dishes or utensils of any kind. Fear must constantly pervade all or the dread malady will spread in the household. Mr. M. must have no marital relations for from two to four years to come. He can not kiss his wife without danger. The daughter must remain home from school for two years or more, otherwise she may give the disease to her schoolmates as she may even now have given it to her playmates.

Mrs. M., being a conscientious woman, has not taken a drink of water away from home since her trouble became

\* Read in the Section on Diseases of Children of the American Medical Association, at the Fifty-seventh Annual Session, June, 1906.