It seems possible that some of the aromatic bodies which give flavor and odor to food substances pass over into the human milk just as they do into cow's milk. Certain it is that the foods which seem to give rise to the greatest amount of disturbance during the early weeks of lactation are those which contain the aromatic bodies in the largest amounts, such as fruits, vegetables of the more highly flavored sorts, and spices. These aromatic bodies are not destroyed by boiling, so that they are present in cooked as well as raw fruits, and in such articles of diet as jellies, preserves, marmalades, wines, etc., they are found in a considerable degree of concentration.

Whatever the nature of the irritating substances contained in the milk, there is manifestly a great variation in the sensitiveness to them displayed by the digestive tracts of different babies, or even by the digestive tract of the same baby at different ages. Many babies seem to be serene and happy under all conditions, no matter what the mother eats; other babies are restless and disturbed during the early weeks or months of life by food substances in the mother's diet which causes no such reaction at a somewhat later period.

It has seemed to me that the best method of approaching these cases is to begin by forbidding entirely to the nursing mother the use of fruits, fruit derivatives, spices, and highly flavored vegetables at the beginning of lactation or when digestive disturbances are manifested, withholding them until a norm has been established, departures from which may be recognized readily, or until digestive comfort has been restored.

An ample and varied dietary can be provided from fresh meat, fish, eggs, potato, rice, macaroni, cereals, milk, cream, butter, bread in various forms, and starchy substances, like corn-starch, tapioca, sago, etc., and from these there is very little possibility of harm.

In order to avoid the danger of disturbing lactation before it is well established and before the mother has regained her strength to a reasonable degree, it has seemed to me desirable to have an extremely bland diet of this character continued until the end of the first month. After this time additions to the diet in the shape of vegetables and fruit may be tried cautiously, not more than one new thing being tried in any one day to avoid confusion in interpreting the results, and not striving for too great a variety in order to avoid exceeding the gradually increasing tolerance of the infant's digestive tract.

Lest I be suspected of claiming originality for these ideas let me add that among the earliest writings on pediatrics which have come down to us from Greek medicine are instructions as to the diet of the nursing mother. Paul of Aegina quotes from Oribasius, who lived from 326 to 403 A. D., the following directions:

She ought to avoid everything of a very desiccative nature, and likewise such as are saltish, sour, acid, bitter, very heating, or of offensive smell; also, such as are strongly fragrant, condiments, and such like acrid substances.

To-day the pendulum has swung in the opposite direction and it has become the fashion to say that restriction is unnecessary and that the mother's diet has very little effect on the digestibility of her milk, except in a general way.

It seems to me that we have gone too far in removing our restrictions and that in this matter we can well afford to listen to Oribasius, Aristotle, and Hippocrates.

THE FEEDING OF SKIMMED BREAST-MILK*

FRANK C. NEFF, M.D.

KANSAS CITY, MO.

The problem of digestive and nutritional disturbances in the breast-fed is ever with us, and should be met scientifically before resorting to complete artificial feeding. High fat content of the milk, intolerance of the infant for fat, nervous disturbances in the mother, inherited feeble digestive powers of the infant and other causes must be considered. Examination of the stools will often furnish evidence of the nature of the intolerance, and when the fat is at fault a reduction in the amount ingested may permit the continuance of breast-feeding and be only temporarily necessary.

It seems conservative to say that a fat-reduced breast-milk will be as easily digested, when a reduction is necessary, as is fat-reduced cow's milk or any artificial food. Efforts to increase the digestibility of breast-milk through attention to the mother's health are often unsuccessful. Regulation of the length of nursing, giving a known quantity of milk by weighing the infant before and after nursing, lengthening the intervals, diluting the drawn milk—all may be tried. When these are done, we still have many infants that are unsuccessfully fed. Simple dilution of the milk reduces all the percentages, but in skim milk there remains the original amount of sugar, salts and protein. None of these causes disturbances in the breast-fed with the possible exception of great variations in the sugar.¹

INDICATIONS FOR THE USE OF A FAT-REDUCED BREAST-MILK

Cowie² has demonstrated that high fat food tends to slow stomach evacuation, because the duodenal closing reflex is stimulated when fat is present in the duodenum.

Morse³ believes that in the treatment of pyloric spasm, the best food is good breast-milk, and if this is vomited, it is well to remove a part of the fat so as to keep its percentage low and thereby hasten the emptying of the stomach.

The value of stomach washing in pylorospasm cannot be denied, but an adjuvant is found in the reduction of the fat in the food. Persistent vomiting in which there is no constant or intermittent obstruction at the pylorus gives also a like indication. Rott⁴ believes that certain cases of vomiting which consist of a gastric neurosis are caused by a fat-rich breast-milk, and are cured by administering the opposite.

Towle and Talbot⁵ came to the conclusion that the indigestion of fats and carbohydrates as found in the stools occur with some regularity in association with infantile eczema. In the exudative diatheses an intolerance exists for fat.

Infantile eczema occurs more often probably in the breast-fed. It is often found in the overfed child. A reduction in the amount of fat ingested is indicated.

* Read before the Section on Diseases of Children at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Lust (Monatschr. f. Kinderh., 1912, xi, 226) shows that high percentage of sugar can in some instances be the cause of acid formation in the intestine and therefrom give occasion to diarrhea. When the sugar is low, an inhibiting influence on intestinal peristalsis can be occasioned.

2. Cowie: Am. Jour. Dis. Child., March, 1913, p. 233.

3. Morse: Am. Jour. Dis. Child., May, 1911, p. 366.

4. Rott: Vortr. Ver. f. inn. Med. u. Kinderheilk., Berlin, May 29, 1911.

5. Towle and Talbot: Am. Jour. Dis. Child., October, 1912, p. 219.

Too great a fat content in breast-milk can cause digestive disturbances, especially in the premature.⁶

Finklestein and Meyer⁷ have shown that the nutrition of breast infants can suffer from the fat of human milk, if a severe enough injury has been done to the intestine.

Nothmann⁸ advises the use of less rich milk in the premature infants with weak digestions.

Ritter⁹ reports a series of cases in which intestinal injury occurred through the feeding of fat-rich breast-milk, and repair was brought about through the use of fat-poor milk.

Langstein,¹⁰ in the study of eighty-eight infants suffering from disturbances of nutrition, found that the restoration of the child was often completed in a shorter time by the use of breast-milk from which the fat was removed.

During the past year I have been trying to determine the value of fat-reduced breast-milk as a food in congenital weaklings and in infants who show intolerant symptoms after nursing. If it were possible to change the composition of the milk so that digestion would be rendered comfortable, the child might soon increase its tolerance for larger quantities of whole milk and thus continue to be nursed at the breast. In not all cases was the experiment successful. In some the child was lost sight of or it was impossible to secure enough breast-milk. Some distinctly successful cases warrant their report in brief.

CASE 1.—Baby F., born at 8 months, birth weight 5 pounds. At the age of 3 weeks child began to vomit and to have numerous loose undigested stools. The length of breast-nursing was cut to a few minutes and a definite amount of breast-milk given. Whenever nursing over five minutes, the stools increased to six to eight daily. Had much pain from distention. At the age of 10 weeks the weight was 6 pounds. A wet-nurse was secured and her milk drawn and skimmed. Beginning with 1½ ounces of skimmed milk supplemental to the three-minute nursing of the mother, the stools reduced in number from three to five daily, sleep became normal, weight gained. Child was uncomfortable when on an entire feeding of whole milk. At the end of fourteenth week, weight was 7 pounds and 9 ounces. At the end of fourth month weighed 9 pounds, and has since gained normally.

CASE 2.—Baby N., full-term child, had been taken from the breast because of evidences of indigestion and failure to gain. Artificial food, a condensed milk, had been resorted to with no improvement in the condition. A wet-nurse was secured at my suggestion, with a continuance of the dyspeptic symptoms. The amount of breast-milk was reduced definitely to the minimum necessary for a sustaining diet. The colic and crying did not abate. As much drawn milk as could be secured was skimmed and given as supplemental or exclusive feedings with increased comfort to the child and a gain in weight permitting a complete return to whole milk within a few weeks.

CASE 3.—Baby E., aged 3 months. Had been exclusively on mother's milk since birth with exception of the recent supplemental use of a proprietary food. Vomiting of most of the food, much colic, but stools were said to have been apparently normal, no gain over birth-weight, which was 4 kg. Child markedly atrophic. The possibility of pyloric obstruction was disproved by the administering of a barium chlorid meal, under fluoroscopic and roentgenographic observation, there being no delay in the emptying-time of the stomach. Stomach-washing brought no considerable residue. A wet-nurse's milk was substituted for a part of the mother's

nursings with no improvement, reduced in amount to 1-ounce nursings at three-hour intervals. The wet-nurse's milk, skimmed, was then administered at the beginning in 1-ounce doses, supplemental to the known amount of mother's milk. No gain in weight during the time the child was under my observation, two weeks. Vomiting promptly ceased, the child's comfort and sleep practically normal.

CASE 4.—Baby H., aged 2 months, breast-fed, mother in good health and had successfully nursed two other children. Constant vomiting with pylorospasm and daily convulsions. Lavage and regulation of the amount ingested brought relief from vomiting but no gain in weight. Supplemental feedings of skimmed breast-milk from the mother and wet-nurse were given, at first in small amounts and later in as large as the infant could tolerate. Uneventful recovery.

METHODS OF OBTAINING BREAST-MILK

An effort is made to withdraw a part or all of the twenty-four-hour milk from the mother. Allowing the infant to nurse a few minutes each time and then supplementing it with the necessary ounces of breast-milk, previously drawn and skimmed, will keep the breasts active and in some instances will be found to be

tolerated well by the child. Or alternate nursings and feeding of fat-reduced milk may be used. In other cases all the feedings will be of skimmed milk, as long as is needed for the welfare of the child and while the necessary amount is available. Many women can express the milk by massage more satisfactorily than by the use of the pump. When sufficient milk is not obtainable from the mother, a wet-nurse's milk can be obtained. The milk is placed in a covered receptacle and kept on ice.

A detail that works satisfactorily is the storage of the milk in half-pint or larger tubulated bottles which have been made in an 8-ounce size for me by Whitall, Tatum and John M. Maris. A rubber stopper closes the mouth of the bottle, and another one the small

Eight-ounce tubulated bottle used for separating the breast-milk from the cream.

opening at the bottom. This bottle is a duplicate of the nasal douche bottle listed in the catalogs. All of the milk up to the cream line can be withdrawn without mixing the cream. With a little experience rich or poor milk can be told at a glance by the depth of the cream-line in this bottle.

I have examined numerous specimens of breast-milk to determine how much fat is removed by this method. The average fat-content of skimmed breast-milk was determined by the Lewi modification of the Babcock test:

Average content of specimens before skimming, 3.1 per cent.

Fat content at the end of four hours, 1.8 per cent.

Fat content at the end of eight hours, 1.5 per cent.

Fat content at the end of twenty-four hours, 0.9 per cent.

In the specimens from which the foregoing averages were taken:

From 1 to 1.7 per cent. fat was removed at four hours.

From 1.5 to 2.7 per cent. fat was removed at eight hours.

From 2.0 to 3.0 per cent. fat was removed at twenty-four hours.

6. Planchaud and Rendu: *Arch. de méd. d. enf.*, 1911, xiv, 582.

7. Finklestein and Meyer: *Jahrb. f. Kinderh.*, 1910, lxxi, 525.

8. Nothmann, H.: *Ztschr. f. Kinderh.*, 1913, vi, 578.

9. Ritter: *Vortr. Deutsch. Gesellsch. f. Kinderh.*, Wien, 1913, ix, 20.

10. Langstein: *Vortr. der Berlin. med. Gesellsch.*, 1911, xi.

Breast-milk stays sweet on ice much longer than cow's milk, and even during the summer months has been perfectly good as long as three days.

CONCLUSIONS

1. There are certain cases in which the temporary feeding of skimmed breast-milk is advisable until the digestive difficulties of the infant are over and a return to whole breast-milk is possible.

2. This method of feeding is worthy of trial in the great class of infants with intestinal indigestion as manifested by abdominal distention, colic, fretfulness, loose, green dyspeptic stools, failure to gain in weight through several weeks; in babies that have gastric and pyloric symptoms; in the eczema of infancy, and in the congenitally weak and premature infants.

3. Skimmed breast-milk is a safe and digestible food, and is applicable whenever a fat-free milk is indicated.

4. Human milk permits of simple cream separation and can usually be obtained for this purpose from the mother or wet-nurse.

900 Rialto Building.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. MYERS AND NEFF

DR. JOHN ZAHORSKY, St. Louis: If there is one thing we need it is a simple method of treating or preventing the severe dyspepsia that some infants have in the first few days or weeks of life. Little that is definite is found in the literature and I believe we should more and more study these cases. I was surprised to hear Dr. Myers say that the effects of fruits were so bad. Oranges and apples and other fruits have been permitted to nursing mothers, yet, from his observations, these things are not tolerated. Modern writers do not exclude fruit from the mother's diet. Some of the older writers are substantiated by our observations of to-day. We know that these dyspepsias often disappear spontaneously. I recall one baby who had severe attacks of acid dyspepsia, with severe pain, loss in weight and fever. The baby was put on rice-water each time, gradually going back to the breast. The symptoms slowly disappeared. What we want to know is what caused the acid dyspepsia. After all, we know very little about breast-fed babies. As soon as we do know we will be able to keep mothers nursing their babies. The mothers are not unwilling, but when the poor mother who has been up night after night with a screaming baby finds it is not thriving, she will not keep the baby on the breast. No matter how much you may encourage her, she will not nurse it under these circumstances.

DR. CHARLES DOUGLAS, Detroit: For many years I have been opposed to fruits in the diet of nursing mothers, and general practitioners have opposed and laughed at me, because they said fruits did no harm. These papers I think should be of great force to general practitioners. Unfortunately, the profession has learned to give everything to the nursing mother. It is a well-known fact that those who deal in animals, breeding stock, etc., know more about the nutrition of the young animals that they raise to sell than the human family knows about their own offspring. It is a shame to own it but it is true. I have commented on it for many years. Dr. Myers classifies the fruit foods which should be objected to. He gives as a reason "high flavor." I think he should have gone further. It is not the high flavor alone; it is the sugar. Fruits are composed almost entirely of sugars and acids. Must we exclude sugar or flavors from the milk? I believe it is the sugar. I have seen instances in which mothers have indulged in sweet things to excess and have ruined their children's digestion. The children would immediately improve when the mothers

abstained from sweets. I would prohibit sugar in the various drinks which are given to children. To have a baby's digestive organs ruined by an ignorant woman is an everyday occurrence. Some of our trained nurses also are guilty, I am sorry to say. They give the child something sweet because it likes it, and they lay up trouble right from the first twenty-four hours. I think physicians should take as much interest in the child as in the mother. At each visit they inquire particularly into the health of the mother but give little attention to the child. If the physician would always lay down a rule in the beginning to prevent the nurse feeding sweets to the child, we would have less of those troubles.

DR. HARRY LOWENBURG, Philadelphia: Last year I read a paper dealing with this subject, "The Etiology of Artificial Feeding," in which I discussed some of the causes leading to discontinuance of breast-feeding, and I believe this study will lead us to handle these cases more intelligently. Physicians are very quick to discontinue breast-feeding when these symptoms appear, because they are at a loss how to meet them. In the treatment of green stools, and of vomiting, which is not organic but dependent on some food mixture which the child receives, I believe the study of the mother's diet is important. Dr. Neff's suggestion that some of these cases will do well on skimmed milk is also important. If this knowledge could be spread broadcast to the general practitioner, I think more children could be kept on the breast and infant mortality would be lessened.

DR. JOHN LOVETT MORSE, Boston: We all believe that human milk is the best food for the baby. We have been inclined for that reason to conclude that human milk was the best food for the baby under all conditions. That is not always true. We have to remember that human milk contains fat, milk sugar and protein. When we have poor fat tolerance, or when we have bad milk-sugar tolerance, the fat and sugar in human milk will disagree in almost the same way as the fat and sugar in cow's milk would disagree. I say almost, because they do not disagree to the same extent. The baby will often be able to assimilate human milk when it could not assimilate cow's milk of the same composition. It is in the cases in which skimmed milk is useful, that straight breast-milk does not agree. Skimmed breast-milk may be used in these cases and will often be tolerated when skimmed cow's-milk is not. I think there is no question that fruit and highly flavored foods in the mother's diet cause a disturbance in the baby's digestion, but I believe that it is the exception and not the rule, and that the majority of healthy nursing mothers can eat almost everything. If the baby is disturbed, we must find out what article of food is the cause. When the baby is crying, having green stools, etc., the trouble in the breast-milk is usually not so much due to the diet of the mother as to anxiety and fatigue, which increase the amount of protein in the milk. I believe a great deal can be done, not by changing the mother's diet, but by regulating her habits and life and by reassuring her if she is nervous. I feel confident that there are practically no data to prove that any ordinary increase in the amount of sugar in a woman's diet will have any influence on the amount of sugar in her milk. It must be extreme in amount to have any effect.

DR. A. W. MYERS, Milwaukee: Among the substances which influence the taste and odor of foods are certain phenol derivatives which are largely responsible for the flavoring in the more highly flavored foods. What rôle they play in the body is not exactly clear. In the ordinary process of metabolism, these phenol bodies are apt to be combined with the glucose of the blood and eliminated in the urine in the form of phenylglucuronic acid. During lactation a new outlet for the blood-sugar is provided and it is possible that some of the phenol bodies may enter the milk in combination with the sugar.

It is remarkable how large a gap there is in our knowledge of the composition of human milk. Meigs and Marsh have recently shown that there are unknown substances in human milk amounting to about 1 per cent., approximately equal to the percentage of lactalbumin.

As Dr. Morse has truly said, undoubtedly these cases to which I have attempted to call your attention are the exception rather than the rule. I stated that when a baby was doing well on the breast, the ideas expressed in the paper did not apply; they apply only to the baby who is not doing well. I think there are more babies who have than who have not a digestive tolerance sufficient to take care of the normal variation in the mother's diet. Fatigue and worry have a distinct effect. I attempted to call attention to this effect of anxiety and fatigue, which increases the digestive disorders at this period. With regard to the effect of sugar in the mother's diet, it seems to me the effect is indirect. Sugar ingested by the mother may disturb her digestion and in that way indirectly disturb the infant's digestion.

SOME PRESENT-DAY PROBLEMS IN THE SURGERY OF GASTRIC AND DUODENAL ULCER*

HAROLD COLLINSON, M.S., F.R.C.S.
LEEDS, ENGLAND

When your officers paid me the great compliment of asking me to submit a paper to the Section on Surgery, I felt that if I were to accept I must present a contribution which would be of practical value and would stimulate some discussion.

The life of a surgeon attached to a large hospital presents few opportunities for purely experimental research, and his observations are to a large extent confined to the clinical side of surgery. It has been my great good fortune to be closely associated with Sir Berkeley Moynihan for a number of years in both his private and hospital practice, and my interest in the surgery of the stomach and duodenum has naturally been greatly stimulated and by his kindness I have been offered numerous opportunities.

Sir Berkeley Moynihan in my country and Drs. William and Charles Mayo in your own have said almost all that is to be said with respect to the treatment of chronic duodenal and pyloric ulceration, but there are still certain complications and varieties of ulcer concerning the treatment of which surgical opinion is not yet crystallized, and it is with these that I wish to deal. I cannot pretend that what I have to say is in any sense final or that from the material at my command I can draw absolutely definite conclusions, but I will endeavor to indicate in what direction I imagine the road lies to a satisfactory solution of the problems.

I wish first to consider the condition of acute perforation of a duodenal or gastric ulcer. During the last year or two much has been written on this subject and I can present nothing new to you with regard to the diagnosis. I wish to lay stress however, on the following points.

Perforation of a gastric or duodenal ulcer is, with the exception of appendicitis, the most frequent acute abdominal lesion.

It is a condition in which the mortality is directly proportionate to the number of hours which have elapsed between the perforation and operative relief. This is well illustrated by my own cases. Up to the present date I have been called on to operate in 53 cases of acute perforation of a gastric or duodenal ulcer; of these 40 were duodenal and 13 gastric. Of the 40 cases of duodenal perforation, 27 patients

recovered and 13 died; of the 13 gastric ulcers 6 patients recovered and 7 died. Out of the 53 cases 24 patients were operated on within twelve hours of perforation, with 21 recoveries and 3 deaths, a mortality-rate of 12.5 per cent.; of these three patients one, who was an alcoholic, died of acute pneumonia and another died on the eighth day quite suddenly and from no ascertainable cause, the peritoneal cavity being quite clear. Of the remaining 29 patients operated on at various periods after the first twelve hours had elapsed, 12 recovered and 17 died, a mortality-rate of over 58 per cent.; a further investigation shows that in the cases of over twenty-four hours' duration, the mortality is close on 80 per cent., so that in reality the seriousness of the prognosis increases by leaps and bounds as every hour elapses. This fact has been frequently insisted on and is well borne out by the collective report of 200 cases of perforated duodenal ulcer, published by a number of Edinburgh surgeons in the *Edinburgh Medical Journal* of last year.

The imperative necessity for early operative interference makes it essential that the symptoms of perforation should be realized by the practitioner who first sees the case, for on his prompt diagnosis the fate of the patient depends.

That diagnosis is becoming more accurate is evidenced by my own cases, for of the last 13 patients, 12 were operated on within twelve hours and all but one of these recovered.

I would emphasize the importance of the following points in diagnosis:

1. The sudden onset of violent pain in the upper zone of the abdomen.
2. The short duration of symptoms of shock or collapse.
3. The board-like rigidity of the abdominal muscles, particularly above the level of the umbilicus; this rigidity is, in my experience, more marked than in any other acute abdominal condition and in itself is almost sufficient to justify the diagnosis.

Diminution of liver dulness and signs of free fluid are later in their appearance and should not be considered as in any sense necessary for diagnosis; it should be our endeavor to make a decision before they are manifest.

It is not my intention to consider differential diagnosis, for this has frequently been discussed, so I will at once proceed to the consideration of some points in the operative technic.

As soon as operation is decided on, it is my practice to give a hypodermic injection of $\frac{1}{4}$ grain of morphin. By this means the amount of anesthetic necessary to abolish the rigidity of the abdominal muscles is materially diminished and postoperative restlessness overcome.

I am a firm believer in the Fowler position, notwithstanding the fact that recent investigations appear to show that the physiologic reasons urged for its adoption were fallacious; clinical experience, I am convinced, justifies us in retaining it.

We have all patients in whom a perforation is suspected propped up in bed at once and conveyed to the operating-theater in this position. The operating-table is tilted, so that the patient's thorax is considerably higher than his pelvis, and afterward he is returned to bed in the same manner.

The abdomen is opened through the right rectus muscle and the existence of a perforation is deter-

* Read before the Section on Surgery, General and Abdominal, at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.