PROGRESS IN PEDIATRICS

RÉSUMÉ OF THE LITERATURE ON INFANT FEEDING AND DISEASES OF THE DIGESTIVE SYSTEM, FROM JULY, 1912, TO MARCH, 1913

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INFANT FEEDING

BREAST FEEDING

The importance of breast milk is the main topic of medical discussion in infant feeding. This is noticed in many articles.^{1, 6} Herrman¹ observed 139 babies for a year after birth. Eighty per cent. were breast-fed. Though six were premature, only 14 out of 139 died; a mortality under 10 per cent. Although one mother believed that her milk-supply was scanty, regular weighing showed steady gains in weight. Another baby, weaned because the mother left for operation, was later returned to the breast successfully. Griffith⁶ concludes that the ability of mothers to nurse their offspring is no longer materially decreasing; that conditions are improving among the well-to-do and not changing for the worse among the poor; and that the infrequency of nursing depends chiefly on the ignorance of the laity and the indifference of the physician. If the mother has not enough breast milk at first, Von Reuss⁷ advises using milk from another's breasts. Crookshank,⁸ who lays emphasis on the biological qualities of the food given the mothers, advises a wet-nurse as the best substitute for the mother. Sedgwick⁹ shows that about 80 per cent. of the wives of American physicians succeed in nursing their children three months or longer. Davis¹⁰ has collected a mass of mortality statistics to show the value of breast feeding. Risel and Schmitz¹¹ observed 824 infants during 1910, to whose mothers the city of Leipsic paid nursing premiums. No child who was nursed for three-fourths of its first year died during the first year. By test-feeding, Pritchard¹² shows that the amount of breast milk taken by infants is far below our usually accepted estimates. He, as well as Comroe,¹³ Morse,¹⁴ Brady¹⁵ and Ostheimer,⁵ advocates three-hour feedings, provided nutrition is well maintained. The advantages of longer feedings, according to Comroe,¹³ are absence of indigestion, regular gain in weight, gain in appetite, regular sleep and more time for the mother. Von Reuss⁷ advises only five or six feedings in twenty-four hours. Brady¹⁶ states that breast milk is most effective in raising the food tolerance, especially in summer diarrhea.

The difficulties of breast feeding are discussed by Beer.¹⁷ A baby may be too lazy to nurse. It is also common for neurotic women to suffer from intermittent muscular contraction in the breasts, causing periodic diminution of the milk-supply. In such cases a wet-nurse is of value, or supplemental feeding, as advised by McClanahan,¹⁸ should be begun. Von Reuss⁷ advises beginning supplemental feeding when the baby reaches 6 months and weaning totally at 9 months. Decherd¹⁹ begins to give the breast-fed baby one bottle daily on the eighth day of life; weaning is then possible, should it become necessary. Most physicians will object to this. Lust's²⁰ examinations of the breast milk from twenty-five women showed a milk sugar content of from 5.7 to 8.5 per cent. Schmid²¹ noticed dyspepsia in infants under 3 weeks of age when the mothers got about too early, because babies were fed every time they cried. For the baby's sake, therefore, the mother should be kept at rest for two weeks after delivery. Stolte²² noted, in infants who have lost much weight, that breast milk, even if given when the baby is recovering, may produce still further loss of weight. He considers it important to make the baby take enough breast milk to prevent further loss of weight. This amount, however, may cause diarrhea. Knox²³ found that babies of the working class could be kept well during summer heat of moderate intensity if their rights to mother's milk were not denied them. It is interesting to note that Peiser²⁴ was able to preserve the superfluous breast milk of wet-nurses with hydrogen peroxid, keeping it on ice, unspoiled, for as long as fifty-two days. Soxhlet²⁵ and Langstein and Edelstein²⁶ have investigated the iron content of human and cow's milk. They find in cow's milk on an average only one-third as much iron as in human milk, often only one-fifth and rarely somewhat over one-half. Therefore, artificially-fed infants may show pallor from the want of iron.

ARTIFICIAL FEEDING

CERTIFIED MILK

Certified milk is coming into general use. Tenney²⁷ speaks of the advantages of certified milk and the need for a Milk Commission in every city. Coit^{28, 29} and Van Derslice³⁰ also extol certified milk. Coit³¹ tells the standards of the American Association of Medical Milk Commissions; Newton³² discusses recent hygienic improvements in dairying; Nance³³ and Gamble³⁴ emphasize the value of "score-cards" in marking conditions at the farm; while Bell³⁵ describes the New York Sanitary Milk Dealers Association for the improvement of the milk-supply and the observance of state and municipal laws and regulations. This is a great advance over the conditions which existed formerly. Schorer³⁶ discovered that ordinary milk has more dirt, but fewer cells than certified milk. Rosenow³⁷ found, however, that certified milk may contain virulent streptococci and pneumococci, when epidemic sore-throat prevailed.

PASTEURIZED MILK

Jordan's article³⁸ is a strong defense of pasteurization. Morse^{39, 40} advises pasteurizing all except the cleanest milk. He states that it is impossible to determine whether babies fed continuously on pasteurized milk thrive better than those fed on raw milk, or whether the former are more apt to develop the diseases of nutrition. To pasteurize, he keeps the milk, divided into separate bottles, at 145 F. for 30 minutes. Winslow⁴¹ states that the only way to overcome the possibility of tuberculosis in milk is to pasteurize it; and the only safe pasteurized milk is that prepared at home. Rosenow³⁷ advises pasteurizing even certified milk when epidemic sore-throat is prevalent. Kilbourne⁴² has described a device for controlling the temperature to which the milk is heated during pasteurization.

BOILED MILK

Brennemann⁴³ continues advocating the use of boiled milk. There is no evidence to show that babies thrive less on boiled milk than on raw cow's milk. All foreign reports give good results. The hard, tough curds formed in the stools of infants fed on raw milk, with diarrhea and dyspepsia, disappear when boiled milk is given. The casein of raw milk, unless modified so that it will not form hard, large curds, offers serious difficulties in digestion that are not present in boiled milk. Plantenga⁴⁴ observed that infants fed on raw or boiled milk for a prolonged period showed more watery stools while on the raw milk. Milk boiled and utilized at once does not produce scurvy; but if boiled and kept over twenty-four hours, the milk probably will cause scurvy. Morse⁴⁰ advises boiling all except certified milk, in spite of the fact that cooking makes the milk somewhat less digestible and that its continued use predisposes to the development of the diseases of nutrition. Coit,⁴⁵ who reviewed the latest reports on boiled milk, concludes that the boiled milk of a foreign species gives better results than the same milk raw.

METHODS OF FEEDING

Fischer⁴⁶ advises common sense in feeding infants, avoiding all fads and studying the individual baby. He begins with diluted whole milk, one in five, with 5 per cent. maltose added. Then he increases gradually. Ostheimer⁵ advises beginning with whole milk diluted one in four, then one and a half in four, then half and half; then using the upper 24 ounces off the quart, half and half, then the upper 20 ounces off a quart, half and half. By this method, in the vast majority of instances, feeding has been successful. Torian⁴⁷ believes that the young infant should not ordinarily be fed on whole milk mixtures. Pritchard¹² advises beginning artificial feeding on low formulas. He even predigests the mixture at first. Torian⁴⁷ says that the calorie value of every mixture should be

calculated. To use both the caloric and percentage methods is the advice of Morse,¹⁴ and Everhard and Felker.⁴ Amos⁴⁸ quotes the rules formulated by Cheadle. Scott⁴⁹ feeds according to the age of the infant.

Ladd⁵⁰ has described a short method for calculating percentage modifications, using 16 per cent. fat cream and fat-free milk. He divides the fat percentage desired for a 20-ounce mixture by 0.8, which will give the number of ounces of 16 per cent. fat cream. He multiplies this number by 0.15, subtracts the result from the protein percentage desired and divides by 0.2, which will give the number of ounces of fat-free milk. He divides the sum of ounces of both cream and milk by 4, subtracts the result from the sugar percentage desired and divides by 2, which will give the number of level tablespoonfuls of sugar to be added. To calculate the diluent, he subtracts the sum of the cream and milk from the 20 ounces. Graphic feeding charts, one more complex than the other, are described by Smith⁵¹ and Cowie.⁵² Torian⁴⁷ considers it impossible to feed infants intelligently unless gross examination of the stools is made daily.

Much emphasis has recently been laid on educating mothers and young girls in hygiene and infant feeding. Cooley⁵³ considers that this education should be directed by the pediatricist. Knox²³ and Ostheimer⁵⁴ believe that a great aid to the physician is the instruction of mothers by nurses in the home, in the care, clothing and diet of infants. Levy⁵⁵ shows how poor milk and unscientific feeding keep the infant mortality high. With better milk and more scientific feeding, infant mortality should decrease. Freeman⁵⁶ describes the good work accomplished by the Infant Milk Depots in New York City.

FATS

Chapin⁵⁷ states that, while both fats and carbohydrates furnish energy and supply water to the infant metabolism, the fats supply more of the water than do the carbohydrates. This water results from the combination of the hydrogen from the fat with the oxygen from the blood. In milk feeding, the fats supply the greater part of the metabolic water. Brady¹⁶ notes that infants show great differences in their tolerance to fats and carbohydrates. Stolte⁵⁸ makes a plea for the use of higher fats instead of such high sugars. He has given from 5 to 7 per cent. fat, he claims, with good results. When fatty soaps are found in the stools, he adds milk sugar. Americans, however, will prefer the views of Eaton,⁵⁹ who reports eight infants gaining steadily in growth and weight on low fats, with comparatively high proteids. He admits that there are individual children who will do better on higher fats with lower proteins. It is most important to feed each infant as an individual. Morse¹⁴ advises relatively high fat and sugar with relatively low protein. Glaze-

brook⁶⁰ never feeds high fat mixtures. Towle and Talbot,⁶¹ who studied fat and carbohydrate indigestion in infants with acute inflammatory eczema, conclude that as all babies with indigestion do not develop eczema, some underlying systemic condition must exist in those in whom eczema appears. Huldshinsky⁶² shows that the amount of volatile acids remaining in the stomach contents of overfed infants with gastrointestinal disease is in direct proportion to the fat content of the food. These volatile acids do not injure a healthy stomach. They can only harm a stomach whose functions have already been affected.

CARBOHYDRATES

Brady⁶³ has written an interesting report of 170 institution babies fed on a mixture containing barley, dextrin, maltose and cane-sugar, with a total carbohydrate per cent. of 7.91. While ninety babies were breast-fed for two weeks, forty-five took this polycarbohydrate mixture from birth. Eighteen infants died, a mortality of 10½ per cent. Brady¹⁶ notes elsewhere that carbohydrates have the greatest influence in advancing the weight curve. Stolte⁵³ says that, although high sugar may cause gain in weight, the weight rapidly decreases if the baby develops even a mild infection. Johnson⁶⁴ reports diarrhea in three bottle-fed infants of 4, 7 and 9 months, in whom an excess of milk-sugar was the evident cause. He advises using mixtures without sugar at first, and later adding dextrimaltose. Torian⁴⁷ believes that sugar should compose 6 or 7 per cent. of the food. He advises no starch except a cereal diluent until the age of 1 year; then he begins starch gradually. Calvary⁶⁵ considers from 3 to 5 per cent. of sugar generally enough in an infant food. For well infants he prefers cane-sugar. For those with a tendency to diarrhea or during convalescence from gastro-enteritis, he uses dextrin and maltose; for those with a tendency to constipation, milk-sugar. While the baby cannot gain without enough sugar, too much sugar may cause severe intestinal disturbance. Southworth⁶⁶ considers combined dextrin and maltose of value in disturbances of digestion. Both milk and cane-sugar are still to be used, however. Morse⁶⁷ considers lactose preferable to maltose under ordinary conditions, as it is more slowly broken down and has, therefore, a more prolonged influence. The dextrin-maltose preparations can often be given earlier than lactose in diarrhea; but when the *Bacillus perfringens* and the gas bacillus cause acid stools, maltose is more harmful than lactose. Calvary⁶⁸ states that milk sugar is of as much value as the other sugars as regards gain in weight. Coit²⁹ lays emphasis on the use of a clean milk sugar, prepared from whey from fresh high grade milk. Crookshank⁸ advises cereals when the baby reaches 7 months. Pfersdorff and Stolte⁶⁹ show how well starches are assimilated in gruel form. Chapin⁷⁰ prefers to use cereal gruels by

converting the starch into dextrin or maltose by means of diastase. St. Philippe⁵ believes that constipation, with slowly developing gastrointestinal dyspepsia, is the principal danger from the abuse of cereals in infancy. Chapin⁵⁷ shows that the organism obtains the water from carbohydrates as a product of the splitting up of the carbohydrate. Salge⁷¹ observed a rapid loss of salts occur when an infant is fed on cereal foods. The composition of the blood changes, which is an unfavorable prognostic sign. The disturbances in the retention of salts and water by the organism explains the slight resistance of such children to infections. Meyer⁷² noted that babies fed on concentrated milk without water lose weight, but gain again when water is given. Samelson⁷³ tried to demonstrate that the so-called "salt fever" was due to bacterial toxins. Strauss⁷⁴ considers the "salt fever" due more to the sodium than to the chlorine ion. Von Reuss⁷ insists that infants need water soon after birth. The so-called "inanition fever" generally disappears when water is given freely.

PROTEIN

Holt and Levene^{75, 76} noted fever just as long as high protein diet was continued. They believe that 4.5 per cent. protein should never be given, except with whey. This confirms Vaughan's statement of fever following the subcutaneous injection of protein. Brown⁷⁷ and Wollstein⁷⁸ discuss changes noted in infants on high proteins. Eaton⁵⁹ noticed that infants did very well on low fats and comparatively high proteins. Torian⁴⁷ says that about 10 per cent. of the total caloric value of the feeding should be protein. Stolte⁵⁸ says that no baby will gain on high protein without enough sugar in addition.

ALBUMIN MILK: BUTTERMILK

Brady⁶³ reports that twelve among 170 asylum infants who did not gain on the polycarbohydrate mixture, did well on albumin milk. He considers a high protein necessary, though the fat is only to be increased when the baby fails to gain in weight. Friedlander and Greenbaum⁷⁹ state that sugar will be well tolerated after a period on albumin milk. Johnson⁶⁴ uses albumin milk in subacute and chronic diarrhea. Weston⁸⁰ considers albumin milk valuable in reducing infant mortality, especially in the fermental disorders of infancy. Brady¹⁵ states that it is of value, like Keller's malt-soup, because of its low fat, high protein and maltose. Cassel and Weill and Mouriquond are not enthusiastic about albumin milk. Cassel⁸¹ noted that it was not well taken by all infants and that the gain in weight was not steady. Weill and Mouriquond⁸² tried it on sixteen infants, ten of whom were ill. None died, while all the others lost weight and strength, had vomiting and digestive disturbances, and diarrhea developed in the healthy babies. Neff⁸³ gave a high percentage

albumin milk, made with buttermilk, with good results. In diarrhea, Morgan⁸⁴ prefers albumin milk in infants under 3 months; in others he uses buttermilk, after all acute symptoms have disappeared. Stolte²² and Schaps⁸⁵ report good results in diarrhea by feeding babies on buttermilk. Stolte⁸⁶ reports four cases in which he gave buttermilk in place of two or more regular feedings each day with success. He ascribes the good results to the low fat and the high lime and high protein content of the buttermilk. It is of value in infants who have lost much weight when they do not gain on breast milk alone. Peiser⁸⁷ describes an alkalinized kefir with which he claims success in acute intestinal disturbances in infants.

DESICCATED MILK

The controversy on the value of dry milk powder in infant feeding is still agitating French physicians. Aviragnet, Bloch-Michel and Dorlen-court, champions of this form of infant food, report twenty infants who did well. They consider desiccated milk better than any other form of milk for infants. Nageotte-Wilbouchewitch⁸⁹ agrees with their conclusions. But Variot, Zuber, Lavialle and Sédillot,⁹⁰ who observed fourteen infants, found that only six gained in weight. Diarrhea developed commonly. Variot⁹¹ insists that it is the cause of grave gastro-intestinal disturbance. Variot, Lavialle and Rousselot⁹² also report using sweetened condensed milk in twenty babies who vomited, with cessation of the vomiting. It is not to be given to atrophic infants; nor do they advise it when cow's milk can be obtained. Ausset⁹³ considers condensed milk of little value.

FEEDING AFTER FIRST YEAR

Yerington⁹⁴ advises four daily feedings after the baby reaches 1 year. He allows milk, well-cooked cereals and vegetables, zweiback or toast, scraped beef, baked potato, baked apple and apple sauce. Later he adds meats, finely cut up, soft-boiled or poached egg, custard, gelatin, etc. Many infants are overfed on fats and starches. Ostheimer⁵ prefers three daily meals; with meat, beef juice and broths only for weak, under-nourished infants. He lays emphasis on teaching every baby to masticate its food. Küsel⁹⁵ also states that all food requires thorough mastication. Nourishing food, containing calcium and magnesium salts, is needed early, such as cheese, milk, eggs, green vegetables and the natural mineral waters. Starch is worse than sugar as the exciting cause of dental caries. An excess of sour fruit or acids also has a decalcifying action on the teeth. Hutchison⁹⁶ lays especial emphasis on defective mastication and excessive carbohydrates as causes of dyspepsia. Dennett⁹⁷ advises three bottles and two meals for infants from 12 to 15 months of age. He thinks that babies of this age are fed too often, and are, therefore, never hungry. They frequently get too much cereal, soup and sugar.

Watson⁹⁸ ascertained by chemical analysis the food requirements of healthy children about 5 years old. He advises not to attach too much importance to the chemical composition of the food. In gouty children protein should be restricted; in tuberculous children, it should be increased. Food should be pure and hard enough to necessitate thorough mastication. Sugars and sweets should be restricted. Langstein and Kassowitz⁹⁹ recommend green vegetables and fresh fruits, even as early as seven months of age. They also advise powdered spinach and carrots, prepared with flour, sugar and milk.

FEEDING PREMATURE AND ATROPHIC INFANTS

Durham¹⁰⁰ considers breast milk essential for premature infants; also external heat and pure air. He reports a case, born at twenty-six weeks, weighing 1 pound, 12 ounces at birth. At 8 months she died of pneumonia. Rott¹⁰¹ uses a No. 9 or No. 10 catheter, 6 inches long, introduced into the esophagus when the infant is too weak to nurse. He feeds the baby from five to ten times in twenty-four hours. Of eighteen infants fed in this way only two died. He keeps them in an incubator until they weigh 2,000 grams. Wyatt¹⁰² reports eight successful cases of feeding premature infants. He begins on the third day with equal parts of cow's milk and a mixture containing water, cream, lactose and sodium citrate. He gives an ounce every two hours and more as soon as the baby will take it. Litzenberg¹⁰³ advocates four-hour intervals for premature infants. The relatively large amounts of nourishment required can be given without trouble. He reports fifteen cases with increase in weight, more sleep and less digestive disturbances by this method. Dennett¹⁰⁴ found that emaciated, atrophic infants required 150 to 170 calories per kilogram, while normal babies did well on 110 to 120 calories per kilo. Gray¹⁰⁵ keeps these infants warm, wrapped in flannel soaked with cod liver oil.

Little¹⁰⁶ considers a wet-nurse the best treatment for marantic infants, whose condition is often the direct result of improper feeding. Dunn¹⁰⁷ studied the feeding of infants with malnutrition, for four years. He first gives a fat-free food, with maltose and high casein, adding fat if the stools improve, but the baby fails to gain in weight. He prefers maltose to lactose. Glazebrook⁶⁰ believes that thymus gland may help atrophic infants. Morse¹⁰⁸ has reported four cases of what he calls intestinal toxemia in the new-born, a bacterial infection of the meconium, occurring twenty-four to forty-eight hours after birth, with the absorption of toxic products. On castor oil, withdrawal of all food and the administration of water, recovery follows. He also irrigates the bowels at the beginning. Breast milk should then be given. If cow's milk is given, it should contain much lactose, to change bacterial activity from the proteolytic to the fermentative type.

DISEASES OF THE DIGESTIVE SYSTEM

ESOPHAGUS

Morse¹⁰⁹ reports three cases of congenitally imperforate esophagus. He also describes two cases of stricture, with dilatation, and two cases of cardiospasm. Brennemann¹¹⁰ reports three cases of congenital atresia. Shukowsky and Baron¹¹¹ report a case, the esophagus ending in a blind sac, from which there existed a fistula into the trachea. Haus¹¹² reports performing an emergency operation, median esophagostomy, in a baby of 14 months, who had swallowed a garter-clasp, 1½ inches long. Theories to explain the origin of stenosis of the esophagus and intestine are discussed by Forssner^{113, 114} and Kreuter.¹¹⁵

MUCOUS GASTRITIS

Cautley¹¹⁶ discusses the treatment of mucous gastritis in infancy; diet and alkalies. When much mucus is secreted, lavage with an alkaline solution is advised. As food he uses sweet whey powder, 1 dram in 2 ounces of water; later he adds cream; then substitutes peptonized milk, and then milk and barley water. He prefers milk-sugar in these cases. In the habitual vomiting of infants, Sébilleau¹¹⁷ advises a tablespoonful of a 1.7 per cent. sodium citrate solution before each nursing or in each bottle.

CYCLIC VOMITING

Sandt¹¹⁸ considers cyclic vomiting a neurosis, found only in nervous children, often closely related to migraine. It is primarily due to the effect of certain exhausting or depressing influences on the nervous mechanism of digestion; the intestinal toxemia is secondary, possible only through the subsequent perverted function of the liver. In treatment attention should be directed to the general physical well being of the child rather than to the alimentary tract. Langmead¹¹⁹ considers cyclic vomiting due to some disturbance in metabolism. The cause may be a toxemia or infection derived from stomach or intestines, since gastrointestinal lesions are found *post mortem*; constipation or diarrhea is a precursor; marked indican reaction is found in the urine and decided changes in the liver. The possible danger of an anesthetic to children with cyclic vomiting should never be forgotten. Terrien¹²⁰ suggests that some adrenal condition may be the cause. In a child under 4 years of age, autopsy showed the liver large and fatty. To a child of 3 years he gave 1/1,000 of epinephrin by enema and vomiting ceased. When he gave this to a boy of 8 years twice each month, it apparently prevented recurrence.

GASTRIC ULCER

Cackovic¹²¹ states that 2.32 per cent. out of 172 cases of gastric ulcer operated on at Zagreb, occurred in children under 10 years of age and 7.55 per cent. in children under 15. These figures are probably too low,

since gastric ulcer must have existed early in many others, though diagnosis was only made later. In thirteen cases, with symptoms which appeared early in life, operation was performed years later; all except two recovered. Comby¹²² reports five cases of rumination in children between 2 and 4 years. To overcome this habit he advises toning up the nervous system and regulating digestion. Hutchison⁹⁶ advises change of air, corrected diet and hygiene in the treatment of the dyspepsias of childhood.

PYLORIC OBSTRUCTION

Cowie¹²³ has studied the significance of the "pyloric reflex." As the opening of the pylorus may be delayed by giving a normal infant an alkali, giving more alkali to an infant with hyperchlorhydria will effect the same result. The dose needed can be regulated by analyzing the stomach contents. Rapid recovery followed the controlled use of the alkali in Cowie's case, a baby of 8 months. The protein in the baby's food was cautiously increased, reaching nearly 2 per cent. three months after beginning treatment. Theoretically, high protein would be advisable in pyloric spasm or stenosis with hyperchlorhydria. Recovery means that conditions have been produced which are favorable to normal pyloric function. Pisek and Le Wald¹²⁴ exhibit twenty-four radiographs showing in cases of pylorospasm that food had already passed into the duodenum a few minutes after ingestion. When this is not found, true pyloric stenosis exists and the case needs surgical treatment. They advise radiographic study of every case of pyloric obstruction. Taylor¹²⁵ reports three attacks of pylorospasm in a boy of 2 years; Fischer¹²⁶ a case in a child of 14 weeks, with recovery on large and small doses of breast milk. Schäfer¹²⁷ reports a fatal case of pyloric stenosis, with the development of "hour-glass" stomach. Molloy¹²⁸ reports a similar condition in a baby 4 days old. Rammstedt¹²⁹ reports three cases of pyloric stenosis. He prefers Weber's pyloroplasty to gastro-enterostomy. Keefe,¹³⁰ who reports operating on babies of 4 and 5 weeks, also considers pyloroplasty the operation of choice. Lendon¹³¹ did posterior gastro-enterostomy in a boy of 6 weeks. Fredet and Tixier¹³² report gastro-enterostomy on a baby of 13 days, with recovery. Hipsley¹³³ examined six cases *post mortem*. While gastric dilatation was absent in four, three of whom had died after operation, it was found in the other two which had not come to operation. Louria¹³⁴ reports an interesting case of sudden projectile vomiting of a large amount, with great abdominal pain, rapid and severe distention, collapse, constipation and visible peristalsis due to acute dilatation of the stomach complicating pneumonia in a boy of 2 years. The patient recovered.

DUODENAL ULCER

Flesch¹³⁵ diagnosed duodenal ulcer during life in a baby of 3 months from the profound anemia and bloody stools. He believes that the lack of salts and inanition due to improper food led to autodigestion of the mucous membrane of the duodenum. He quotes Entz, who found eleven cases of duodenal ulcer in infants between 6 weeks and 6 months among 364 autopsies at the Children's Hospital, Budapest. Studies of the pancreatic ferments have been made by Hess^{136, 137, 138} by means of the duodenal catheter. The duodenal catheter has also been used in the diagnosis and treatment of pylorospasm by Putzig¹³⁹ and Hess.¹³⁸ The value of radiography in the diagnosis of duodenal ulcer is commented on by Pisek and Le Wald,¹²⁴ Means¹⁴⁰ and Cole.¹⁴¹

INTESTINES

Rosenstern¹⁴² observed that infants commonly fail to take enough food. He therefore recommends more frequent feeding. To some infants a stronger food may be given, with water by rectal or subcutaneous injection if there is diarrhea. Cautley¹⁴³ and Hutchison⁸⁶ discuss the treatment of intestinal dyspepsia. Abt¹⁴⁴ reviews the classification of gastro-intestinal diseases in ancient and modern times. Johnson¹⁴⁵ explains the development of the mucous membrane of the large intestine and vermiform process in the human embryo.

CONSTIPATION

That constipation is a common cause of gastro-intestinal disturbance in childhood is shown by Freeburg.¹⁴⁶ Grulee¹⁴⁷ advises against the routine use of cathartics in these cases, but advises suppositories. Massage may be of benefit. Weill¹⁴⁸ insists on regular daily bowel movements before the child goes to school. Bueri¹⁴⁹ advises using hot fomentations which regulate the circulation, combat congestion and stimulate function in the intestines.

DIARRHEA

Brady¹⁶ states that summer diarrhea is now explained as due to overstepping the tolerance limit, which has been lowered by excessive heat. By careful observation of the weight curve, temperature and general behavior of the infant, we can determine the tolerance limit. The causes of summer diarrhea in Spain are given by Suñer¹⁵⁰ as overfeeding, artificial feeding, food spoiled by heat, digestion lowered by heat, diminished bactericidal strength of intestinal secretions, increased bacterial growth due to heat and transmission of pathogenic germs by flies. As prophylaxis he recommends decreasing quantity of food during hot weather, encouraging breast feeding, aseptic artificial feeding, avoiding exposure to heat, and the use of screens. Morton¹⁵¹ considers the heat and the food the causes of summer diarrhea. Heim¹⁵² blames it on spoiled milk and salted

broths. The baby must be protected from the heat, given plenty of water and no salt soups. Royster¹³⁰ has collected statistics to show a definite relation between the mortality from summer diarrhea and the humidity rather than the heat alone. MacCarthy¹⁵⁴ and Venable¹⁵⁵ consider the food the chief cause of summer diarrhea. Allan¹⁵⁶ lays emphasis on flies, Bloch¹⁵⁷ reports a low mortality, 100 infants dying among 3,000 sick. Though fifty-eight were very ill, only six died. He gives water only, as long as alarming symptoms exist. He begins feeding with much diluted milk and gradually increases its strength. Rulison¹⁵⁸ begins with diluted skimmed milk. While all writers advise stopping food at once, Filiatreau¹⁵⁹ has had success on that alone. Initial doses of castor oil are advised by Morton¹⁵¹ and Heiman.¹⁶⁰ Johnson⁹⁴ says that drugs are not usually needed, though Connelly¹⁶¹ uses them. Morse⁸ uses alkalies in gastric, but not in intestinal indigestion. The treatment of ileocolitis is discussed by Botts;¹⁶² of cholera infantum by Hobbs.¹⁶³ Whey is advised by Frank;¹⁶⁴ albumin milk by Morgan,⁸⁴ Heiman¹⁵¹ and Abt;¹⁶⁵ buttermilk by Schaps,⁸⁵ Stolte⁸⁶ and Abt;¹⁶⁵ alkalized kefir by Peiser.⁸⁷ Clock¹⁶⁶ reports wonderful success in twenty-two cases of bottle-fed infants from 5 weeks to 10 months of age, seen in private practice, to whom tablets of the *Bacillus lactis bulgaricus* were given before and after feedings, while the food was not stopped in one case. Macé and Quinton¹⁶⁷ use the subcutaneous injection of sterile sea water with marvellous results. Schmidt¹⁶⁸ reports success with the insufflation of oxygen into the rectum and stomach in six out of nine infants so treated. Abt¹⁶⁵ discusses the abuse of cathartics, starvation and loss of heat. Long continued laxatives produce gastro-enteritis; even heart weakness may result from active purgation. Babies are often kept on too low a diet too long, and therefore show diminished resistance to infection. Sick babies must be kept warm. Overfeeding during the period of reconstruction and repair is as pernicious as starvation.

JAUNDICE

From a study of the "hematies granuleuses" of Cesar Demel in twenty-eight new-born infants, Maliwa¹⁶⁹ concludes that when these colored erythrocytes are found in large numbers, even though the baby is not jaundiced, icterus will probably develop; but when only a few are present, no jaundice will appear. In the former case jaundice develops as the erythrocytes disappear rapidly. Niemann¹⁷⁰ reports tests made on an infant with congenital stenosis of the bile-ducts, who died at nine months. Serious symptoms only appeared during the last month. The bile in infants has the same significance in fat absorption as in adults. Koplik and Crohn,¹⁷¹ in a case of congenital absence of the bile ducts, found nitrogen metabolism normal, but poor absorption of fat and defi-

cient splitting up of the neutral fats. Blakeway¹⁷² reports a most interesting case of congenital absence of the gall-bladder, associated with imperfect pancreatic development and imperforate anus. Niemann¹⁷³ considers catarrhal jaundice an infection, most common in Autumn. Huber¹⁷⁴ reports a case of acute yellow atrophy in a child of three years, ill only two weeks. Peiper¹⁷⁵ reports a case of malignant adenoma in a girl of 8 months, an overgrowth of embryonic tissue. Idzumi¹⁷⁶ reports a case of primary cancer of the liver in a boy of 7 months.

APPENDICITIS

A large number of articles have recently appeared on appendicitis in children. Stiven¹⁷⁷ considers operation imperative in children. If not operated on within twenty-four hours, infection becomes general. Complications are less frequent in children than in adults. Deaver¹⁷⁸ reports operating on 100 children. Fifty-six had been vigorously purged; of these, 86 per cent. showed serious lesions; 12 had diffuse peritonitis. There was perforation in 22, gangrene in 15, acute ulceration in 6, peri-appendicular abscess in 4, acute catarrhal inflammation in 8, with an indefinite condition in 1. Among the 44 children who had not been purged before admission, only one case of perforation occurred and 8 cases of gangrene. Only one died. Cumston¹⁷⁹ says the prognosis is poor, because the condition is not recognized or is only recognized too late. Sonnenburg¹⁸⁰ considers chronic appendicitis more frequent than acute. The common symptoms are constipation, headache and digestive disturbances. Colitis is often due to appendicitis. He advises prompt removal of the appendix. Lereboullet¹⁸¹ also discusses chronic appendicitis. Fowler¹⁸² reports 179 cases of acute appendicitis in children under 12, with operation. Twenty died. Cautley¹⁸³ cautions the physician about calling in a surgeon at once in every doubtful case. Mitchell¹⁸⁴ operated on 40 children between 14 months and 13 years of age. Ten died. Clarke,¹⁸⁵ among 33 cases, had 9 children under 12, two of whom died. Mummery¹⁸⁶ has never seen acute appendicitis in children under 5 years. Wade¹⁸⁷ believes more children are affected than is commonly estimated. Attacks are either very mild or very severe. Both Mummery and Wade advise early operation. Wahle¹⁸⁸ reports what he considers appendicitis in a girl of 3 and a boy of 5 years, within one week. He believes this was an acute infection. Both recovered without operation. Fairbanks¹⁸⁹ says that appendicitis is much more apt to lead to abscess or general peritonitis in children than in adults. Thread-worms play a not unimportant part in the etiology. Green¹⁹⁰ reports three cases in which seat-worms were found in the appendix at operation. Rheindorf¹⁹¹ concludes that oxyuris is found in a large percentage of cases of appendicitis in children. Brun¹⁹² found ascarides in the appendix in three cases at herniotomy.

He advises postponing all operations if a preliminary purgative discloses the presence of ascarides. Remsen¹⁹³ operated on an infant 16 days old for appendicitis occurring in the sac of an inguinal hernia. Becker¹⁹⁴ found appendicitis in an incarcerated left-sided inguinal hernia in an infant of two months. He says this is much more rare than on the right side. Neuwalt¹⁹⁵ reports operating on a girl of 8 months for intussusception with appendectomy. Five months later laparotomy was performed again for adhesions. The baby recovered after each operation.

INTESTINAL OBSTRUCTION

Edmunds¹⁸⁶ considers congenital malformations the common cause of acute intestinal obstruction in children, especially absence of the greater part of the intestine, imperforate anus and Meckel's diverticulum. Other causes may be tuberculosis, cysts, hernia, foreign bodies and appendicitis. Children stand laparotomy poorly. Mummery¹⁸⁶ discusses acute obstruction, appendicitis and intussusception. Early diagnosis and early operation are advised. Kock and Oerum¹⁹⁷ report 397 cases of intussusception in children, 288 in infants under a year. They also advise early operation. Woolfenden¹⁹⁸ reports performing enterostomy for intussusception in a boy of 3 months twenty-seven hours after the onset of symptoms, with recovery. Horsley¹⁹⁹ reports three cases in children under 1 year and one in a child of 3 years. Barling²⁰⁰ reports operating for intussusception in a boy of 4 years, who had Henoch's purpura, with recovery. Power²⁰¹ showed a boy of 5½ years, with irreducible intussusception due to sarcoma. He recovered after the operation, but a week later a mass was found near the right nipple. Gaardlund²⁰² reports two cases of invagination, one in a boy of 14 years, with Meckel's diverticulum, recovering after operation; the other in a girl of 4 months, ending fatally. Three cases of intussusception with Meckel's diverticulum are reported by Brennecke.²⁰³ Grigsby²⁰⁴ reports three cases of imperforate anus with one death. Weber²⁰⁵ operated on a baby 15 days old with atresia of the duodenum, with death seven hours later. Bell and Le Wald²⁰⁶ report a case of chronic colitis in a child of 3 years, with great deformity of the sigmoid, as shown by radiographs. Aitken²⁰⁷ reports an unique case of doubling of the intestine, occurring in an infant with a large congenital umbilical hernia, extensively ulcerated, who died when 2 days old. The ileum bifurcated, forming two separate tubes of equal caliber, 17 cm. long, ending on opposite sides of a conical cecum, which had a deep longitudinal sulcus and a small appendix 2 cm. long at the end of each side. Smester²⁰⁸ reports thirty years of success in the treatment of umbilical hernia in infants by piling up strips of adhesive plaster after reducing the hernia and approximating the edges of the ring. Over this plaster he paints collodion. Elting²⁰⁹ reports a case of fistula in ano in a baby

of 10 months. He has seen a second case in a child under 10 years. Vidakovich²¹⁰ describes an adhesive plaster bandage over the buttocks for preventing prolapse of the rectum. Von Sury²¹¹ tells of a baby dying twenty-four hours after having an enema given by a midwife when but 12 hours old. The autopsy showed the intestine ruptured, with peritonitis. The author believes that rupture occurred before birth, yet many readers will consider the enema the cause.

INGUINAL HERNIA

Ochsner²¹² believes that approximately 95 per cent. of inguinal hernias in childhood will heal spontaneously if the intra-abdominal pressure is relieved and the sac kept empty. Rest in bed is better than a truss. Operation is indicated in strangulated hernia, irreducible hernia due to adhesions, congenital hernia if unusually large, irreducible hydrocele and in some cases of undescended testicle. Meredith²¹³ and Savariaud²¹⁴ advise early operation. Nicholls²¹⁵ reports operating on a strangulated hernia in an infant of 8 weeks with recovery. Collins²¹⁶ reports a similar case. Appendicitis in a hernia sac is described by Remsen¹⁹³ and by Becker.¹⁹⁴

INTESTINAL FLORA

After thorough investigation, Veeder, Kilduffe and Denny²¹⁷ found dysentery micro-organisms in about 20 per cent. of cases of ileocolitis in infants. Dysentery organisms are only present as a predominating type in severe cases, and it is in these cases that the distinctive lesions of dysentery are found *post mortem*. Friedlander and Greenbaum⁷⁹ found the same intestinal flora in infants when fed on ordinary milk mixtures and on albumin milk. The latter, given for a short period, causes acidophilic to replace putrefactive organisms and rests the gastro-intestinal tract by reason of its low sugar content. Simonds²¹⁸ reports an epidemic of thirty-four cases of bacillary dysentery. Twelve died, all under 4 years, eight before the sixth day. Graham²¹⁹ reports a case of bacillary dysentery, Type Y, in a 6-months old infant in India, with recovery after three injections of Shiga serum. Meilo Leitao²²⁰ found 7 cases of flagellate dysentery among 32 children under 10 years of age. The youngest was 2 months old, breast-fed. It is a benign affection, not dependent on the food. Murphy²²¹ found intestinal worms in only seven out of 102 children between 2 and 12 years of age, whose stools he examined. Eosinophilia was not constant. Rémy²²² describes the Triboulet and Pettenkofer methods of examining feces, with a discussion of the results obtained by each method.

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