PROGRESS IN PEDIATRICS

RECENT WORK IN ANATOMY, PHYSIOLOGY AND PATHOLOGY OF INFANCY AND CHILDHOOD

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BALTIMORE

ANATOMY

Significance of Striations in Muscle.—Lewis,¹ in some studies on the cells of heart muscle from very young chick embryos, arrives at some conclusions that are of far reaching application. She finds it possible to study with satisfaction the living cells of heart muscle from embryos of ten myotomes. In these cells she finds that complete cross striations are present, and much earlier than has been supposed by other observers. Cross striations are present, but not fibrils. The cross striations are very thin bands on the surface of the cell. They extend across the cell and never appear as narrow threads or fibrils. Fixation of the cell causes the formation of the surface layer into fibrils on which the cross striations are drawn together into deeper bundles, and then become evident as sharply marked structures. In places where the pull on the surfaces of the cell is such that they are not coagulated into fibrils, the cross striations remain spread out as thin bands extending across the cell. No structure resembling the fibrils of the fixed preparation was present in the living heart muscle at any of the ages studied.

"The physiologists have endeavored without success to formulate a theory, based on the myofibrils, to account for the contraction of the muscle cells. It is not surprising that such a theory has not proved satisfactory, at least in regard to the heart muscle, since the structure on which it was based is not a part of the living heart muscle cell, but only of the dead cell. In other words, a cell containing the structure on which it was attempted to build the theory is not capable of undergoing contraction."

The ossification centers of the fetal pelvis receive further consideration from Rosmark.²

R. Taylor³ contributes measurements obtained from 250 full term, newly born infants.

1. Lewis, M. R.: The Development of Cross Striations in the Heart Muscle of the Chick Embryo, *Bull. Johns Hopkins Hosp.* **30**:176, 1919.

2. Rosmark, T.: The Ossification Centers of the Fetal Pelvis, *Am. J. Obst.* **78**:175, 1918.

3. Taylor, R.: Measurements of 250 Full Term New-Born Infants, *Am. J. Dis. Child.* **17**:353 (May) 1919.

Scammon⁴ points out that while accumulated data regarding the growth of gastric capacity have been summarized from time to time in the studies of Pfaundler, Borie, Marfan and Figueira, it is now more than fifteen years since the last attempt at a synthesis of this material. Much valuable new material has accumulated. The material is presented by Scammon in an article that is replete with graphs and references to statistics.

The question of growth of gastric capacity has been approached from many angles, and it is noteworthy that graphic curves based on the data obtained by different methods are of the same general type. Curves of gastric capacity show an initial stage of rapid rise (during the first month of life) followed by a much longer stage in which the rise is slower and without important changes in rate. It is found possible to represent the curves by certain empiric formulas of a single type. In these formulas gastric capacity equals a numerical value plus a multiple of the age of the child expressed in weeks.

PHYSIOLOGY

Metabolism.—Olmstead, Barr and Du Bois⁵ report further studies on the metabolism of growing boys. Two years ago Du Bois reported figures showing that the metabolism in boys 12 years of age is 25 per cent. higher than for an adult of the same height and weight. (As since expressed in other figures by Lusk: The basal metabolism of an average boy, 13 years of age, 4 feet 10 inches in height, and weighing 80 pounds, may be calculated as 1,525 calories a day. This is the same as that of a man, 25 years of age, weighing 126 pounds, and 5 feet 2 inches in height.) It is generally accepted that metabolism is relatively high during childhood, falling rapidly in adolescence, and then decreasing slowly during the rest of life. Du Bois has been fortunate in being able to reexamine certain of the boys whom he had previously studied, some of them now exhibiting signs of puberty. He finds a marked decrease in metabolism, a decrease of 13 per cent. per unit of body surface, for the seven boys studied. The metabolism is, however, still 11 per cent. above the average for adult men between 21 and 40 years of age, and about 4 per cent. above that of adult women.

The Stomach.—F. W. White⁶ has studied the effect of stimuli from the lower bowel on the rate of emptying of the stomach. Studies were

4. Scammon, Richard E.: Some Graphs and Tables Illustrating the Growth of the Human Stomach, *Am. J. Dis. Child.* **17**:395 (June) 1919.

5. Olmstead, W. H., Barr, D. P., and Du Bois, E. F.: Clinical Calorimetry, Paper 27, Metabolism of Boys Twelve and Fourteen Years Old, *Arch. Int. Med.* **21**:621 (May) 1918.

6. White, F. W.: The Effect of Stimuli from the Lower Bowel on the Rate of Emptying of the Stomach, *Am. J. M. Sc.* **156**:184, 1918.

made on men, and, experimentally, on cats. The effects of various irritative lesions were studied. Delay in emptying a barium meal from the stomach was found to be the exception; strong stimuli were needed to slow the stomach. Marked delay in emptying the stomach is far more often the result of actual lesions about the pylorus than of reflexes from the bowel. The stomach emptied itself within the normal time in some cases of ileac stasis of two or more days' duration, and in most cases with good sized twelve hour residue in the ileum, also when the colon was distended with a large enema, also in most cases of chronic appendicitis and chronic inflammations and tumors of the colon. These gastric symptoms in intestinal cases are not, as a rule, the result of slow emptying of the stomach.

Sauer⁷ has utilized thick farina feedings in twelve cases of pyloric stenosis in infants. In all but one case the effect of thick feedings was striking. In eleven of the twelve cases the vomiting soon stopped, although in most of the patients the peristaltic waves and the tumor (where palpable) persisted for weeks or months after vomiting ceased. The infants were seen when from 6 weeks to 2 months of age. The feeding was prepared as follows: One part of farina in seven parts of fluid (three parts of milk to four of water) was boiled in a covered double boiler for one hour. Such a food contains about 15 per cent. of cereal. Salt and sugar may be added. The infants are placed on the right side after feeding, and disturbed as little as possible. Small supplementary fluid feedings are added later.

The Intestine and Drugs.—A. Galvani⁸ considers the administration of epinephrin. He remarks that the soft and elastic arteries in children, and the integrity of the cardiovascular and other systems, render epinephrin peculiarly effective in pediatric practice. He reviews the indications for it, the dosage, etc., as published by various writers. When especially prompt action is necessary, it may be administered subcutaneously, from 0.5 to 1 c.c.; but, except in urgent cases, he advocates administration by mouth, from 10 to 30 drops of the 1:1,000 solution. Its action is more protracted by mouth, and abrupt changes in the circulation are avoided. It is thought to stimulate the centers, possibly by way of the sympathetic system. The effect of the drug on the musculature of the intestines, Galvani notes, is yet undecided. Lesné, in 1912, reported that a given dose of epinephrin injected into the rectum of rabbits caused death, but not so rapidly as when a like dose was injected subcutaneously. The same dose introduced into the stomach or small intestine seemed entirely harmless.

7. Sauer, L. W.: The Use of Thick Farina in the Treatment of Pyloric Stenosis, *Arch. Pediat.* **35**:385, 1918.

8. Galvani, A.: *Rivista di Clinica Pediatrica* **16**:225, 1918.

Binet⁹ in a review of the literature, concludes that epinephrin has an undoubted modifying action on the vascularization, secretion and motor functioning of the digestive tract, and states that digestive disturbances from suprarenal insufficiency are known. Administered by mouth, epinephrin does not seem to display a toxic action; it does not appear to be acted on by pepsin or trypsin or passage through the intestinal capillaries. Administered by rectum, it is powerfully toxic. The writer ascribes this to the close anastomoses between the hemorrhoidal veins and the portal vein, the liver being apparently the barrier which arrests the ingested epinephrin.

Alvarez¹⁰ has studied the action of drugs on different parts of the intestine. Other work convinced him that there are marked differences in the neuromuscular apparatus in different parts of the tract. He made use of segments of rabbit's intestine placed in warm aerated Locke's solution, and tested a great variety of drugs. He found that some drugs stimulated all parts equally; some stimulated in small doses but depressed in large doses; some depressed or stimulated after an opposite initial effect; some acted more powerfully in one part than another; a few actually stimulated one end and depressed the other. Epinephrin stimulated. Mercuric chlorid generally stimulated the colon less than the small intestine.

Dudodenum.—E. G. Grey¹¹ has shown that in the dog it is possible to remove the duodenum, transplanting the major pancreatic duct to the jejunum, and have the animal enjoy comparative good health for at least nine and one-half months, provided the pancreas and the liver continue actively to discharge their secretions into the intestinal tract. He thus refutes the conclusion of Stasoff that the duodenum is essential to life. The operation must be done in several stages, but every trace of the duodenal mucosa and approximately all of the muscular coats can be removed without embarrassing the vascular supply of the pancreas. Withdrawal of the alkaline juices from the duodenum, without removal of the tract, not infrequently leads to the formation of peptic ulcers.

Lactation.—E. L. Cornell¹² reports observations on the effect of placental tissue as a galactagogue. He says that 87 per cent. of the babies whose mothers had received placental tissue began to gain on the fourth and fifth days, against 69 per cent. whose mothers did not

9. Binet, L.: L'Action de l'Adrenaline sur le Tube Gastro-Intestinal, Presse méd. **26**:407, 1918.

10. Alvarez, W. C.: Differences in the Action of Drugs on Different Parts of the Bowel, J. Pharmacol. & Exper. Therap. **12**:171, 1918.

11. Grey, E. G.: Duodenectomy; Its Effect on the Life of an Animal. Transplantation of the Pancreatic Duct, Surg., Gynec. & Obst. **28**:36, 1919.

12. Cornell, E. L.: Placental Tissue as a Galactagogue, Surg., Gynec. & Obst. **27**:535, 1918.

receive this medication. Forty-four per cent. of the babies regained their birth weight before leaving the hospital, against 24 per cent. who did not.

Milk.—The presence of citric acid as a normal constituent of cow's milk was reported by Soxhlet in 1888. Sommer and Hart¹³ have recently isolated and identified the compound anew. They find that it amounts to approximately 0.2 per cent. of the milk, or 2 per cent. of the milk solids. Citric acid is a recognized constituent of various "acid" fruit juices and vegetables, and to its presence in them some have ascribed their antiscorbutic properties. Sommer and Hart, therefore, studied the effect of heat on the citric acid content of milk. They find that it is not destroyed even by autoclaving the milk; nor are the citric acid salts of milk changed to an insoluble form by heating.

Bosworth and Giblin¹⁴ report the preparation of a considerable quantity of pure casein from human milk. It is found to have the same nitrogen, phosphorus and sulphur content as casein prepared from cow's and goat's milk; it has the same degree of valency and gives the same series of salts with bases; it has the same molecular weight; it is acted on by rennin in the same manner; the paracasein produced by the action of rennin is similar to the paracasein produced by the action of rennin in the casein of cow's milk.

Van Slyke and Baker¹⁵ describe a method of preparing pure casein from milk which is practically quantitative.

Barley.—Steenbock, Kent and Gross¹⁶ present the results of experiments with barley in feeding growing animals. Barley alone does not meet the needs of the growing animal. It contains an abundance of water soluble vitamin, but is deficient in fat-soluble vitamin. The addition of butter-fat improves its growth promoting quality to some extent. Of single additions, a salt mixture, by satisfying the demands of the animal for elements in the group, calcium, chlorin and sodium, exerted the most beneficial effect. Where salts, protein and fat-soluble vitamin were all added, normal growth, reproduction and raising of young became possible.

13. Sommer, H. H., and Hart, E. B.: The Effect of Heat on the Citric Acid Content of Milk. Isolation of Citric Acid from Milk, *J. Biol. Chem.* **35**:313, 1918.

14. Bosworth, A. W., and Giblin, L. A.: The Casein of Human Milk, *J. Biol. Chem.* **35**:115, 1918.

15. Van Slyke, L. L., and Baker, J. C.: The Preparation of Pure Casein, *J. Biol. Chem.* **35**:137, 1918.

16. Steenbock, H. E., Kent, H. E., and Gross, E. G.: The Dietary Qualities of Barley, *J. Biol. Chem.* **35**:61, 1918.

Calcium and Metabolism.—Sherman, Gillette and Pope,¹⁷ and other co-workers, in a series of very careful and prolonged balance experiments, have shown that, in general, an average of 0.45 gm. (about 7 grains) of calcium per adult man per day represents approximately the minimum maintenance requirement for normal nutrition. This amount of calcium is contained in a pint or less of milk; there is less proportionately in meat or common cereals. Though calcium is the most abundant inorganic element in the body, the bones particularly forming a large store of it, nevertheless, as Osborne and Mendel¹⁸ have recently emphasized anew, the supply of calcium cannot long be neglected with impunity in the diet of individuals that have a special need for it, as is true in growth and during gestation and milk production.

The mode of absorption of fats from the alimentary tract has long been a matter of controversy. The present view is that fats are chemically split in the gastro-intestinal tract into fatty acids and glycerols. The fatty acids react readily with bases to form soaps, and as such pass through the intestinal mucosa with varying degrees of facility. The soaps of sodium and potassium are somewhat soluble; those of calcium and magnesium tend to be insoluble. In the case of infants particularly the soaps of calcium are found in the stools. When present in large amounts, or accompanied by other symptoms, the appearance of soap (fatty curds) in the feces has been interpreted as evidence of faulty digestion of fats, or of "fat intolerance," and, as a rule, the amount of fat in the infant's food has been greatly reduced, and often with apparent improvement.

Recently the matter has been approached from a different angle by Bosworth, Bowditch and Gilbin.¹⁹ They note that the calcium content of cow's milk is proportionately higher, compared with the other nutrients, than that of breast milk, a relation which is not altered by merely diluting the milk. This is true also of the phosphoric acid. Both the substances, when fed to infants in the proportions found in cow's milk or in modified cow's milk, are greatly in excess of the amounts supposedly required to supply the demands of the infant, and hence are eliminated either in the urine or in the feces. As the calcium metabolism of bottle fed infants, as measured by the calcium eliminated

17. Sherman, H. C., Gillette, L. H., and Pope, H. M.: Monthly Metabolism of Nitrogen, Phosphorus and Calcium in Healthy Women, *J. Biol. Chem.* **34**:373, 383, 1918.

18. Osborne, T. B., and Mendel, L. B.: The Inorganic Elements in Nutrition, *ibid.* **34**:131, 1918.

19. Bosworth, A. W., Bowditch, L. H., and Gilbin, L. A.: Studies, etc., Calcium in Its Relation to the Absorption of Fatty Acids, *Am. J. Dis. Child.* **15**: 397 (December) 1918.

in the urine, is seldom greater, and often less, than found in breast fed infants, it appears that the excess of calcium must be eliminated in the feces, mostly as insoluble calcium phosphate and calcium soaps, or be ingested at the risk of entering the body fluids and tissues in organic combination and, perhaps, subsequently setting up a toxic condition.

Bosworth, Bowditch and Giblin have, therefore, devised a method by which they reconstruct cow's milk so as to remove much of the calcium. By the use of this reconstructed milk they think they have obtained favorable results in certain cases otherwise difficult to manage dietetically, and in cases classified as "fat intolerance" and "infantile atrophy." Reports of further work by these authors will be awaited with interest.

Meantime, Holt, Courtney and Fales²⁰ have attacked certain of these contentions. They deny that a high calcium intake necessarily causes a serious loss of fat in the feces. Great reduction of the calcium content of the food of infants may, on the other hand, be attended with considerable risk. These authors are of the opinion that it has yet to be demonstrated that infants fed on simple dilutions of cow's milk do not retain an adequate amount of fat, when the stools are formed, or semiformed and soapy. They warn that unless the harm caused by a fairly high calcium intake can be demonstrated quite definitely it would be safer to allow an excess of calcium in the intake rather than to run any risk of providing less calcium than is needed for the normal growth of the bones. The large calcium requirement of children with a tendency to rickets is mentioned; as is also the occurrence of tetany and rickets in children too long fed exclusively on breast milk.

Sato²¹ reports experiments made with the same malt preparation on the same child to determine whether the beneficial effect on the calcium retention attributed to malt extracts is due to the extract itself or to the added alkali. He found that the addition of alkali to milk produced no favorable effect on the retention of calcium, but distinctly an unfavorable one. Malt extract alone appeared to act beneficially on calcium storage. Malt extract to which a considerable amount of alkali has been added seemed to act unfavorably. Thus, if malt soup has a favorable effect on calcium metabolism, it is not as the result of the alkali originally contained in it or added to it.

20. Holt, L. E., Courtney, A. M., and Fales, H. L.: Is the Amount of Calcium Usually Given in Dilutions of Cow's Milk Injurious to Infants? *Am. J. Dis. Child.* **16**:52 (July) 1918.

21. Sato, A.: The Effect of Alkali and Malt Preparations on the Retention of Calcium in Infancy, *Am. J. Dis. Child.* **16**:293 (November) 1918.

Givens²² and McClugage and Mendel²³ have studied two other phases of calcium metabolism experimentally (in dogs). The former, as the result of new experiments, is able to confirm his previous statement that ingested hydrochloric acid is without marked influence on the calcium and magnesium metabolism of the dog. There is an increased urinary elimination of calcium after ingestion of acid, but the absolute amount of this increase is not sufficient to affect to any noticeable degree the calcium balance.

McClugage and Mendel show that, in dogs at least, the calcium in milk is better utilized than that in calcium phosphate, and the calcium in spinach and carrots was poorly assimilated as compared with that in milk.

The outcome of analogous studies in infants, if such are possible, will be of interest. During the past two decades it has become increasingly the practice in infant nutrition to introduce suitable garden vegetables, such as carrots and spinach, into the infant's dietary, and this more especially where the onset of rickets was feared. Recently Courtney, Fales and Bartlett²⁴ presented some analyses showing the effect on these vegetables of the method of cooking employed. It is understood that they are comparatively rich in calcium, and their supposed value has been attributed in part to their effect on mineral metabolism.

Goldschmidt and Dayton²⁵ have studied the effect of sodium, calcium and magnesium salts on the absorption of sodium chlorid in the intestine. They find the colon is not characterized by a strictly one-sided permeability. Toward solution of sodium sulphate it behaves like a semipermeable membrane.

Further work by Bosworth and Bowditch²⁶ bears on the absorption of calcium. They report experiments to show that the ingestion of large amounts of calcium and its absorption as organic salts, if unaccompanied by the ingestion of sufficient phosphorus or chlorin to form soluble salts, may lead to an accumulation of calcium in the tissues, to be followed by a toxic condition and the elimination of

22. Givens, M. H.: Studies in Calcium and Magnesium Metabolism, etc., *J. Biol. Chem.* **35**:241, 1918.

23. McClugage, H. B., and Mendel, L. B.: Experiments on Utilization of Nitrogen, Calcium, and Magnesium, etc., *ibid.* **35**:353, 1918.

24. Courtney, A. M., Fales, H. L., and Bartlett, F. H.: Some Analyses of Vegetables Showing the Effect of the Method of Cooking, *Am. J. Dis. Child.* **14**:34 (July) 1917.

25. Goldschmidt, S., and Dayton, A. B.: The Mechanism of Absorption from the Intestine. I. Colon. One-Sided Permeability of Intestinal Wall to Chlorid, etc., *Am. J. Physiol.* **48**:419, 1919.

26. Bosworth, A. W., and Bowditch, H. I.: Infant Feeding. High Protein Feeding vs. High Calcium Absorption as a Cause of Increase of Body Temperature in Infants, *Am. J. Dis. Child.* **16**:279 (November) 1918.

calcium lactate in the urine. An accompanying high protein content in the food (a synthetic one) they thought responsible only to the extent that it might be a carrier of calcium in the form of calcium caseinate. Once in the body it was thought the calcium might act itself, or as a salt, possibly calcium oxalate.

PATHOLOGY

Of Schoolchildren.—In New Jersey, during the school year 1917-1918, 21,263 children were examined.²⁷ Of this number only 6,243 were reported to be normal, 15,020 were reported to be subnormal, or approximately 75 per cent. of the total number; 4 per cent. were found to be suffering from malnutrition; 5 per cent. from enlarged cervical glands; 15 per cent. with defective vision; 3.5 per cent. with defective nasal breathing; 5.5 per cent. with defective teeth; 8.5 per cent. with enlarged tonsils; 1.25 per cent. with impediment of speech.

As usual, the subnormal children were found to suffer chiefly from defects of vision, from unhealthy conditions of the adenoids and tonsils, and from faulty nutrition. It is obvious that wide latitude must be allowed to individual examiners as to what constitutes an abnormal condition of the adenoids and tonsils.

Malnutrition.—The Dunfermline scale groups children as I, II, III, IV, according to the state of their nutrition, and is based on their appearance only. Holt,²⁸ in a criticism of the figures given out by the New York Department of Health, writes that observations which do not take account of height and weight cannot be relied on as determining the child's nutrition. Figures based on inspection, and made without removing the clothing, cannot be accepted as accurately representing the amount of malnutrition existing among schoolchildren.

Anamolies.—Massini²⁹ reports the occurrence of an ectromelic monster. The roentgenograms of his case confirm the assumption that the so-called amputations are in reality malformations. The limbs show different malformations above the supposed amputation from constricting bands.

D. M. Greig³⁰ describes an instance of congenital tumor of the frontonasal region. The tumor was pyriform in shape, thick skinned, reddish, 1½ inches in length, and dependent from the region of the left frontonasal suture. It had a translucent appearance, its surface was glazed and smooth, and it was of a somewhat soft consistency.

27. Public Health News (New Jersey), 1918; Abst. J. A. M. A. **72**:1289 (May 3) 1919.

28. Holt, L. Emmett: "Erratum," Arch. Pediat. **35**:512, 1918.

29. Massini, J. C. L.: *Semana méd.* **25**:365, 1918.

30. Greig, D. M.: Two Cases of Unusual Congenital Abnormalities, Edinburgh M. J. **11**:384, 1917.

It could not be diminished by pressure, and there was no evidence that it communicated with the interior of the cranium. A large double hare-lip and cleft palate, more marked on the left side, was also present. The tumor was readily removed under general anesthesia, and was reported to be composed of "fibrous tissue, unstripped muscle, etc."

A. Brown Kelly³¹ describes a teratoid growth on a hairy polypus of the rhinopharynx in a 6-weeks-old female infant. The tongue-like growth was first noticed when the baby was one week old, and had been getting bigger and more troublesome. It was more than 2 inches in length and $\frac{1}{2}$ inch wide in its thickest lower part. It was attached by a slender pedicle to the left side of the rhinopharynx, and frequently protruded from the mouth. The soft, fleshy body was covered with skin, stratified squamous epithelium, provided with numerous fine hairs; the underlying connective tissue was of a loose rudimentary character, with two or three minute glands; the central and larger portion of the polypus was composed of tissue closely resembling fat.

Greig³² reports an instance of congenital Dupuytren's contraction of the fingers. This was observed in a well developed male infant, aged 5 weeks. The mother had noticed since birth a difficulty in getting the child's palms washed, in that she was unable to get the fingers extended. On careful examination under general anesthesia the condition was apparently not a tendinous affection, and there was no evidence of any abnormality in the growth, or peculiarity in the innervation of the muscle. The lesion appeared to involve the skin and the subcutaneous and deep fascia, and to be similar to the condition known as Dupuytren's contraction in adults.

Influenza.—During the recent pandemic of influenza the occurrence of a form of severe croup closely resembling clinically a true diphtheritic croup, but without the presence of the Klebs-Loeffler bacillus, was noted by a number of writers. Coray³³ relates that during the severe wave of influenza at Zurich many children developed laryngeal stenosis, and in one half of his eighteen cases emergency treatment was required. The resemblance to true diphtheria was so deceptive that it seemed antitoxin should be given as a routine measure in such cases, although it probably had no influence on the influenza. Coray was unable to find any mention of croup with influenza in the records of the 1890-1891 epidemic.

31. Kelly, A. Brown: Teratoid Growth on Hairy Polypus of the Nasopharynx, Brit. J. Child. Dis. **15**:226, 1918.

32. Greig, D. M.: Two Cases of Unusual Congenital Abnormalities, Edinburgh M. J. **11**:384, 1917.

33. Coray: Ueber Kruppartige Affektionen bei Influenza, Cor.-Bl. f. schweiz. Aerzte **49**:475, 1919.

Regan³⁴ reports a series of twenty cases, five of which terminated fatally. The bacterial flora found by him was similar to that generally found among influenza cases. There was absence of the Klebs-Loeffler bacillus. The most effective treatment was the use of steam inhalations, followed by intubation, if necessary. The lesion as seen postmortem, is thus described by him:

Microscopic sections of the larynx and trachea show the surface epithelium of the mucosa to be intact, and without presence of fibrin formation, showing thus dissimilarity to diphtheritic laryngitis. The blood vessels of the mucosa and submucosa are seen to be markedly dilated. There is excessive exudation of polymorphonuclear cells, lymphocytes and serum into the surrounding tissues. The thickness of the mucosa and submucosa is greatly increased by this infiltration of tissues and dilatation of blood vessels.

V. B. Philpot³⁵ reports an instance of lymphangioma of the chest in a girl 4 years of age, with complete cure by operation. The child was born with two small tumefactions, one below the axilla and one just above the left clavicle. After a time these began to grow rapidly and the patient became weak and emaciated. The occurrence of abnormally high temperature, from time to time, was supposed to be due to some inflammation in the tumor. At operation it was found that a sac extended below the ribs and formed pockets all through the upper left chest, one of them extending to the scapula behind, and another between the clavicle and the scapula forming the large cyst to be seen above the left clavicle. Drainage, repeated curretting and swabbing effected a complete cure.

Canelli³⁶ has studied the size of the thyroid in infants prematurely born or dying a few days after birth. Assuming that the maximum weight of the normal thyroid is 4.85 gm., he found the thyroid enlarged in four of the seventy cadavers examined. In one instance the thyroid weighed 21.5 gm. No trace of iodine was found in the smallest of the four enlarged thyroids, but the largest one, 0.007015 gm. of iodine was present. A brief historical review of the subject is embodied in the paper.

Brennemann³⁷ reports four additional cases of congenital atresia of the esophagus seen by him since his report of three cases in 1913. In his experience no other congenital anomaly of the intestinal tract has

34. Regan, J. C., and Regan, C.: Influenzal Croup, *Am. J. Dis. Child.* **17**:376 (June) 1919.

35. Philpot, V. B.: A Rare Surgical Case, *South. M. J.* **12**:147, 1919.

36. Canelli, A. F.: Contributo allo studio dello struma tiroideo congenito, *Pediatrics* **27**:264, 1919.

37. Brennemann, Joseph: Congenital Atresia of the Esophagus, with Report of Four Additional Cases, with Three Necropsies, *Am. J. Dis. Child.* **16**:143 (August) 1918.

approximated even remotely such frequent appearance, with the possible exception of hyperplastic stenosis of the pylorus. In all of them the upper end of the esophagus ended blindly, the lower end connecting the stomach with the trachea. There is a striking lack of uniformity in the frequency with which this anomaly is met by pediatricians. Brennemann finds the symptomatology strikingly uniform.

Hymnson and Kahn³⁸ analyzed the intestinal contents (meconium) of five newly born infants. They found the iron and calcium contents similar to those found in hunger feces; the phosphorus was less, the sulphur was much increased. Traces of ammonia were found, but no uric acid. Extremely faint traces of amylose were found, but no trypsin, erepsin, lactase or lipase.

Batchelor³⁹ reports in greater detail the findings in her investigation of the dejecta of seventy-four children with special reference to the isolation of aerobic sporebearers. She found *Bacillus cereus* in thirty-two cases; *B. albolactis* in seventeen cases; *B. pseudotetanus* in nine cases; *B. mesentericus* and *B. subtilis* each in six cases; *B. petasites* and *B. vulgaris* each in two cases.

The normal occurrence of these spore bearing organisms and of yeasts in the intestinal contents is worthy of note, as is also their relation to the bacterial flora of the diet, and their susceptibility to change with changes in the diet,⁴⁰ as shown by Herter and Kendall, Torrey and others.

Lowenburg⁴¹ reports a case of congenital unilocular cyst of the liver (hemangioma) in a male infant 19 months old. These cases are rare; they have been considered by Still (1898), Morris (1913) and Moschowitz (monograph). According to Moschowitz, operative results have been satisfactory. In Lowenburg's case the walls of the cavity were stitched to the abdominal wall, and the cavity was packed with gauze. The walls of the cyst were 1 inch thick, friable, brown, and suggested a membranous lining. The child reacted well after the operation. Later, however, there developed great drainage of serum from the cyst wall, entailing the loss of much water, and mineral and albuminous matter. The child gradually weakened, became asthenic (demineralized) and died.

38. Hymnson, A., and Kahn, M.: Study of the Intestinal Contents of Newly Born Infants, *Am. J. Dis. Child.* **17**:112 (February) 1919.

39. Batchelor, M. D.: Aerobic Spore Bearing Bacteria in the Intestinal Tract of Children, *J. Bacteriol.* **4**:23, 1919.

40. Torrey, J. C.: The Regulation of the Intestinal Flora of Dogs Through Diet, *J. M. Res.* **39**:415, 1919.

41. Lowenburg, H.: Liver (Hemangioma) Congenital Unilocular Cyst of, *Arch. Pediat.* **35**:285, 1918.

Young and Wright⁴² report an instance of congenital defect of the abdominal wall.

Carr⁴³ reports an instance of Hirschsprung's disease, in which secondary calcification of the lower part of the sigmoid and the upper part of the rectum had occurred. The patient, a girl, aged 6 years, was brought to the hospital in a condition of shock and died soon afterward.

Bacigalupo⁴⁴ describes a mucodermoid cyst of the pericardium. He considers that intrathoracic congenital tumors are rare and states that Nandrot⁴⁵ recorded the fifty-seventh case. In certain cases the cyst had extended to and become adherent to the pericardium, but in no case has the cyst involved the pericardium. Bacigalupo's case is believed to be the first case of congenital cyst of the pericardium to be described. The age of the patient is not stated.

Bronson and Sutherland⁴⁶ report an instance of ruptured aortic aneurysm in a child 5 years and 10 months of age. The lesion was a fusiform aneurysm of the secondary arch of the thoracic aorta. The aneurysm apparently followed a partial stenosis of the aorta between the insertion of the ductus arteriosus and the left subclavian artery. That this structure was a congenital anomaly was supported by the presence of a diaphragmatic hernia, subluxation of the joints, and defective cranial development.

The authors give a brief discussion of the etiology of aneurysms in children. From the literature they summarize two instances of aneurysmal dilatation due to partial stenosis of the thoracic aorta,⁴⁷ and also five cases of aneurysm apparently due to congenital anomalies in the structure of the ductus arteriosus; in two of the latter, rupture caused death. In the literature they find seven reports of death following rupture of thoracic aortic aneurysms in children, one case of rupture of the aorta without aneurysm, and two cases of rupture of aneurysms of the abdominal aorta. A roentgenogram and photographs of the specimen accompany the description of their case.

42. Young, W. A., and Wright, E. J.: Congenital Defect of Abdominal Wall, *J. Trop. M.* **21**:158, 1918.

43. Carr, W. L.: Case of Hirschsprung's Disease, *Tr. Am. Pediat. Soc.* **30**:108, 1918.

44. Bacigalupo, Juan: Mucodermoid Cyst of the Pericardium, *J. A. M. A.* **71**:961 (Sept. 21) 1918.

45. Contribution a l'etude des kistes dermoïds du mediastin anterieur, Thèse de Paris, 1917.

46. Bronson, E., and Sutherland, G. A.: Ruptured Aortic Aneurysms in Childhood, with the Report of a Case, *Brit. J. Child. Dis.* **15**:241, 1918.

47. Smith and Targett: Aneurysm of Aorta in a Boy Nine Years Old, *Tr. Path. Soc., Lond.* **48**:53, 1897. Wasastjerna, E.: Fall von Aortaruptur nach Schlittschulaufen, *Ztschr. f. Klin. Med.* **49**:405, 1903.

Rivers⁴⁸ describes an instance of erosion of the blood vessels of the neck in the course of scarlet fever. The patient was 5½ years of age. The symptoms at onset were not characteristic; albuminuria subsequently appeared, and on the twenty-third day after onset a characteristic scarlet fever desquamation was present. At the same time, the child became very ill, and a necrosis of the right tonsil, with a very foul secretion, was found. Two ounces of pus, but no blood, were evacuated from a mass the size of an egg on the right side of the neck. During the night the child was found exsanguinated, lying in a pool of blood. Physiologic sodium chlorid solution was given subcutaneously and a transfusion of mother's blood was done. An attempt was then made to examine the abscess cavity; there was a gush of blood, apparently from the external carotid or the lingual artery. These vessels were ligated and the hemorrhage was controlled. Another transfusion was given and the child improved for two weeks, when there was a second hemorrhage, the result of sloughing of the suture on the external carotid. The child then went on to recovery, though convalescence was complicated by a psychosis.

Howland⁴⁹ reports several cases which ended in death, with marked evidence of circulatory failure, but with no changes other than great cardiac hypertrophy and more or less dilatation. Postmortem the hypertrophy was the striking feature. None of the conditions in which hypertrophy usually occurs were present in any of these cases. The myocardium was normal; the musculature was intact. Howland thinks there is reason for believing that as a result of some nervous or muscular disturbance incoordinate action of the heart results.

Marriott and Howland⁵⁰ report experiments showing that the presence of acid phosphate in the body, even in the absence of renal disease, gives rise to the excretion of urine of a character such as has been previously observed only in nephritic acidosis. It is their opinion that the results of their experiments give additional confirmation to the view that the acidosis occurring in the course of nephritis is due to retention of acid phosphate.

Canelli⁵¹ writes on congenital syphilis of the kidney. He states that this condition is found to be rather frequent at necropsy, being shown by the presence of sclerosis, atrophy, gummas and retention cysts.

48. Rivers, T. M.: Hemorrhage Into a Postscarlatinal Cervical Abscess. Ligation of the Common Carotid. Recovery, Johns Hopkins Hosp. Bull. **30**:240, 1919.

49. Howland, John: Tr. Am. Pediat. Soc. **30**:2, 1918; abstr. J. A. M. A. **71**:221 (July 20) 1918.

50. Marriott, W. McK., and Howland, John: The Influence of Acid Phosphate on the Elimination of Ammonia in the Urine, Abstr. Bull. Johns Hopkins Hosp. **29**:264, 1918.

51. Canelli, A. F.: Sifilide renale congenita, La Pediatria **26**:257, 1918.

Amyloid degeneration of the kidneys is not characteristic of syphilis in the congenital form. There may be acute interstitial nephritis or a chronic, sclerotic (atrophic) form. Tardy inherited syphilis is frequently manifested by a syphilitic albuminuria.

Hinman⁵² reports a cytoscopic study of urologic conditions in children.

Comby⁵³ discusses the occurrence of suprarenal hemorrhage in children. Friderichsen⁵⁴ has shown that the condition presents a uniform and constant symptomatology and is not extremely rare, presenting three cases of his own and twenty-five from the literature. The attack may come on at any age. It occurs suddenly. The child becomes pale or cyanotic, and then quickly moribund, without noteworthy dyspnea or other signs of pulmonary affection. Necropsy always shows the same findings: cutaneous hemorrhages and hemorrhages into the cortex and medulla of both suprarenals. Comby presents three cases, occurring in children 6 months, 10 months and 14 years of age, respectively.

Comby⁵⁵ also presents a case of Addison's disease in a girl 13 years of age. The patient had probably been infected by her father, who had died of pulmonary tuberculosis. She presented all the symptoms of Addison's disease, including bronzing of the skin, profound asthenia, arterial hypotension and vomiting. Death occurred after an illness of about two months. The only lesions found at the necropsy were in the suprarenals. The right gland was converted into an abscess; the left gland was studded with caseous nodules.

Rutelli⁵⁶ describes another case of Addison's disease in a girl, 10 years of age. There was a history of enlarged cervical glands at the age of 10 months, and an affection of one finger which resulted in ankylosis at the age of 2 years. Pigmentation of the skin commenced at the age of 4 years. The blood pressure ranged from 65 to 70 mm., and there was marked asthenia; the urine was normal, except that there was slight diminution in the elimination of urea and creatinin. On a diet rich in carbohydrates, sugar appeared in the urine twenty hours after injection of 1 mg. of epinephrin; on an ordinary diet, after eighteen hours, and on a diet poor in carbohydrates, after four hours.

52. Hinman, F.: Cytoscopic Study of Urological Conditions in Children, *Am. J. Dis. Child.* **17**:306 (May) 1919.

53. Comby, J.: Apoplexie surrenale chez les enfants, *Arch. de méd. d. enf.* **21**:651, 1918.

54. Friderichsen, C.: Hemorrhage in Suprarenals, *Ugesk. f. Læger* **79**:1817, 1917.

55. Comby, J.: Maladie d'Addison chez une fille de treize ans. Mort. Autopsie, *Arch. de méd. des enf.* **20**:28, 1917.

56. Rutelli, G.: Contributo allo studio della matellia di Addison nell'infanzia, *La Pediatra* **24**:274, 1916.

Control experiments in a healthy subject gave similar findings in twelve, eight and two hours, respectively.

Strick⁵⁷ reports a case of congenital absence of the uterus complicated with anomalous vulvovaginal anus. He presents statistical data on the occurrence of the condition.

Comby⁵⁸ discusses the occurrence of abscess of the anus in children. A case seen by him, the patient being 13 months old, recalls to mind an early series of seven cases, and he enumerates the causes of the condition. It usually appears in infants and is rarely tuberculous in origin.

The occurrence of a pouch in the buttocks with an opening into the rectum is reported.⁵⁹

Hayd⁶⁰ reports the occurrence of a small round cell sarcoma in the right ovary of an infant, aged 23 months. It was the size of a goose egg, and was felt in the right lower quadrant as a large, movable, smooth tumor, not painful to the touch. Two or three weeks later the mass had become tender, and considerable fluid was present in the abdomen. On exploration, the tumor was found to be free in the abdomen, with the right tube attached to it. Bloody fluid was present; and on palpating the liver it was found to be much enlarged and filled with nodular masses. The child died several weeks later.

Mandelbaum,⁶¹ in a study of two cases of Gaucher's disease in adults, offers the following conclusions: "Gaucher's disease is characterized by a distinctive, well defined clinical picture and constant, definite changes in the hematopoietic organs. The presence in these organs of peculiar large cells, with a characteristic type of cytoplasm, not duplicated in any other disease, is a distinguishing histologic feature. These cells are derived from the reticular apparatus of the hematopoietic structures, but an additional origin from the endothelial cells of the venous sinuses of the spleen cannot be denied. Fat or lipid bodies cannot be found in the large cells by microchemical or polariscopic tests. The peculiar substance in the large cells does not lie in the extractive group, on chemical analysis, but is apparently of complex protein nature, in combination with lipoids. The disease is evidently caused by some disturbance of metabolism, the products being found in a specific group of cells (reticulo-endothelial) of the hematopoietic system."

57. Strick, E. J.: A Case of Congenital Absence of the Uterus with Anomalous Vulvovaginal Anus, *Am. J. M. Sc.* **156**:75, 1918.

58. Comby, J.: Absces a l'anous chez les jeunes enfants, *Arch. de méd de enf.* **21**:365, 1918.

59. Pouch in Buttocks Opening Into Rectum, *Arch. Espanola de Pediat.* **2**:533, 1918.

60. Hayd, H. E.: Sarcoma in the Left Ovary in a Child Twenty-Three Months Old, *Am. J. Obst.* **78**:764, 1918.

61. Mandelbaum, F. S.: Two Cases of Gaucher's Disease in Adults. A Study of the Histopathology, Biology and Chemical Findings, *Am. J. M. Sc.* **157**:388, 1919.

Carr and Moorhead⁶² report a case of Gaucher type of splenomegaly.

Inaba and Ohashi⁶³ report the finding of a new microbody in the blood in a case of myelogenous leukemia.

Jemma⁶⁴ reports a case of malignant lymphogranuloma in a girl, 6 years old. The disease had existed for ten months. The tumors were situated chiefly in the cervical region. There was intermittent fever and increasing pallor and weakness. The von Pirquet test was positive. The blood examination showed 53 per cent. lymphocytes—in a total count of 7,600 leukocytes—and tubercle bacilli. Scattered Schrön-Much granules were found in material taken from the glands.

Ward⁶⁵ discusses the nature of von Jaksch's disease.

Schwarz⁶⁶ discusses the occurrence of a chlorotic type of anemia in infants and children.

Wolbach and Morse⁶⁷ report a case of neuroblastoma sympaticum, and Humbort and Naville⁶⁸ report a case of neurofibromatosis.

Barron⁶⁹ reviews the subject of meningitis in the newly born and in early infancy. He refers to Koplik's recent paper⁷⁰ and tabulates forty-two cases reported in the literature since 1895, when Sherer appears to have reported the first cases. The causative organisms in these cases were, in order of frequency: *B. coli*, fourteen cases; staphylococcus and streptococcus, six cases; meningococcus cases, five; streptococcus, four cases; pneumococcus, 4 cases; tuberculosis, three cases, and *B. lactis-aerogenes*, *B. pyocyaneus*, *B. mucosus-capsulatus*, *B. typhosus*, *B. influenzae*, *B. catarrhalis*, one case each. In Barron's case—a male infant, born in breech presentation in which the delivery was assisted by inserting a finger into the mouth and then exerting a moderate amount of traction, and which died from meningitis on the eleventh day—the causative organism was definitely *B. coli-communis*.

62. Carr, J. G., and Moorhead, L. D.: Report of a Case of Gaucher Type of Splenomegaly, *J. A. M. A.* **72**:19 (Jan. 4) 1919.

63. Inaba, Ttsuyoshi, and Ohashi, Shin: A New Microbody Found in the Blood in a Case of Myelogenous Leukemia, etc., *Am. J. Dis. Child.* **16**:1 (July) 1918.

64. Jemma, R.: Sul linfogranuloma maligno, *Pediatrics* **26**:513, 1918.

65. Ward, G.: Nature of von Jaksch's Disease, *Brit. J. Child. Dis.* **15**:101, 1918.

66. Schwarz, Herman: The Chlorotic Type of Anemia in Infants and Children, *Arch. Pediat.* **35**:430, 1918.

67. Wolbach, S. B., and Morse, J. L.: Neuroblastoma Sympaticum, *Am. J. Dis. Child.* **16**:63 (July) 1918.

68. Humbort, G., and Naville, F.: Neurofibromatosis, *Ann. de méd., Par.* **5**:108, 1918.

69. Barron, Moses: Meningitis in the New-Born and in Early Infancy, *Am. J. M. Sc.* **156**:358, 1918.

70. Koplik, H.: Meningitis of the New-Born and in Infants Under Three Months of Age, *Arch. Pediat.* **33**:481, 1916.

Barron tabulates also the probable portal of entry in nineteen of the forty-two cases. The figures are as follows: spina bifida, four cases; otitis media, four cases; hematogenous, three cases; eustachian tube, one case; mouth, one case (Barron's case); lungs, umbilicus, intestine, circumcision wound and placenta, each one case. Meningitis in the new-born and in early infancy is a rare disease.

It appears that *B. coli* occupies in the meningitis of early infancy the important place held by *B. tuberculosis* in the later months of infant's life. The pathogenic strains of *B. coli* may show marked variations in form, in rates of fermentation and in motility. Most of the strains isolated in the cases tabulated by Barron were actively motile. The avenues of infection in the new-born, in general, have not been definitely established.⁷¹ La Fetra⁷¹ believes that infants are born septic very rarely. Scherer, Noeggerath and Hermann believe that contaminated water of the bath tub is a frequent source of infection. According to Scherer, infected liquor amnii furnishes a similar possibility. Aschoff,⁷² in the course of careful studies, found that the passage of liquor amnii up the eustachian tubes during premature respiration is fairly common; he believed that resulting inflammation occurred not from infection thus introduced, but only from the fluid acting as a foreign body, a locus minoris resistentiae being caused. Bonhoff and Esch^{72a} held that infection occurred in this manner in their case. Rasch^{72a} believes that infection of the external auditory canal is more important than infection of the eustachian tube. Others believe that the umbilicus is the most important route. The possibility of injury of the mucous membrane of the mouth by the accoucheur's finger giving a portal of entry has been suggested. Barron thinks this occurred in his case. Infection through the intestinal tract is possible.

The susceptibility of infants to infection with organisms that are otherwise only slightly pathogenic may be explained, concludes Barron, by the feebleness of antibody production during the early months of infancy (Halban and Landsteiner); and the greater resistance of breast fed infants over artificially fed ones is probably due to the compensation of the passive immunization by the breast milk for the active immunization which is still deficient.

71. La Fetra, L. E.: Accidents and Diseases of Early Weeks, Arch. Pediat. **33**:401, 1916.

72. Bonhoff and Esch: Ueber einen Fall von Meningitis purulenta beim Neugeborenen, infolge rechtseitiger Mittelohrentzündung, Ztschr. f. Geburtsh. u. Gynäk. **70**:886, 1912. Cited from Barron.

72a. Rasch: Ueber die Häufigkeit und Bedeutung von Mittelohrentzündung bei Kleinen Kranken Kindern, Jahrb. f. Kinderh. **37**:319, 1844. Cited by Barron.

Kramer and Wright⁷³ report an instance of meningitis due to *Streptococcus pyogenes-hemolyticus* in a mother and her unborn child. The fetus was 40 cm. long. The authors believe that this occurrence supports Rosenow's dictum of elective localization in the maternal and fetal meninges.

Hunt⁷⁴ reports a case of juvenile paralysis agitans.

Naville⁷⁵ reports the microscopic findings in a typical case of amaurotic family idiocy. The infant was the fourth in a family of six children to be thus affected. Naville describes aplasia of the tracts in addition to the usual lesions of this form of idiocy. Clinically, he recognizes a juvenile form and atypical forms, besides the usual infantile form. All are believed to proceed from the same pathognomonic degeneration of the cells. The eye findings may vary widely. A connection with certain other familial diseases of evolution is suggested, essential atrophy of the optic nerve, Marie's cerebellar ataxia, etc., and certain mendelian features are pointed out.

Talbot⁷⁶ reports studies on the energy metabolism of an amaurotic family idiot.

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73. Kramer, G. B., and Wright, W. B., Jr.: Streptococcic Meningitis in the Mother and Child in Utero; Report of a Case, J. A. M. A. **71**:729 (Aug. 31) 1918.

74. Hunt, J. R.: Case of Juvenile Paralysis Agitans, Primary Atrophy of Pallidal System of Corpus Striatum, Neurol. Bull. **1**:237, 1918.

75. Naville: Pathological Anatomy of Amaurotic Familial Idiocy, Arch. f. Neurol. u. Psychiat. **1**:286, 1917.

76. Talbot, Fritz B.: Energy Metabolism of an Amaurotic Family Idiot, Am. J. Dis. Child. **16**:39 (July) 1918.

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