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THE

Practical Medicine Series

COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY

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UNDER THE GENERAL EDITORIAL CHARGE OF

CHARLES L. MIX, A.M., M.D.

Professor of Physical Diagnosis in the Northwestern University Medical School

ROGER T. VAUGHAN, Ph.B., M.D.

VOLUME V

PEDIATRICS

EDITED BY

ISAAC A. ABT, M.D.

Professor of Pediatrics, Northwestern University Medical School, Attending Physician Michael Reese Hospital

ORTHOPEDIC SURGERY

EDITED BY

JOHN RIDLON, A.M., M.D.

Professor of Orthopedic Surgery, Rush Medical College

WITH THE COLLABORATION OF

CHARLES A. PARKER, M.D.

SERIES 1914

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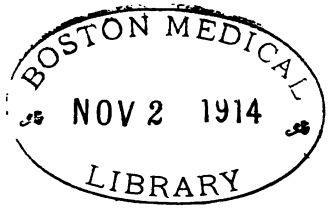

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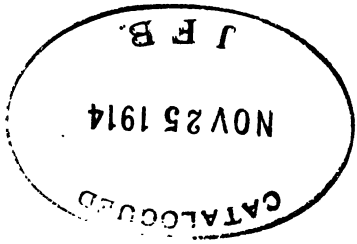

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TABLE OF CONTENTS.

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PEDIATRICS.

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ORTHOPEDIC SURGERY.

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PEDIATRICS.

DISEASES OF THE NEWBORN.

Treatment of Hemorrhagic Diseases of the Newborn. J. B. Manning[1] reports a case of hemorrhage of the newborn, appearing in the stools, treated successfully by the injection of horse serum and serum withdrawn from the father. After 96 hours the blood had completely disappeared.

The writer sums up the literature of the serum treatment briefly as follows:

Serum. Weil, in 1907, first began the use of fresh serum injections to supply the conditions necessary for the actual increase in coagulability of the blood. He recommended horse, rabbit or human serum. In 1908 Leary used fresh rabbit serum from a cardiac puncture in a number of conditions in which hemorrhage was a prominent feature. Bigelow, also Lucas, reported favorable results with rabbit serum injections. Horse serum appears to be of less value than rabbit, probably because it is not fresh. Very recently Bluhdon reported 3 cases treated in this manner with horse serum with excellent results.

Human Blood Serum. Welsh reported, in 1910, 12 cases of hemorrhagic disease in the newborn with very favorable results, treated with subcutaneous injections of human serum. Subsequently the total of Welsh's cases was increased to 32 cases. Nicholson published a report following this of 6 cases treated in this manner, of which 5 died. Richards and also Unger reported favorable results. R. Franz, in 1912, reported 35 cases treated with human blood serum with a mortality of 50.9%. These were all cases of gastroenteric hemorrhage.

Whole Human Blood. Schloss and Commiskey, in

(1) Northwest Med., August, 1913.

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1911, in an excellent paper on hemorrhagic disease in the newborn, reported 7 cases treated by whole human blood, used instead of human serum, with extremely favorable results. Whole blood is easier to obtain and can be used immediately without waiting for the serum to separate. In most of their cases it was taken directly from the veins in the forearm of one of the parents by means of an exploratory syringe and injected immediately into the infant's back. Meyers and Boyd, following this method, obtaining blood from the placenta, reported favorable results. In a second article Schloss and Commiskey increased their series to 9 cases, claiming it as an efficacious, simple, harmless procedure so far as can be judged from their cases. They conclude that where the bleeding is profuse and, as a rule, with a tendency to become quickly fatal, transfusion often gives the best results.

Transfusion. This method, as recommended by Sombert, Carroll and others, offers the best line of treatment for desperate cases, but it is so difficult that but few can attempt it.

Cooley[2] advocates the transfusion of human blood in the hemorrhagic disorders of childhood. The technical skill required has heretofore stood in the way of this, but recently there has been more than one suggestion of simple methods for accomplishing the operation. Crile's method is an improvement over direct suture or the older canula methods, but is not readily applicable to babies. Vaughan and Cooley have described a method which required no special apparatus, and which they have found to be really as easy as any intravenous injection. It consists simply in drawing blood from the donor's vein into a glass syringe and injecting it rapidly into the vein of the recipient. A small amount of salt-solution is drawn into the syringe before and after the blood, to prevent clots forming. The only requisite for success, apparently, is to have everything so prepared that one may work fast and keep within the time-limit of coagulation.

In summing up his studies the author presents the following conclusions:

(2) Jour. Amer. Med. Assoc., Oct. 4, 1913.

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First. Blood therapy of some kind is the best remedy we have for hemorrhagic conditions.

Second. In hemophilia blood-serum seems to have a specific action so far as checking the hemorrhage is concerned. It may be used as a prophylactic measure, as well as to stop existing hemorrhage. Fresh human serum is probably to be preferred.

Third. In purpura, melena, and other toxic conditions, in which various blood elements have been shown to be lacking, none of the serums are always effective, and there are good theoretical and clinical reasons for believing that whole blood should be preferred, not only to stop hemorrhage, but for a possible curative effect on the underlying disease condition.

Fourth. Transfusion is not really a difficult procedure. It is deserving of extended trial—not as a last resort, but as the first treatment in any of the hemorrhagic diseases of toxic nature.

Melena Neonatorum. Merckens[3] reviews theories concerning the etiology of melena neonatorum, and says Whipple has proven that there is no lack of fibrinogen in the blood, but there is a deficiency of thrombin. As defibrinated blood contains this ferment, he also used this in the treatment of a case of severe intestinal hemorrhage. The blood was obtained from an adult and defibrinated by shaking in a sterile flask with sterile glass pearls. He injected 12 c.c. into the child one hour after birth, with a perfect recovery. The hemoglobin and erythrocytes almost doubled in the following few weeks.

Franz[4] reports 35 cases of intestinal bleeding of the newborn, occurring in the Graz clinic during the years 1900-11. The mortality of these was 52.9%. He tried as remedies Liq. ferri sesquichlorate, ergotin, hydrastis, ice water, calcium, adrenalin, and gelatin in 2-5% sterile solution. Even with the latter the mortality was very high. The results of gelatin per rectum were very poor, and when given by mouth or subcutaneously though somewhat better were certainly unreliable. The hemorrhages occur partly through the intact mucosa of the

(3) Münch. med. Woch., 1913, No. 18, p. 971.
(4) Ibid., 1913, No. 53, p. 2905.

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intestinal tract, partly from small ulcers. Though the cause is unknown, certainly a delayed coagulation time of the blood, and perhaps an injury to the vessel wall, play an important rôle.

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The serum treatment of hemorrhagic diathesis was first introduced by Sahli, who showed that the addition of normal defibrinated blood to the hemophiliac blood caused coagulation. This treatment was then applied successfully to hemophilia by many different observers.

Franz now applied this method to melena neonatorum and in 5 newborn infants suffering from severe spontaneous intestinal hemorrhages, he injected the serum obtained from the umbilical cord in amounts varying from 10 to 25 c.c. He obtained the serum by letting the blood from the cord run into sterile test tubes, centrifuging, and sealing with a few drops of chloroform. The best site for injection is in the thigh. The serum will keep for 4 months. In every case injected there was a perfect recovery. He prefers human serum to animal serum, for if reinjection is necessary, one need not fear anaphylaxis.

Chicken Pox During Intrauterine Life. Pridham[5] reports the occurrence of chicken pox in a newborn infant. The character of the eruption was identical with that which occurs about the 4th day in varicella. The mother was apparently unaffected with the disease, but in the same house there had been cases of chicken pox 14 days previously.

INFANT FEEDING.

The Gastric Secretion of Infants at Birth. Alfred Hess[6] reports his study of the gastric secretions. Newborn infants regularly secrete a considerable amount of HCl before they are given any food. Among 52 infants varying in age from ½ to 18 hours, only one did not have HCl in the stomach; in all but one instance free acid was obtained. The acid varies greatly in amount. Exceptionally it was found almost lacking on repeated tests (congenital hypochlorhydria) or very profuse (congenital hyperchlorhydria). In almost all cases acid was

(5) Brit. Med. Jour., May 17, 1913.
(6) Amer. Jour. Dis. Children, October, 1913.

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obtained throughout prolonged tests, in spite of the fact that food was not given to stimulate secretion. In one instance 17 c.c. of highly acid juice was aspirated in 110 minutes. Rennin, pepsin and lipase were also obtained in the (unfed) newborn.

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Prevailing physiologic views cannot account for the gastric secretion immediately after birth. It is not the result of mechanical stimulation by means of the catheter, as the juice was obtained immediately on the introduction of the tube, without an intervening latent period. It may be prenatal in origin. Nor is it clear what stimulates the continued secretion which was obtained for hours. Experiments showed that the saliva is not the exciting agent; the effect of sucking could not be determined. Comparative tests of the same infants at birth and later, during the first week, showed that the stimulus to gastric secretion may be greater in the newborn infant which has not been fed.

This chlorhydria of the newborn is not usually associated with increased tonicity of the pyloric sphincter, as the duodenal catheter can readily be passed through the pylorus. Even when 0.4% HCl is instilled into the gastric cavity the catheter can be readily passed into the duodenum. However, the high acidity may at times be related to the pylorospasm or to duodenal ulcer met with in infancy.

Although gastric secretion is so marked in the newborn, duodenal and pancreatic secretion is very scanty. Nor can this secretion be readily stimulated by allowing HCl to enter the duodenum. Evidently the mechanism of pancreatic secretion is not as easily activated in the newborn as in later infancy.

Infant Feeding in Theory and Practice. Schlutz[7] discusses the nutritional disorders, their cause and treatment, based on the ideas of the European schools, especially the Germans. The writer warns against the promiscuous weaning of the baby on the least pretext—that the milk is too rich or too thin and does not agree with the baby. He believes that all breast-milk is good and that the trouble lies, not with the milk, but with the baby itself.

(7) Journal-Lancet, July 1, 1913.

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[The above represents the prevailing continental view. It seems, however, that the final word concerning chemic composition, biologic nature and nutritional value of human breast milk, represents a vast field for future investigation; and there remain many unsettled points in breast milk feeding.—Ed.]

Effect of Carbohydrate Excess in the Diet. Children fed on infant foods containing an excess of carbohydrates may seem well nourished and gain in weight for a long time. Finally, however, there is a loss in weight extending sometimes to extreme atrophy but marked frequently in the terminal stages by edema. Frank and Stolte[8] believe that the harm is due not so much to the excess of carbohydrate as to the lack of other elements found in the normal food of the infant. N. and mineral salts are found in much greater quantity in milk than in the oat or wheat flours that form the basis of so many infant foods. Lipoids and fat are also lacking, but the fat deficit can be made up to some extent from the carbohydrate. The bodies of infants so fed contain more water than normal, and they are more susceptible to infection. Analyses of the livers from 4 cases are given, supporting these conclusions.

On Pasteurized Milk and Its Effects. Vincent[9] calls attention to various facts concerning pasteurization of milk. In general he states that it is important to bear in mind the following:

First. Any method of pasteurization which effectually and certainly destroys the pathogenic organisms, also destroys the organisms typical of pure milk, *e.g.*, the *Streptococcus lacticus* and the lacto bacillus.

Second. The bacterial growth occurring in milk so pasteurized when incubated at blood temperature is wholly different from the growth occurring in raw milk incubated at the same temperature.

A few instances are cited illustrating the growth of bacteria in milk:

A. Pure raw milk incubated at 100.4° for about 8 hours. A luxuriant growth of the *Streptococcus lacticus* is generally found. As a rule this is seen in practically

(8) Jahrb. f. Kinderheil., August, 1913.
(9) Amer. Med., June, 1913.

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pure culture, for the *S. lacticus* in raw milk is extremely potent in inhibiting the growth of all other organisms.

B. Milk heated at 170° F. for 10 minutes, cooled and then incubated at blood temperature for about 48 hours. The milk is generally stinking and a pure growing culture of the *B. putrificus* will be found.

C. Milk heated at 190° F. for 3 minutes, and then incubated at blood temperature for about 48 hours. The curd is raised to the surface of the milk, and is "honeycombed" owing to the production of much gas after the "setting" of the curd. There is a strong smell of butyric acid which is present in considerable amount, and on bacteriologic examinations a pure growing culture of the *B. e. sporogenes* is found.

D. The milk is maintained at boiling point for 5 minutes and is then incubated either at blood temperature or at about 80° F. for some 24 hours. There is a profuse growth of highly proteolytic organisms such as *B. subtilis, B. mesentericus vulgaris, B. mesentericus* (7), etc.

None of the organisms growing in pasteurized milk are capable of growing in raw milk or in the alimentary canal of an infant or child fed on raw milk. The *S. lacticus* is invariably present in breast milk as it is received by the infant.

When pasteurized milk is given to an infant that has recently received raw milk, the organisms present in the pasteurized milk will fail to grow for the same reason that they fail to grow in raw milk. But when an infant is systematically fed on pasteurized milk, the danger of their development is always present for the true lactic bacteria are delicate and soon die out, so a fresh supply of these lactic organisms is a specific requirement of the infant. When the action of these organisms fails, acute or chronic disorder develops. In the alimentary canal the actual attack by the non-lactic organisms is frequently preceded by a "colon toxemia."

The colon organisms, *e. g.* the *B. coli* and the *B. acidi lactici* are typically proteolytic organisms, but they will act as *fermentative* organisms when they cannot act proteolytically.

When an infant or child is fed on pasteurized milk,

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the normal growth and action of the lactic organisms present in the alimentary canal are retarded. Coincident with this retardation of their active development, their dominance also fails and the proteolytic organisms begin to establish themselves in the small intestine, once this process begins the lactic organisms are rapidly overwhelmed.

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While the colon organisms are usually the first to establish themselves, this is not always the case and even when the colon organisms have become established they may soon be compelled to give way to more virulent organisms.

The Principles of Treatment in Malnutrition and Atrophy, are set forth by J. Foote.[1] Courtney found in atrophic infants adequate digestion of proteids, but a deficiency of power to absorb fats. Meyrhofer and Pribram found that the osmotic power of alimentary mucous membranes, taken from infants who had died from atrophy, was much less than that of infants dying from other causes. This would point to a decreased power in absorbing crystalline substances such as sugar and the mineral salts. Sheible, after exhaustive work, could find no organic changes to account for the symptoms of atrophy, while the work of Hess shows an actual relative increase in the proteolytic enzymes of the marantic baby as compared with the normal infant. If we accept these findings, we must look upon atrophy as a condition in which foods containing even normal quantities of sugar and fat are not well absorbed and likely to produce intolerance. Rational treatment would suggest a food poor in these particular elements. The loss in heat units by the decrease in quantity of these energizing constituents can only be partly compensated for by increasing the proteid elements. This would give us a food low in its percentage of fat and sugar and relatively high in its proteid—not unlike skimmed milk, excepting that the latter contains its normal percentage of sugar. Buttermilk, albumin milk and albumin-buttermilk fulfil our theoretical requirements more exactly, since their sugar has been diminished by fermentation.

In the writer's opinion no food fulfils the conditions

(1) Interstate Med. Jour., June, 1913.

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so well as albumin milk, or albumin-buttermilk. Used in 24-hour quantities of 1 to 3 oz. to each pound of the infant's weight, these foods will frequently tide babies over the danger of collapse and restore tolerance for other foods. Small quantities should be fed at first and gradually increased, especially if vomiting is present. Unless the baby is less than a month old, the interval between feedings should be at least three hours. No gain in weight is to be expected at this time, as the main object is to restore the food tolerance. It is well to start with 1 oz. to every pound of body-weight in the 24 hours, increasing gradually until 2 or 3 oz. to the pound of body-weight are being given. Then add sugar, preferably a malt sugar, about one-fourth oz. at a time to the 24-hour quantity, until 1-1½ oz. is being given. But until the infant has begun to gain steadily it is unsafe to give the larger quantity. The expensive imported malt preparation used by Finkelstein may be replaced by a domestic preparation of dextri-maltose which is perfectly satisfactory. The important point is not to force the feeding too early. Often the weight will remain stationary for weeks. But once the child begins to gain, the tolerance for food increases until 60 or 70 calories to the pound of weight are required as compared with 35 or 40 for the normal infant. Buttermilk contains from 10 to 12 calories, albumin milk about 13 calories, and whole milk about 21 calories to each ounce. Dextri-maltose contains about 110 calories in each ounce. It is an easy matter to estimate the caloric value of the 24-hour quantity.

As early as possible, but not too early, these soured milk foods should be replaced by mixtures of skimmed milk and later whole milk. Cream mixtures are usually not well borne at this time. The daily weight record should be scrutinized, and should a rapid loss of weight occur after an increase of food, or in an intercurrent infection as middle-ear disease—a common complication—it will be necessary to start all over again and build up the food tolerance. Months of patient work are often necessary to bring these infants to a normal metabolic standard. Atony of the intestine accompanies the atrophic condition, so when the food quantity of milk is in-

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creased, as when milk mixtures are given, the increased food residue finds the intestine unable to cope with it and constipation results. An increase in malt extract, or the use of suppositories will correct this. In severe cases collapse may complicate matters, and this is especially to be feared in very hot weather or during parenteral infections, either with or without overfeeding. Rapid loss of weight, sunken fontanels, weak pulse and a very low temperature, with pinched, ashen features are danger signals. Whiskey, strychnia by hypodermic injection, salt solution and external heat are all useful in this complication.

Albumin Milk. Schwyzer[2] reports his experiences with the Eiweiss Milch of Finkelstein and Meyer, in a series of cases consisting of dyspepsia, decomposition, alimentary intoxication and parenteral infections. In dyspepsias, he usually gives the mixture in doses of 300 gm. per day after 24 hours of a tea diet. Every second day the quantity is increased by 100 gm. until the necessary 180-200 gm. per kilo body weight are covered. Five or six feedings per day are given and on the second day 1% of a carbohydrate is added, or in mild cases 2%-3%, soon this may be increased to 4-5%. In cases where hunger seems very dangerous, on the first day he gives 10-20 grams of the Eiweiss Milch. To cover the water loss, tea may be given in any quantity. During the first day or two there may be a loss of 50-250 gm. from hunger, but this soon ceases. When children refuse to drink the quantity ordered, the food may be given in 8-10 feedings. In cases where foul stools continue, one must look for signs of infection in the body as a furuncle, coryza, etc. Food can then be continued, as the stools are now probably an evidence of the existing infection, and not of a true alimentary disturbance. With the technic above described he got most excellent results in the diarrheal cases of dyspepsia, in intoxication and decomposition even in premature children.

Parenteral infections are among the most troublesome conditions prevailing in the infant's wards, for they most frequently give rise to nutritional disturbances,

(2) Corr. Blatt. f. Schweiz. Aerzte, 1913, No. 36, p. 1121.

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which in themselves may be severe enough to be fatal. Accordingly, when treating such a case it is well to bear the danger in mind and to avoid the use of foods rich in carbohydrates and whey. It is here that Eiweiss Milch is invaluable and in any of these secondary disturbances should be used as in a primary dyspepsia or intoxication.

He concludes that Eiweiss Milch is a most useful addition to our therapy in the diarrheas of children induced by acid fermentation in the bowel, and even superior to breast milk in alimentary intoxication. One should always remember, however, that it is a medication and not a permanent food.

Beck[3] in discussing Eiweiss Milch, reports his observations on 300 cases, including all sorts of acute gastrointestinal disease, dyspepsia, entero-catarrhs, enterocolitis, and decomposition. In all these cases he got most excellent results.

Brady[4] describes a method of making albumin milk which he has found saves time and labor. The original directions given by Finkelstein are carried out with difficulty, especially in the home.

Brady's method. 1. Bring a quart of sweet whole-milk to the boiling point; raw-milk is not used, as its curd is much tougher. 2. Cool to 100° F. 3. Add one tablespoonful essence of pepsin and allow to curdle. 4. Pour off the whey and suspend curds in muslin bag 2 hours. 5. Stand bag containing curds in 8 oz. boiled cool water for one hour. This is very important and is the secret to the success he has had in the preparation of this food. 6. Remove the bag from the water, allow as much water to drip as will and place curds in sieve. 7. Add a pint of fat-free buttermilk to sieve containing curds, and stir; it will be found that the curds will pass through in 2 to 3 minutes, which must be repeated three or four times. 8. Turn the bag inside out and return to the 8 oz. of water so as to obtain all the curd. 9. Pour in the sieve the 8 oz. of water which was used to soak the curds. 10. Add enough water so that the whole measures a quart. 11. Add the percentage of maltose-dextrin

(3) Klin. Therap. Woch., 1913, No. 25, p. 737.
(4) Jour. Amer. Med. Assoc., Nov. 15, 1913.

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desired and put on ice. One is able to prepare 10 quarts of this food after the curds have drained and soaked in less than ten minutes with the minimum separation of the fat.

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Engel[5] recommends a *simplified technic* for making a mixture on the principles of Finkelstein's and Meyer's "Eiweiss Milch." The great success of this food in the treatment of diarrheal disorders is made difficult by its complicated preparation. Engel's method is as follows: First he boils the milk and then cools it to 104-122°. The rennet ferment is then dissolved in 5-6 c.c. of lukewarm water. This is the one part of the procedure which requires experience, as the curd becomes thick if the proper amount of the ferment is not added; if done correctly, however, the coagulum formed by the addition of the ferment to the milk is very fine and delicate. The ferment is poured into the milk, the mixture stirred, allowed to stand for thirty minutes and then heated to 104° when the coagulum forms. An equal volume of boiled water is added and the mixture is allowed to stand for half an hour until the casein has settled to the bottom. Then one pours off half as much of the supernatant fluid as the water added. In this way half of the whey is got rid of. This mixture corresponds closely to Eiweiss Milch in its composition and gave very satisfactory results. On analysis it shows—

	Eiweiss Milch.	This Mixture
Protein	28-32	27-31
Fat	20-25	21-34
Sugar	12-16	30
Ash	4.5-5	4.6
CaO	0.927	1.4

Larosan. Stoelzner[6] in discussing the value of Finkelstein's and Meyer's "Eiweiss Milch" agrees with most observers that its great value lies in its high protein and calcium content. In seeking some simplified method of making the mixture he conceived the idea of

(5) Deut. med. Woch., 1913, No. 26, p. 1251.
(6) Münch. med. Woch., 1913, No. 6, p. 291.

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compounding a synthetic calcium casein which could be added to ordinary milk. This he did in the powder called "Larosan," which when added to half milk gives a mixture of about the same chemical composition as Eiweiss Milch. Stoelzner claims it can be used with results equally as good.

Forcart[7] believes "Larosan" a very good substitute for Eiweiss Milch. In some cases he dilutes the milk and increases the "Larosan" powder a little more than in the prescribed amounts.

Wegener[8] reports his results with Larosan. At first he met with disappointment, the powder dissolved poorly, the children did not like the food, and it did not agree with them as shown by the failure of any improvement in the diarrheal stools. The children failed to gain, and so in despair he gave up the attempt and went back to "Eiweiss Milch." However, since the improved technic for making of Larosan powder has been devised, Wegener has used it again, and this time with astonishingly good results. The children liked it, digested it well, the stools improved at once, and the weight curve ascended.

Following the classification of Finkelstein and Meyer, he then cites cases of "Dyspepsia," "Decomposition," "Alimentary Intoxication," combined "Decomposition and Intoxication," and "Parenteral Infections," all of which were greatly improved by the use of the new Larosan. It must be understood that this powder, like Eiweiss Milch, is to be used more in the nature of a medication than of a permanent food. The observations were made in the presence of a grippe epidemic, which made the feeding even more complicated. He found this same treatment of value in the diarrheal cases of older children also.

Kern and Miller[9] say that the substitutes for Eiweiss Milch such as Larosan, the casein enriched milk, the protein cream milk of Feer, and Engel's method, are all weak in that they contain no buttermilk. They advocate a method based on the fact that in boiled butter-

(7) Ibid., 1913, No. 27, p. 1199.
(8) Ibid., No. 7, p. 359.
(9) Berl. klin. Woch., 1913, No. 48, p. 2237.

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milk, the casein precipitates without the addition of any rennet, after the principle suggested by Engel. To a liter of buttermilk they add a liter of water, and stirring the mixture gently boil for a short time. The mixture is allowed to stand for thirty minutes and then 1125 gm. of the clear whey removed. To keep the fat content unchanged 125 gm. of boiled cream are added to the residue. This then contains the casein and one-half the last albumin of a liter of buttermilk, the fat content of 125 gm. 20% cream plus the little in the buttermilk, one-half of the whey, and also half of the lactic acid of a liter of buttermilk.

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	Eiweiss Milch	This Mixture
Protein	31.9	26.5
Fat	20-25	29-31
Carbohydrate	12-16	....
Ash	4.09	3.96
P_2O_5	1.33	1.24
CaO	0.960	0.838

This mixture gives results, which are equally as good as those of Eiweiss Milch.

INFANT MORTALITY.

Liefmann[1] brings up once again the relation of heat to infant mortality. That the heat proper by its action on the child is a far more important factor than its action on the milk is shown by his statistics concerning heat and mortality. During April (1913) there were a few days of very warm weather, and the infant mortality all over Berlin at once increased markedly, absolutely independent of milk supply and without any pathogenic organism being discovered. He then goes over the statistics for the preceding years, and finds that many times during spring when the weather has suddenly gotten warmer that infant mortality at once increases. He believes an important factor is that in this season the houses are not heated, and the difficulty of adjusting the temperature of the home to the outside

(1) Deut. med. Woch., 1913, p. 1729.

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makes the child particularly susceptible. The peculiar thing is that boys are affected much more often than girls.

Summer Heat and Infant Mortality. Rietschel[2] maintains that, aside from its indirect effect in spoiling the milk, the high temperature in summer has a direct effect on the child's health. This may be acute, manifesting itself in coma, cramps, fever, diarrhea and vomiting, or it may be chronic, lowering the resistance and bringing about various changes in the organism, such as reducing the fermentative processes in the intestine, affecting the intestinal flora, changing the water content by increased perspiration and thus increasing the danger of skin and other infections. There is likewise danger of overfeeding on account of the increased thirst. Clinically we get all kinds of pictures, from acute intoxications to chronic summer diarrhea, with or without infection. To be sure, poverty, lack of fresh air, sunlight and proper care are factors in the production of these diseases, but all these causes exist in the winter also, and the excess of the summer over the winter mortality is to be attributed solely to the effect of heat which aggravates all the other disease-producing agents.

How Far Are Teachers Responsible for the Morbidity and Mortality of School Children? Abt[3] believes that the system of school instruction should consist of more intimate cooperation of the various forces that are interested in the great problem of education and child welfare. It would be well if parents obtained their first clews from the teachers concerning defects or deficiencies in matters pertaining to the school life and education of the child. The school physician and family physician should give aid and direction in all matters pertaining to the preservation of health and prevention of disease.

In summing up, one feels constrained to say that the teacher in the public school is restricted in as far as the prevention of disease and possibly the death of her pupils are concerned. She cannot easily go beyond the precincts of her school-room. Even here the sanitation

(2) Jahrb. für Kinderh., September, 1913.
(3) Interstate Med. Jour., October, 1913.

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is not altogether within her province. Certainly she has no jurisdiction over the child at home or at play. She will recognize the delicate child, the nervous child, possibly the one with special sense defects or physical ailments. These children she can report to the parents, to the school or to the family physician. When occasion offers, especially in the cases of older children, she can give brief health talks on the dangers which occur from infection, the pernicious effects of tobacco and alcohol, the dangers resulting from insanitary homes, improper feeding, unphysiologic manner of eating, the necessity of bathing, the health advantage of cleanliness, and one might continue suggesting almost innumerable topics. But to this her power to improve the health of the pupils is limited, on account of the very nature of school conditions. While in most cases she will take a personal interest in the health of each individual child, nevertheless it is almost impossible for her to do more than to offer suggestive advice.

In short, it is the prime function of the school-teacher to teach. It is the writer's own opinion that the final responsibility for the morbidity and mortality of school-children is in the least part to be assumed by the school-teacher. The relation of the school to morbidity and mortality, if there be such a one, must be referred to those higher up: the school system itself, the administrative boards and the highest officials.

Infant Mortality in the First Four Weeks of Life. H. Koplik[4] discusses infant mortality in the first 4 weeks of life, based on the statistics of the various state boards of health. Quoting from the record of the Michigan state board, he finds the statistics as typical of the conditions in this country:

"Some of the causes of infantile mortality are common to every locality, such as prematurity of birth and congenital defects. The health conditions under which the mother lives have an undoubted influence on the vitality of her progeny, and on the occurrence of premature birth. Hereditary influences, such as syphilis, or the degradation and drunkenness of parents, are also of importance. The inexperience with and neglect of their

(4) Jour. Amer. Med. Assoc., Jan. 10, 1914.

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infants by mothers is a most important factor in infantile mortality. Long hours of service of mothers among the industrial classes under improper conditions also is most serious in effect. As regards inexperience, it has been suggested that the deaths of first-born children should be separated from the general infantile mortality. Such returns would undoubtedly show that the rate of death in the first-born is higher than that in the other children; but some of the excess might be attributed to greater difficulty in parturition as well as to parental inexperience. Improper food and methods of feeding are responsible for a large amount of mortality in infants. When improper feeding is a chief factor in producing infantile mortality, a large proportion of the deaths are caused by diarrhea and digestive disturbances. Convulsions are a common result from the irritation produced by improper food."

The points of greatest interest are that the first week of life shows the greatest mortality, the number of infants dying being 71% to 73% of the whole number of deaths in the first four weeks. The second week shows a mortality of 13.5% up to 8% during the third week, and 5% to 7.8% during the fourth week.

DISORDERS OF NUTRITION.

Infantile Scurvy. J. L. Morse[5] calls attention to the increase in the number of cases coming to the Out-Patient Department in the last 4 years. This increase has been not only absolute but also relative to the total number of cases, as is shown by the following table:

TABLE I.

Year.	Number of New Cases.	Number of Cases of Scurvy.	Per Cent.
1904	2,579	3	0.11%
1905	2,533	11	0.43%
1906	2,288	4	0.17%
1907	2,075	7	0.33%
1908	2,407	6	0.24%
1909	2,062	5	0.24%
1910	2,311	11	0.47%
1911	1,967	12	0.61%
1912	1,932	13	0.67%
1913	2,416	21	0.87%

(5) Bost. Med. and Surg. Jour., April 2, 1914.

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An analysis of the foods was then undertaken to determine, if possible, the cause of this increase. The data in the records were, unfortunately, in many instances, incomplete. The food taken by these babies at the time of the appearance of the first symptoms of scurvy is shown in the following table:

TABLE II.

Condensed milk mixed with water or gruel	4
Proprietary foods mixed with water	14
Proprietary foods mixed with milk—raw	1
pasteurized	1
boiled	7
no data as to heating	7
Proprietary foods, no data as to milk or heating	10
Milk, plain, diluted with water or cereal diluents, or modified—	
pasteurized	5
boiled or scalded	23
no data as to heating	14
Breast-fed	3
Total	89

It would appear that proprietary foods, "stale" foods and the heating of milk to the temperature of pasteurization or higher, may all play a part in the etiology of scurvy. The fact that three cases developed in babies taking only breast-milk shows, however, not only that no one of these can be the exclusive cause, but also that there must be some other cause. The most striking fact in these figures is, however, that 54 of the 58 cases in which there are data as to the "freshness" of the food, were fed on foods which were not fresh, that is, containing either no milk or cooked milk.

Symptomatology. An analysis was undertaken, but was not very satisfactory because of the meagerness of the records in many instances. The results are given, however, for what they are worth. The first symptom noted was:

Crying on handling	69
Paresis	11
Swelling of legs	5
Abnormality of gums	2
Ecchymoses	1
Bloody urine	2
"Failing"	1
Condition discovered at hospital	2

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The following symptoms were noted at the examination, or were given in the history of the patient. They are undoubtedly incomplete, but presumably show something as to the relative frequency of the different symptoms:

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Tenderness of the legs and crying on being handled	93
Swelling of legs (thighs 10, lower legs 15)	25
Swelling of the arms	3
Loss of power in legs	20
Rigidity of legs	15
Inflammation of gums	37
Discoloration of urine or staining of diapers	6
Swelling of eyelids	1
Ecchymosis of eyelids	1
Ecchymoses	9

Errors in Diagnosis. The most startling feature of Morse's report relates to the errors made in diagnosis. The diagnosis of inflammation of the joints had been made in one of these cases, of fracture of the thigh in another, and of tuberculosis of the spine in still another. These figures do not give a correct impression, however, as to the frequency with which this disease is overlooked or mistaken for some other condition. This disease was recognized by the attending physician in but 4 of 37 cases seen by the writer in consultation or at his office in the last five years. It was overlooked entirely in 12, while the following diagnoses were made in the other cases:

Rickets	1
Rheumatism	4
Injury to spine	1
Disease of spine	1
Diphtheritic paralysis	1
Infantile paralysis	3
Acute nephritis	5
Tuberculosis	1
Teething	1
Injury to leg	2
Inguinal hernia	1

It is evident, therefore, that in spite of all that has been written and said about infantile scorbutus during the past 15 years, there are still many physicians who

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are not familiar with the disease or who, if they know of it, are unable to recognize it.

Pritchard[6] records 2 *unusual cases of scurvy.*

The first was a baby aged 9 months. When first seen the patient had been sick for 2 weeks, the case at the onset being diagnosed as "teething." The condition, however, did not improve, and the child became obviously ill, with a running temperature ranging between 100° and 101° F., quick breathing, and a rapid pulse. The striking feature of the case, however, was the development of a generalized edema, which gave the infant a very puffy and bloated appearance. This condition naturally gave rise to a suspicion of some involvement of the kidney, but the urine showed no trace of albumin or other abnormality.

When seen she was evidently in a serious condition; the respiration rate was about 90, the temperature 101°, and the whole body enormously swollen and edematous. There was little or no tenderness of the limbs, only slight sponginess of the gums, and no indications of hemorrhage from the kidneys, bowels, or other organ in the body, and beyond rapidity of action no abnormality could be detected in the lungs or heart. The reflexes were slightly sluggish, and the infant lay in a distinctly lethargic condition. From a review of the method of feeding it appeared that this was an abnormal case of scorbutus, and so subsequent events clearly proved, for although on the following day the infant had hemorrhage from the bowel, subsidence of the edema and recovery from the other symptoms took place almost miraculously under antiscorbutic treatment. The interest of this case lies in the extensive development of the edema from which no part of the body seemed exempt.

The second infant, aged 10 months, fell from a cart onto a mat on the floor; it did not appear at the time to be seriously injured, but the same evening a swelling gradually appeared on the side of the head on which it had fallen. On the following day the infant was examined and at the time did not show any serious symptoms beyond the swelling on the head which had now attained to considerable proportions. Examination showed no

(6) Lancet, June 7, 1913.

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evidence of cerebral pressure, but on inquiry it was discovered that the infant had not been well for some days before the accident. The child had been lethargic, disinclined to move, had had no appetite, and seemed generally indisposed. The method of feeding again was not without its significance. There was general tenderness over all the limbs, and evidently strong aversion to being moved or otherwise disturbed. The gums were spongy and purple. An antiscorbutic diet of orange-juice, raw meat-juice, egg water, and milk was prescribed and the writer strongly advised against aspiration or other interference with the hematoma, which by the time of his examination had assumed an enormous size. The general condition rapidly improved under this treatment, and at the end of 10 days it had practically returned to normal health and showed an increase in weight of over 18 oz.

Starch Injury. I. A. Abt[6a] reports two cases of starch injury in infants, the condition which the Germans call *"Mehlnährschaden."* The author comments on the fact that few, if any, cases have been reported in the English literature.

The disease presents itself in three main types:

First. Atrophic—resembling marasmus.

Second. Hydremic—with retention of water in the tissues, leading to edema.

Third. Hypertonic—characterized by muscular rigidity and excitability, resembling tetany.

The treatment consists in the administration of milk containing a moderate quantity of fat. Carbohydrate food, such as buttermilk mixtures, malt soup and cereal decoctions, should be avoided. Best of all is breast-milk. Even with the use of breast-milk one should consider the damaged tolerance of the organism and small quantities frequently repeated should be administered; first 2 ounces, 6 ounces, 10 ounces per day increasing gradually. Even with the use of breast-milk the cure will not be rapid. If breast-milk is not available, it has been suggested to use small quantities of undiluted cow's milk, 1 to 2 ounces per day, gradually increasing to 3 ounces

(6a) Jour. Amer. Med. Assoc., Oct. 4, 1913.

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and eventually to 6 ounces; finally by gradual increase to 10 or 12 ounces.

Case I., aged 10 months, was on an exclusive diet of strained oatmeal gruel without milk from the age of 4 months to 10 months. The child was rachitic, pasty and swollen, the abdomen was covered with a diffuse purpura hemorrhagica and there was a well-marked keratitis on both eyes. After 59 days' treatment the eyes had cleared up entirely, and the child was discharged in good condition.

Case II., aged 3 months, breast-fed for the first two weeks, on ½ milk and ½ oatmeal water for the next three weeks, was then given plain oatmeal water, without milk, until 3 months old. The stools became thin, the baby was markedly atrophic. Small doses of breast-milk were given, and three weeks afterward the child began to gain in weight, and from this time on she made a rapid recovery.

Acid Intoxication. T. C. McCleave[7] states this is an extremely common phenomenon in a variety of pathologic conditions, but in children, usually from 2 to 10 years old, we see very frequently a symptom-complex in which acidosis is a marked and constant characteristic. Attacks are commonly recurrent, and may come on suddenly or be preceded for a day or two by a prodromal period in which are observed listlessness, anorexia and coated tongue, and, quite strikingly, a bluish pallid ring around the mouth and beneath the eyes, with dusky cheeks. Headache may be complained of, and there is usually a coryza and injection of the conjunctivæ, with a variable cough. Intense nervousness, even to marked meningismus, may be exhibited in the beginning, though always as the attack progresses, and frequently throughout, the child is apathetic and, in extreme cases, may even develop coma. In any but mild cases, the appearance is indicative of serious illness. The face is pinched and pale, or often cyanotic, the eyes become sunken and dull, the lips are dry and cracked, the teeth covered with sordes, and the tongue dry and brown over the dorsum, with "strawberry" edges. The abdomen is retracted,

(7) Jour. Amer. Med. Assoc., Nov. 15, 1913.

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and general wasting may be extreme. The skin is dry and harsh, often scaling after a severe attack.

The breath is foul, but the sweetish, fruity odor of acetone can always be detected, and frequently permeates the entire room. There is always fever, rarely exceeding 102° or 103° F., but occasionally very high. The pulse is soft, rapid and irregular, and the respirations sighing and irregular, often slow and deep, with marked "air hunger," both clinical and experimental evidence seeming to show that the acid poisons have a direct depressing effect on the vasomotor and respiratory centers.

There is no desire for food, and vomiting, except in the mildest cases, is always present, and often extremely intractable. Large amounts of fluid may be vomited, and the rapid dehydration occasions a most intense thirst, the child constantly pleading most piteously for water. The bowels may be constipated, or, less frequently, loose, with green or gray foul stools. The urine is scanty, and may contain albumin, casts and blood. Prostration, in severe cases, is always marked, and not infrequently a fatal termination seems imminent; but deaths are very rare. The duration is from one or two to seven or eight days.

Diagnosis, when one is familiar with the condition, is usually not difficult. Acute digestive disorders may be excluded by the absence of a history of dietetic errors, and the persistence of the vomiting and other symptoms; acute appendicitis by the absence of pain, tenderness, and rigidity; disease of the brain or kidneys, or beginning meningitis, at first readily suspected, by the progress of the attack, and the early development of the characteristic urinary findings. Acidosis and vomiting are frequently observed at the onset of an acute infectious disease.

The etiology and pathology of this condition are still obscure. Because of the infrequency of death from this cause, we have almost no necropsy data. In children who suffer from periodic attacks of acid intoxication or recurrent vomiting, there is probably almost always some chronic focus of infection, adenoids, diseased tonsils, or what not, the toxins from which, being constantly ab-

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sorbed, act primarily on the liver. From time to time, by the cumulative effect of the toxins, or to further disturbance of the already impaired metabolism by dietetic indiscretions, or by excitement, fatigue or other nervous element, there results a failure of the liver properly to perform its functions. The processes of carbohydrate metabolism are first disarranged, the frequency and severity of the attacks in childhood, perhaps, being due to the fact that the reserve supply of glycogen in the liver is not so great, proportionately, in children as in adults, and that therefore any interference with the glycogen-storing or glycolytic powers of the liver, there being no longer a proper supply of sugar available, induces an immediate disturbance of fat and protein metabolism, manifested by the appearance in the urine of toxic bodies.

The little patients who suffer from this disorder offer excellent opportunity for successful therapy. Of fundamental importance, of course, is the determination and proper treatment of such foci of infection. Adenoids and bad tonsils will be most commonly found, and their removal is usually followed by complete cessation of the attacks. Similar relief has frequently resulted from appendectomy. Next may be placed a properly balanced dietary, low in fats, with ample carbohydrate (breadstuffs, crackers, dry cereal preparations, rice, etc.) with simple sweets and milk and lean meats in moderation, with plenty of green vegetables and fresh fruits. Citrus fruit juices are of especial advantage because of their content of potassium citrate which is converted in the body to carbonate, and so tends to maintain the alkalinity of the tissues. Grape-juices, being rich in alkaline salts, are also valuable.

Constipation may be overcome by dietetic measures or by mild saline aperients if necessary, and the general hygiene should be carefully conserved by a quiet outdoor life with avoidance of too great fatigue and excitement. Drugging is not to be recommended except that in children with frequent recurrence of attacks, a periodic thorough emptying of the large bowel with a saline laxative or castor oil, with the administration of a dram or two of sodium bicarbonate one day per week may be

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beneficial. The routine daily use of an alkali is, of course, inadvisable because of its deleterious effect on gastric digestion.

Impending attacks, if recognized, may often be aborted by prompt catharsis and the free use of sodium bicarbonate. Routine examinations of the urine will often give warning of the approach of an attack even before the onset of prodromal symptoms. In the treatment of an established attack, the bicarbonate is valuable not because of any neutralizing effect on the acid bodies, but because it stimulates their excretion, and probably exerts a protective influence on the body fats. It may be given by stomach, if vomiting does not prevent, or preferably by rectum, in doses of 60 grains in 3 or 4 ounces of water every three or four hours, or more or less continuously by the drip method; and in extreme cases, by intravenous injection. To meet the need for carbohydrate, sugar must be given in that form in which it is most available for utilization, namely, dextrose. It, too, may be administered by mouth, by rectum, in a 4% solution with alkali, or by hypodermoclysis if the symptoms are urgent. So-called "corn-syrup," sometimes recommended for this purpose, is commercial glucose, derived from starch by the action of HCl under pressure of steam, and as it contains only about 30% of dextrose and over 50 of dextrin, it should not be used if true glucose can be obtained.

Extreme drying out of the tissues may be counteracted by saline infusions, prostration by appropriate stimulants, and nervous symptoms by opium, chloral or bromids, or by ice-packs or moist packs. As the vomiting subsides, gruels may first be given with orangeade or other fruit-juice drinks, gradually increasing the diet to normal.

Convalescence is frequently surprisingly rapid, and the patient, except for the wasting, will soon show no signs of what, a few days previously, appeared to be so serious an illness.

An *unusual type of acid intoxication* was met with in 9 cases by I. A. Abt.[8] They were severe cases and

(8) Amer. Jour. Med. Sciences, January, 1914.

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usually terminated fatally. They occurred mostly in previously healthy infants at about the weaning period. In most instances the infants came from healthy parents. In one family two children had died from this affection. The third child was similarly attacked, but recovered after a severe illness.

The illness usually occurs in large, robust, previously healthy infants. In some cases the children show a stationary weight curve for several weeks before the onset. If fed at the breast, they show signs of hunger and dissatisfaction with the food because the breast milk is scanty or of poor quality. Some of the infants in this series were artificially fed for weeks or months before the onset of the illness.

The disease is ushered in by gastro-intestinal symptoms, consisting of more or less diarrhea, and nearly always vomiting. The patients are at first restless and show moderate febrile reaction during the first days, rarely exceeding 101°. Later on the temperature tends to be lower, averaging between 99° and 100°. On the second or third days there is some abdominal distention, dyspnea, with rapid respiration and an increase in pulse-rate. The respirations are labored, and the accessory muscles of respiration show marked activity. The liver is markedly enlarged, the edges are plump, and the surface firm. The urine soon contains albumin, and hyalin and granular casts, without blood, with acetone and diacetic acid. In one of his cases leucin and tyrosin were also found. There is no sugar.

About the third day stupor is noted, which gradually deepens into coma. The blood shows no pathologic changes, the leucocytes vary between 9,000 and 12,000, and the differential count shows no variation from normal. Toward the close of the disease intestinal atony may occur. As a result, no feces or gas are passed voluntarily, nor can any intestinal evacuation be induced by mechanical or therapeutic agents. Abdominal distention increases progressively, and cyanosis and dyspnea are marked. Unconsciousness continues, and occasionally vomiting persists until the end. The reflexes are present and normal. There are no symptoms of cranial nerve involvement, and usually no pulmonary compli-

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cations. When death takes place it generally occurs in four or five days after the onset.

In 4 of these cases, necropsies were performed, the principal findings being fatty degeneration of the liver and other organs.

In the literature one finds scant mention of this extreme form of acid intoxication in infancy. Possibly some of the severer forms have been described as acute yellow atrophy of the liver, though in none of Abt's cases was jaundice present. The liver remained constantly large, not atrophied, as in acute yellow atrophy. The presence of leucin and tyrosin is not pathognomonic of acute yellow atrophy, since both substances may be found in small amounts in urine in extreme degenerative diseases of the liver, such as afebrile jaundice with slight hepatic enlargement, leukemia, typhoid fever, and other diseases.

From the urinary findings, from the symptom-complex, and from the almost universally fatal termination we are justified in assuming that some profound intoxication has taken place in the infant's organism.

Chondrodystrophia. Chiari[9] reviews the literature showing that if one reads carefully one finds that chondrodystrophia is often a hereditary condition, if not directly transmitted from parent to child, at any rate occurring in families. He quotes 19 cases from the literature to prove his point, and cites 2 of his own. These were children of the same father but of mothers who were sisters. The father was normal in size, but his father was a typical chondrodystrophic dwarf.

GASTRO-INTESTINAL DISEASES.

Abt[1] gives a résumé of the *classifications* of gastro-intestinal diseases of infancy which have been advanced up to the present. He states that we find great variation in clinical description and in the interpretation of the gastro-intestinal disturbances of infancy. The classifications, in so far as they have been made, have been influenced by the prevailing thought of the period. In an-

(9) Münch. med. Woch., 1913, No. 5, p. 248.
(1) Lancet-Clinic, March 7, 1914.

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cient and medieval times, classification of disease was elementary and imperfect. In the anatomico-pathologic period the profession was possessed by the thought that every disease must have not only a distinct anatomic location, but must be represented by gross anatomic and histologic changes in tissue and cells. Virchow pronounced the dictum that every physiologic type must have its pathologic prototype. With him cellular pathology was sufficient to explain disease processes of almost every kind. With the advent of the bacteriologic era, the flora of the gastro-intestinal tract was most assiduously studied. Normal and abnormal organisms were discovered, but it was soon found that bacteriologic investigation had its limitations. It was settled for all time that some gastro-intestinal diseases were definitely due to bacteria, but it was shown also that there was a group of infantile intestinal diseases which seemed to bear no definite relation to the nature, number or kind of bacteria.

Then began the investigations of food and the physiology of their digestion, perversion of digestion, studies in metabolism, and the effect of anomalies in the constitution of the individual in so far as they could affect digestion and nutrition. Classification, then, of the gastro-intestinal diseases of infancy at any period can consist only of a systematic arrangement of the knowledge of that period. A real classification can be made only when a sufficient number of facts are accumulated to explain the nature of the disease processes. It is evident, too, that the various arrangements into groups of diseases reflect the prevailing medical opinion of the time. Progress has been slow; the labor and energy which has been expended in the study of this disease group has not been in vain, and need not be done over again. If the anatomico-pathologic findings are insufficient to explain the facts, then possibly the bacteriologic investigations may shed more light. If the latter are insufficient, then possibly chemical and physiologic investigations may assist in unraveling the mysteries of the difficult problems which present themselves.

The writings of Wiederhofer represent the anatomico-pathologic era in the classification of gastro-intestinal

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diseases of infants. The classification is a long and painstaking one, including diseases of the stomach and intestines. Wiederhofer in an ingenious way endeavors to reconcile pathology and anatomy with general symptomatology and his own bedside observations. The observations were acute and unerring; clinical descriptions were painstaking; there were wide gaps in the knowledge concerning causation and interpretation.

Jacobi (1887) contributed a valuable monograph classifying diseases into gastric and intestinal affections, and in a later paper considers the infective causes of intestinal diseases, particularly dysentery.

Biedert (1878-1894) gives it as his opinion that the cause of gastro-intestinal disease in the majority is due to food. He lays great stress on a condition which he terms "fat diarrhea" and he recommends a classification based on the appearance of the stool. He considers in detail overfeeding, the diseases due to decomposition of proteins, diseases due to excessive fat feeding, and a group of disturbances produced by excessive sugar, especially as it occurs in breast milk.

Baginsky represents the transitional period from the anatomico-pathologic to the bacteriologic era. He thought that micro-organisms were not specific; nevertheless, the common saprophytic bacteria of the intestines were capable of taking on virulent activity and becoming pathogenic. Though foreign bacteria may gain access to the gastro-intestinal tract, they may, according to Baginsky, wander from the intestine into other organs, such as the kidneys; they rarely occur in the blood. He says the severest disturbances are caused by the action of bacteria on the foodstuff, producing fermentation and toxic products.

The labors of Booker, of Lesage and Escherich did not show any specific micro-organisms for the diarrheal diseases. Escherich considered that gastro-intestinal diseases might be due to ecto- and endogenic causes. The ectogenic gave rise to toxic gastric catarrh, while the endogenic caused infection of the chyme, with dyspepsia.

The American Pediatric Society (1894) offered a classification which is very extensive. The enteric diseases are divided into non-inflammatory and inflammatory.

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The non-inflammatory may be mechanical, such as dilatation of the colon, prolapse of the bowel and polypi. The classification is extensive, though in many instances non-committal. The system is complicated and seems difficult of practical application.

It is evident that the digestive disturbances of nurslings were in the past classified variously according to the progress of physiology, pathology and bacteriology. The oldest classification was based on symptomatology. One would suppose that pathologic research and knowledge would have led to a simpler classification. This, however, was not the case. The classifications of Wiederhofer and Baginsky were not inclusive. The pathologic knowledge was vague and in most cases indefinite. It was also observed that one and the same pathologic lesion was associated with a varied or inconstant clinical course.

Thus, it was noted that inflammatory conditions as a basis for classification of the digestive disorders in infants resulted in disappointment. Terms like gastric catarrh, intestinal catarrh, gastritis and enteritis are confusing and require considerable elucidation in every instance, and pathologic conditions were persistently assumed which did not really exist. As improvement in pathologic investigations and technic occurred, lesions which were supposed to exist could not be confirmed. Although bacteriologic research furnished interesting and valuable information concerning normal processes in the digestive tract, it did not afford data for classification of pathologic processes of gastro-intestinal disorders. In this respect bacteriologic classification failed. Some authors attempted to refer all digestive troubles to bacterial action, and when the ectogenic causes of disease could be excluded, then the normal endogenic microorganisms of the intestinal tract were supposed to be capable of taking on pathologic activity and producing the disease in question.

Czerny and Keller insist that aside from the intestinal disorders which are explained by pathology or by bacteriology, there are many disturbances of nutrition which could be understood only by a knowledge of infantile metabolism. All three modes of investigation are of the greatest importance, and none should be used exclusively

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while others are neglected. Since the most enlightened students of this disease group can not accept a bacterial cause for the entire group of gastro-intestinal diseases, it is necessary to divide them into two classes:

1. Those diseases which are evidently bacterial in origin.

2. Those in which there is no evidence of a bacterial infection.

It is well known that bacteria take part in all the normal processes of digestion. This does not imply that they are always causal factors in disease. This very fact led Czerny and Moser (1894) to make a general classification into two groups—dyspepsia and gastro-enteritis. Czerny and Keller in their "Ernährungsstörungen" say that the names of the two groups were unfortunate, because they have been employed by other authors in former times with various meanings. Nevertheless, the basic idea was accepted and was finally made use of in the classification of the Pediatric Section of the International Medical Congress, 1900. Czerny and Keller insist that the digestive disorders of infants should be separated from those of older children. This was in contrast to the older writings of Wiederhofer and Baginsky. Czerny and Keller propose the following classification:

1. Digestive disturbances *ex alimentatione.*

2. Digestive disturbances *ex infectione.*

3. Digestive disturbances through congenital anomalies.

Czerny attempted an etiologic classification. An objection has been raised against the etiologic classification based on the fact that our knowledge of the causal factors is deficient and incomplete.

The question has been raised, also, whether one single cause was sufficient, or whether there were several causes in combination to produce nutritional disease.

Thus: Will overfeeding produce serious disturbance in children who are normal and not suffering from a constitutional disorder?

Or: In considering food injury, may we neglect such influences as infection, hunger and summer heat?

Czerny believes that excessive fat may be productive of great injury. In the splitting up of fats the fatty

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acid residue may cause irritation to the gastro-intestinal mucosa, or it may combine with the alkalies of the body thus eliminated in the feces, producing the so-called soap stools. In going a step further, experiments have shown that the body is robbed of its alkalies in the attempt to neutralize the acids. The infant is thus suffering from an alkalipenia, and the free acids are producing acidosis.

If starch be given in excessive quantities for an extended period of time, particularly if it be used without the addition of milk, it may lead to disastrous results. The salts contained in the starch food, as well as the starch itself, tend to combine with water in the tissues, leading to water retention. A condition of inanition results, and the resistance of the infant against infection is lowered.

The digestive disturbances through constitutional anomalies depend on some inherited defect in the structure of tissue and organs. Thus, the far-famed exudative diathesis does not depend upon the feeding, but upon a congenital vice. In such infants, eczema, lymphatic enlargements, bronchitis and bronchial asthma and eosinophilia manifest themselves to a greater or less extent despite the quantity or quality of food.

Finkelstein believes that the term "nutritional disturbances" is preferable to that of "gastro-intestinal disturbances," because the disease group manifests itself not only by local lesions, but also by the involvement of other organs and functions. Infectious processes in various parts of the body are frequently associated with gastro-intestinal disturbances.

In the most recent report from Finkelstein's clinic we learn that whey, with its sugar and its salt content, is a potent factor in the causation of the alimentary disturbances, though he maintains that bacterial growth is favored by the damage to the intestinal mucosa caused by the whey ingredients. He believes that these disturbances may at times occur in the stomach and upper intestine. These regions, which are usually sterile, may become the seat of bacterial invasion, especially if whey products have been partaken of. The classification of Finkelstein, like all of the others which have been offered in the past, is schematic. It could not be otherwise

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because of the deficiency of detailed knowledge of the subject. He divides the subject as follows:

1. *Weight disturbances,* characterized by a diminished tolerance for milk, especially milk fat. The infant does not thrive. The weight is stationary, as a rule. The bowel movements are hard, dry and formed.

2. *Dyspepsia* is a more severe disease manifestation than the foregoing. It is characterized by a diminished tolerance not only for fat but also for carbohydrates. Such children do not gain in weight; they tend to suffer from diarrhea and fail to increase in weight even if the diet is increased, constituting the so-called paradox reaction.

3. *Decomposition,* a condition characterized by marked loss in weight, low temperature, slow pulse. The loss in weight continues even when considerable food is administered; the child is easily infected, or infection takes place readily. A marked intolerance for fat and carbohydrates is present. These infants are subject to secondary infectious processes, as furuncles, abscesses, etc.

4. The next clinical group is *alimentary intoxication,* characterized by fever, disturbances of consciousness, albuminuria, rapid superficial breathing, great intolerance for food, particularly for sugar and other whey constituents.

In considering the disturbances produced by breast milk, he refers to underfeeding as well as the dyspepsia produced by overfeeding. Disturbances of nutrition on account of congenital perversions of the constitution receive attention; *e. g.,* he discusses the neuropathic constitution, the exudative diathesis and errors in development as factors influencing digestion and nutrition. He also considers the effect of quantitative changes in food which refers to overfeeding and underfeeding. Passing to the next qualitative changes, he pays particular attention to the injuries produced by starch. He devotes a chapter to parenteral infection, and insists that infants suffer infections because food tolerance has been lowered by disturbances of nutrition, the lowered resistance which results in consequence making infection possible. He concludes with a chapter on the infections of the gastro-intestinal tract, though he believes that parenteral

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infections are more frequent than genuine gastro-intestinal infection. He concludes by saying that knowledge of the gastro-enteritis of infants, so far as bacteriologic facts are concerned, is only slightly developed, and consequently present views are subject to considerable changes in the future. He devotes a chapter to infections, gastro-enteritis, typhoid, septic infection, and concludes with a short chapter on colitis.

It is doubtful whether this much-involved subject can be clarified by a single stroke. In order that we may interpret our cases at the bedside, teach and describe this disease group, a working hypothesis, based upon some classified arrangement, is an absolute necessity. It is true that uniformity is much to be desired. This much-desired end can only be reached when unaniminity is born of knowledge.

Tobler[2] discusses the *severe forms of anorexia* in infants and says it is often difficult to determine whether the anorexia is the primary cause of the infant's malnutrition or is secondary to the general condition. First we must be sure that the infant is not getting sufficient caloric value, in spite of his drinking small quantities by volume, as often the breast milk contains more fat than we suspect. Then again many infants are very particular about their bottles, and any little variation in the technic, as forgetting to add the accustomed saccharin, will cause them to refuse the bottle. Many children will wait for days rather than accept new food in a bottle, or take solid food from a spoon. Again, where obtaining the milk is associated with difficulties, as in a poorly-flowing breast, the child soon tires of his work, or in cases where nursing causes pain, as in pharyngitis, or when it causes dyspnea as in a cold.

But there are many cases where the cause of the anorexia is not so evident, endogenous causes as severe nutritional disturbance, faulty cerebral development and congenital idiocy, and especially the reverse, the over-developed, nervous child. For therapeutic purposes we must ask ourselves: (1) How can we stimulate the appetite? (2) How can we get sufficient food to the

(2) Deut. med. Woch., 1914, No. 7, p. 313.

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child, in spite of his aversion to taking it? (3) What technic can we use for forced feeding?

(1) We can accomplish considerable with the food, not giving too much diluting fluid, regulating the temperature, sweetening with saccharin or cane sugar. Some children like raw milk better than boiled. The nipple must have a large hole, and the bottle held in the hand. Again increasing the number of bottles may be of value. Fresh air, light, and exercise is equally as important to the infant's appetite as they are to the adult's. A cool bath, and a good alcohol rub may be effective, as is also the example of another hungry child. Of medications Tobler has had little result, with the exception perhaps of pepsin with HCl.

(2) One can aid a breast child by pumping off the milk. For a bottle baby we can make the concentration greater by means of the various foods on the market, but must be careful not to make the diet too one-sided and always to cover the need of the child for water. This can be given, if necessary, per rectum.

(3) A specially-made spoon may be of service—a spoon with a sort of nozzle-like end, which prevents the

Fig. 1. Specially-made spoon (Tobler).

food from spilling, and which can be used in premature children to introduce the milk into the nose. For older children and difficult cases gavage is the most satisfactory way. One uses a 13-16 Nélaton catheter, oils it, and introduces it rapidly through the nose into the stomach. The filter is held 8 to 12 in. high. That this is harmless is shown by the report of a French author who on one child in a period of two years did it 2,500 times.

[Many, though not all, the cases of anorexia occur in neuropathic children. With this class no one plan of treatment is as effectual as isolation of the infant, and removal from home surroundings.—Ed.]

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A Rapid Method for Estimation of Total Fat in Infant's Stools. Cowie and Hubbard[3] presents this:

The Sample.—If pulverized stool is examined, 0.25 gram should be carefully weighed. If fresh or moist stool is examined, 0.5 gram. An inexpensive prescription balance is sufficiently accurate for clinical purposes. The stool, if dry, is best weighed in a poised watch glass and transferred to glazed paper. Moist stool is quite easily removed by means of a spatula from glazed paper on which it is weighed, or from the watch glass, by means of water. The sample is carefully rubbed up in a thin-lipped mortar. A maximum of 20 c.c. of warm (104c) distilled water is used to transfer the mixture to a Babcock milk bottle graduated in *fiftieths*. A little practice enables one to transfer the entire sample with the first 10 c.c. of water, leaving the remainder to rinse off the mortar and pestle.

1. To the sample, now thoroughly mixed, 17.5 c.c. H_2SO_4 (1.84) is added. Great care should now be taken to mix thoroughly by shaking vigorously (all the organic material except the fat must be completely burned, or the test will be a failure).

2. One c.c. amyl alcohol is now added and thoroughly mixed.

3. The tube is now carefully counterpoised and centrifugalized for 3 minutes at high speed. Enough hot water is then added to bring the fat into the graduated portion of the stem of the bottle. The bottle is again counterpoised, centrifugalized for 1 minute and the number of divisions on the stem occupied by the fat read off. Care must be taken to keep the stem hot and all readings must be made while it is hot. This is quickly accomplished by immersing the bottle in a pitcher or beaker of hot water.

Calculation.—If 0.25 gram of stool has been used, multiply the number of divisions on the stem of the tube occupied by the fat column by 7.2; if 0.5 gram is used, multiply by 3.6; the result is the perecentage of fat in the sample examined.

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(3) Amer. Jour. Dis. Child., Sept., 1913.

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The Pathogenesis of Casein Curds in the Stools. Hess[4] presents the following conclusions:

The large curds are formed in the stomach. The fact that they contain no bile in their interior goes to prove that they are moulded before they reach the level of the duodenum where the bile is poured into the intestine; the additional fact that they disappear when the food is introduced by catheter directly into the duodenum, and reappear when it is once more given by mouth must be accepted as strong evidence toward this conclusion.

The author believes that it is an open question whether these curds cause serious disturbances. He believes, however, that the curds should not be allowed to persist, but should be checked, either by a high degree of pasteurization or by boiling the milk. Brenneman and Ibrahim simultaneously (1911) showed that the casein curds in the stool can be controlled by boiling.

Indigestion in Infants. Mumford[5] presents a classification of intestinal indigestion in infants which will cover most of the digestive disturbances. He states that an ideal classification is almost impossible, as one based on pathology, chemistry, bacteriology or symptoms will not include all the types. Excluding those types occurring with the infectious diseases, nephritis, nervous conditions, he groups the indigestions under 2 heads with subdivisions:

I. Infectious.
II. Non-infectious.
  A. Irritative.
  B. Assimilative.
    1. Proteid.
    2. Sugar.
    3. Fat.

Infectious.—This is the cholera infantum of most textbooks. The author does not believe that this should be considered as an intestinal indigestion any more than should typhoid. It is a true infectious disease of known pathology, etiology and symptomotology.

(4) Amer. Jour. Dis. Child., June, 1913.
(5) Jour. Indiana State Med. Assoc., July 15, 1913.

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The treatment is largely that of any toxemia. Plenty of water, hot packs, and fresh air are essential. Following the work of Kendall, he limits the food to a carbohydrate solution, preferably 6% lactose. The proteid element of the food should be kept low for some time. Local treatment consists of hot saline irrigations and the application of a 3% solution of silver nitrate to the colon.

Non-infectious.—The irritative type results from some undigested food, as unripe fruit, etc., and is usually seen in older children.

The proteid indigestion is practically never seen. The tough proteid curds often seen in the stools will disappear if the cow's milk is boiled.

Sugar indigestion usually results from proprietary foods containing a high carbohydrate percentage. The treatment consists of an initial dose of castor oil, a period on plain water and then a mixture of low sugar content.

Fat indigestion is the most common type, according to the author. It is almost as common in breast-fed as in bottle babies, and results from overfeeding and too frequent feedings.

The treatment consists in the use of a fat-free food, with a gradual return of the fat element. The caloric value of the food may be kept up by carbohydrates. The author advises 4-hour intervals between feedings.

Wieland[6] writes of the *severe digestive insufficiency of older children.* We are so accustomed to considering gastro-intestinal disturbance as a condition limited to the nursling, that we pay little attention to it in the older child. There are children, however, who even in the second and third years react to every slight change in diet with a severe disturbance, as if the digestive tract had remained in an infantile condition.

These children are often breast fed or rationally fed during infancy and seem normal. Some, however, have suffered even during the early months. The primary stages of the disease are usually overlooked and start when a mixed diet is instituted. At first the appetite is increased and only after a time do the parents notice the cessation of growth, pallor, lack of energy

(6) Corr. Blatt f. Schweiz. Aerzte, 1913, No. 40, p. 1249.

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and increasing abdominal circumference. Or sometimes the intercurrent severe diarrheas first draw the attention —which are prolonged and slow in healing. The children look almost bloated, are flaccid, have an anxious expression and are inclined to subnormal temperature. Urine is decreased and often contains indican. The stool may be either a fermenting loose mass of acid reaction and odor, from a carbohydrate intolerance, or a whitish, paste of penetrating odor, often shimmering and filled with mucus from a fat intolerance. As both types usually exist together, the picture depends on the diet. As months go on attacks become more frequent and may follow very mild errors in diet, or parenteral infections and leave the child always more and more susceptible, forcing the parents gradually to restrict the diet to the tightest food.

This condition was first described by Schuetz in 1905, and much more exactly by Herter in 1908. The latter observer believed it was a reversion of the intestinal functions to the infantile type and was caused by a specific intestinal infection by certain bacilli and cocci. Heubner in 1909 described the condition as a congenital defect and believed the bacteria described by Herter to be incidental. Czerny considers the condition a neurosis.

In differential diagnosis tuberculosis of the peritoneum or of the bowel may play an important rôle. Here the von Pirquet reaction is of great importance.

In spite of its long course and severe symptoms, the prognosis, if good therapy and diet is employed, is not so very bad.

Therapy consists of treating the child as if he were a nursling. High carbohydrate mixtures are to be avoided, however, due to the intolerance, while small quantities of fat are usually well borne. A diet rich in protein is probably the best.

Wieland then reports in detail two typical cases. The first was entirely cured by "Eiweiss Milch." The second child seemed to be doing very nicely under this therapy when she died very suddenly. An autopsy showed no apparent cause for the sudden death, and a most careful examination of the intestinal tract showed nothing except a little thickening of the mucosa. Wie-

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land concludes death must have been due to some unknown change in metabolism.

[The author calls attention to a very numerous and interesting group of cases. There is no doubt that this ailment may be due to injudicious feeding in early infancy, but in the vast majority of instances, it may be assumed the condition is due to an insufficiency of the digestive system. Heubner first called attention to these cases and described them under the caption of "digestive insufficiency."—ED.]

Pyloric Stenosis in Infancy. C. L. Scudder[7] states that a pyloric tumor is always present. It is oval in shape, hard and firm, smooth of surface and in size equal to that of the terminal phalanx of the finger or thumb. The tumor consists of an overgrowth and hypertrophy of the circular fibers and presents a distinct mechanical obstruction to the passage of food. The narrowed canal is further encroached upon by an enormous hypertrophy of the longitudinal folds of the mucosa. Secondary to this obstruction there results, an empty intestine, thickened or stretched stomach wall, dilated esophagus and emaciated body.

Vomiting occurs soon after birth, it is projectile and persistent. Palpable tumor. Visible peristalsis, due to Nature's effort to overcome the obstruction. Constipation, meconium-like stools; epigastric fullness, progressive loss of weight.

Spasm of the pylorus is not associated with a permanent tumor and occurs in irritable, excitable, neurotic, bottle-fed babies. The stools contain fecal matter and the vomiting has not the characteristics of the tumor case. *X*-ray after a bismuth feeding is of considerable assistance in doubtful cases. The occurrence of bismuth crystals in the stool after the administration of bismuth subnitrate by mouth is significant of something passing through the pylorus.

The mortality is high. Most cases die of starvation in about 3 months. Some cases of partial obstruction reach maturity undeveloped and poorly nourished.

The treatment should be surgical at the earliest pos-

(7) Illinois Med. Jour., July, 1913.

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sible moment, because no true case of pyloric stenosis with tumor has yet been cured by medical means. Heubner's results are to be accounted for on the basis of a mistaken diagnosis or a temporary cure. The estimated mortality under medical treatment is over 80 per cent.

Gastro-enterostomy has been shown by chemical and clinical tests to have no deleterious effects on the metabolism of the body.

As to what becomes of the muscle tumor at the pylorus after operation the question naturally arises: does it disappear as the child grows older? The evidence collected from the *x*-ray from physiology from the post-mortem table, and from clinical observation, points pretty conclusively to the fact that the muscle tumor does not materially change; in other words it still obstructs.

X-Ray Studies of Congenital Hypertrophic Stenosis of the Pylorus. Mixter[8] presents *x*-ray studies of 10 cases of pyloric stenosis. He emphasizes the following points:

1. An early diagnosis is the most essential factor in lowering the mortality from this disease.

2. The bismuth *x*-ray will conclusively demonstrate the presence of pyloric obstruction.

3. In any case in which careful medical treatment has been unable to check the vomiting and progressive loss of weight, and where a pyloric obstruction can be demonstrated by *x*-ray, even if the differential diagnosis cannot be definitely made between hypertrophic stenosis and pylorospasm, exploration should be advised.

4. *X*-rays, taken at varying intervals after operation, show the obstruction to be permanent.

5. In the cases studied, spasm was of no importance as a factor in the obstruction.

6. In true stenosis, therefore, surgery offers the only hope of cure.

7. The infant develops normally after posterior gastro-enterostomy.

22 Operations. H. M. Richter[9] reports his results by operation on 22 infants suffering from congenital pyloric stenosis, the largest series heretofore published.

(8) Bost. Med. and Surg. Jour., Aug. 28, 1913.
(9) Jour. Amer. Med. Assoc., Jan. 31, 1914.

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Nineteen were of the type described as hypertrophic; 3 were of the spasmodic type.

In the author's series the essential features of the disease presented a striking uniformity. The onset was always within a few weeks of birth and usually abrupt. The first symptom was spitting up or vomiting, accompanied almost from the start with marked constipation and very soon with a rapid loss of weight. These symptoms were uniformly progressive. The symptoms were unaccompanied by any symptom suggestive of peritonitis. The lower abdomen was uniformly found empty, the upper bulging and tense. Passing across the upper abdomen from under the left costal margin to the right, extraordinarily marked peristaltic waves were easily shown. In 18 cases a pyloric tumor was easily palpated. The author believes that the *x*-ray bismuth examination should be limited, as a diagnostic measure, to determine the rate of emptying the stomach, not the patency of the pylorus, as small amounts may be forced through in all cases.

Of the 22 cases, only 3 died. In 19 typical gastroenterostomy was performed, in 2 submucous pyloroplasty and in 1 a divulsion of the pylorus. All of the babies who survived are normal in development at present and none have shown any post-operative sequel in the form of hernia or obstruction.

[The operative treatment of pyloric stenosis is undoubtedly gaining ground. In the hands of well-trained surgeons and under proper indications, operative treatment seems a rational and life-saving procedure. It is as important, however, to select the surgeon as it is the case.—Ed.]

Diarrheas. H. Koplik[1] reviews the various classifications of summer diarrheas to date. No classification of a disease can be said to be complete until it rests upon the firm basis of pathologic and pathogenic knowledge. The writer refuses to commit himself to any "pet set of theories," because he feels that in the next 10 years theories which hold the minds of students today must give way to more definite data when our clinical, physi-

(1) Archives Ped., July, 1913.

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ologic and pathologic methods have undergone a refinement and perfection today unknown.

Gildmeister and Baerthlein[2] report bacteriologic investigations of the stools of diarrheal cases during the summer of 1912. This season was characterized by considerable rainfall and by infrequent periods of heat, not of great duration. They examined 70 cases of diarrhea, of which 14 contained blood; and 120 normal children. In the 70 sick children, in 9 cases dysentery bacilli were found, in 4 cases paratyphus, in 1 case *B. enteritidis*. Of the normal children in only 1 case was the dysentery bacillus found. As regards the remaining flora *B. proteus* was found in 31% of sick children, in 9% of the well; *B. pyocyaneus* was found in 10% of sick children, in 3.3% of the well; *B. coli* was found in 31% of sick children, in 7.5% of the well. The cocci were not investigated.

In all dysentery cases the stools were thin, watery, contained much mucus, and usually macroscopic blood, but not in every such stool were dysentery bacilli found. The latter were typical in all their cultural reactions and in 2 of 5 cases tried, a specific agglutination reaction appeared in the blood. In 3 the serum reaction was negative. The cases with paratyphoid showed nothing of particular interest and showed no positive serum reaction.

Acute Diarrheas of Infants. Smith[3] discusses the infectious diarrheas of infants, caused by the gas bacillus and the dysentery bacillus. They are characterized by frequent loose, watery stools, usually green in color with fine white curds, considerable mucus, pus and blood, high temperature, vomiting and signs of toxemia and prostration.

The prognosis is grave. The infants die within a few days of the first symptoms or occasionally the disease becomes chronic in character but ends fatally.

Treatment consists of: Treatment of the toxemia, which is by far the more important, and secondly, treatment of the local condition. A cathartic should be given to clean the intestinal tract so far as possible. For this,

(2) Deut. med. Woch., 1913, No. 21, p. 982.
(3) Interstate Med. Jour., September, 1913.

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castor-oil is best, then water should be given freely and all other food withheld. The amount of water should be equal at least to the amount of liquids which the child would be taking were he taking a normal amount of food for a child of his age and size. If the child is unable to take water by mouth it should be supplied in some other way. Usually tenesmus and frequent movements prevent the giving of liquids by rectum, so subcutaneous injections are necessary. For this normal salt solution is used. Following this initial purgation and starvation, after 12 to 14 hours a 5 per cent. lactose solution should be given. This supplies a certain amount of nourishment and prevents formation of toxic products. Living matter needs proteid, and this must be supplied in the food to prevent too great a drawing upon the proteid of the body. Just when anything other than lactose should be given must be decided in accordance with the individual patient. Milk should be withheld for a considerable length of time. It is rarely wise to increase the diet so long as the temperature is elevated or the stools contain blood. Dextrose infusions 2.5 per cent. may be given as another means of supplying food and liquid. Stimulation is often necessary. Irrigations of the colon with normal salt solution or sterile water should be given twice daily provided they are not followed by a severe depressing reaction. If there is a tendency to collapse they should not be given at all. A certain number seem to be benefited by an astringent injection. For this purpose one pint of a 3 per cent. silver nitrate solution injected after a cleaning irrigation with sterile water has proved most valuable.

In gas bacillus dysentery the symptoms and stool picture are like bacillary dysentery. The bacterial examination of the stools, however, shows the gas bacillus in large numbers.

Prognosis is good provided the proper treatment is started early. The treatment consists in the administration of a food of high proteid and low carbohydrate composition. The gas bacillus develops easily on a carbohydrate food and its growth is not self-limiting. After the initial purgation buttermilk should be administered, by stomach tube if necessary. The composition of this

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PLATE I.

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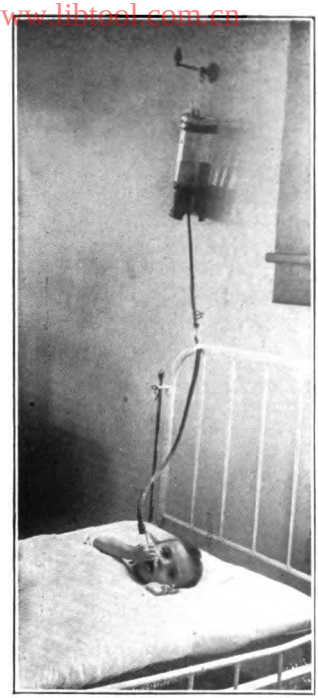

Mouth-drip. Infant sucking on nipple. The glass dropper and regulating stop-cock may be seen just above upper rail of bed. Care should be taken that the tube does not drag, and, by its own weight, tend to be pulled away from the mouth of the infant. In order to avoid this, it can be suspended vertically (as shown in the illustration) or, still better, it can be so arranged that the part near the nipple rests horizontally on the bed. To obviate, furthermore, a tendency of the nipple to be pulled away, it will be noticed that the comparatively heavy glass dropper is placed at a considerable distance from the nipple. Another detail, perhaps worthy of mention, is that before the drip is started the fluid is allowed to fill the entire tube: after it is filled, the regulating pinch-cock is applied so that the fluid falls drop by drop—Hess (see page 51).

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food fulfils the requirements, and the presence of the lactic acid bacilli is unfavorable to the growth of the gas bacilli.

There are many cases of infectious diarrhea in which the dysentery or the gas bacillus is not present in large numbers. These cases are undobtedly caused by organisms which as yet cannot be exactly classified. Future study will reduce the undetermined cases to a minimum. The treatment of these cases must be along the lines outlined for bacillary and gas infections—feeding either carbohydrate or proteid as response in the individual patient may indicate.

The Mouth-Drip. A. F. Hess[4] describes an apparatus which he uses to advantage in cases where it is important for the infant to consume large amounts of water.

This method has the advantage that fluid entering the upper intestinal tract is absorbed more completely than that which is given subcutaneously or by rectum. Furthermore, in acute enteritis the irritability of the bowel is so marked that the rubber nozzle is not well retained and, indeed, intensifies the diarrhea. The apparatus is the same as the rectal drip except that, instead of a nozzle, an ordinary rubber nipple is attached to the end of the tubing by a glass connecting-piece. The baby is encouraged to suck on this nipple for the greater part of the day and in this way obtains a large amount of water, hypotonic salt solution, Ringer's solution or other fluid. The nipple at times falls from the mouth, so the nurse must replace it from time to time. (See Plate I.)

Treatment. Birk[5] is often asked, "What medicine do you give for your diarrheal cases in children?" A vital point is first to determine whether the child is or is not a breast-fed baby. To take up the breast-fed child first, even in the newborn one meets with severe diarrheas. These are usually serious, meaning a sepsis, and are probably evidences of an intestinal infection. In such cases giving the intestinal tract a rest, and then starting with minimal doses of breast milk is probably the best therapy.

As regards alimentary disturbances of the newborn

(4) Jour. Amer. Med. Assoc., Feb. 7, 1914.
(5) Deut. med. Woch., 1913, No. 27, p. 1289.

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on the breast, their etiology is usually overfeeding. For a time this may cause no trouble, but then usually colic, vomiting and green stools occur and the weight curve may remain stationary or go down. One should be very careful, however, not to make the diagnosis from the green stools alone, which are of no importance if the other symptoms of a disturbance are not at hand. In these cases it is self-evident that medicine is of no value, and our whole treatment must be in regulating the diet. In the severest cases one might give a preliminary dose of castor-oil. To place the child on five feedings a day will correct the overfeeding. If these cases with diarrheal stools are doing well and are gaining in weight, one must emphasize the importance of leaving them alone. To blame the diet of the mother for these diarrheal disturbances is an absurdity and does not belong to modern pediatrics. The trouble lies with the baby, as evidenced by the fact that in many cases where a woman is nursing two babies, one may have green diarrheal stools and the other perfectly normal ones. This type of child usually has what Czerny describes as an exudative diathesis, *i. e.*, the tendency to eczema, intertrigo, catarrhs, adenopathy and asthma. In these cases local therapy to the intestine as laxative, hunger, and astringents is of no value. The ideal thing to do is to leave the patients alone, and after a few months they make a spontaneous recovery.

Going to the other extreme, what is one to do for constipation in breast-fed children? Birk arguing from the same standpoint as in dyspepsia, says that as long as the child is on the breast he is safe. Therefore constipation itself, as long as the child is doing well, is not an indication for active treatment. As the idea of the daily bowel movement is so firmly fixed in the mind of the public, however, one may have to make concessions, and in these cases if there has been no bowel movement for two days he sometimes gives a teaspoonful of syrup of figs or of castor oil. As soon as the children get old enough to take solid food, usually the bowels become regular.

The real field for active therapy is in the acute disturbances of the artificially fed. These occur from

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bacterial action on the milk, either outside of the body or in the intestinal tract. Probably the first ingredient to be affected is the sugar, and secondly the fat, with the production of fatty irritating acids. This gives our indication for treatment in two directions—

To reduce the sugar in the food and to change this fermentation into putrefaction.

To accomplish this purpose medication is of little value, but judicious diet is usually effective. To stop fermentation one should first give no food for 24 hours, to let the intestine become empty. Tea or water may be given to any extent. For the next two days barley water is added and then milk is gradually started again. This suffices for the mild cases. For the severer cases, however, particularly in those children who have been repeatedly sick, nothing equals "Eiweiss Milch." The mixture with its low sugar and high protein content is particularly adapted to overcome fermentation and change it to putrefaction.

As to constipation in the artificially fed, it is well to remember that constipation is usually secondary to a metabolic disturbance in the child and that many times by increasing the milk one can actually cause injury. This point Czerny brought out in his description of "Milchnährschaden." In these cases one must reduce the milk and make up the deficiency in calories by carbohydrate. The ideal mixture for these cases is Kellar's malt soup. Cathartics in such cases do no good, and may even do harm.

In diarrheas of the older children it is well to give a dose of castor oil and then barley water for a day or two. Instead of giving astringent drugs Birk rather prefers astringent foods, as Eichel kacao or blueberry juice with arrowroot, sago or farina. On the third or fourth day he adds zwieback and then gradually increases the diet. One must be careful in adding milk, as this frequently causes a recurrence.

For constipation in these older children one can also do a great deal with diet alone. An increase in vegetables and carbohydrate, with a decrease in milk and eggs frequently is sufficient to bring about a cure.

[It is encouraging to note that general attention is

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being directed toward the abuse of cathartic drugs in infancy.—ED.]

Monti[6] in discussing the drug therapy of diarrheal conditions warns us that many astringents given are dissolved in the stomach, absorbed in the upper intestine and never really reach the seat of the disease. To have such a preparation really efficient it must be made insoluble to gastric juice. Bismuth bitannate put up by Heyden as "Tannismut" fulfills these conditions. Experiments on men and animals show that this drug is acted upon only in the intestine, and that it is split up and absorbed very slowly. Its effect, however, on the intestinal epithelium is rapid and its action prolonged. It worked excellently in the diarrheas of older children, and also of infants, though, of course, we must not forget, as Monti points out, that in the case of the infants a concomitant correction of the diet may also have played a very important part.

Treatment by Bulgarian Bacillus. Clock[7] gives his results in 117 cases, with 1 death, a severe case of enterocolitis, which had gone 2 weeks without treatment. There were 4 examples of enterocolitis and 113 of gastro-enteritis (47 mild, 52 severe and 14 toxic).

Duration.—The average period of time that the condition had lasted, prior to instituting treatment, was one week; the longest duration of the condition, before treatment, was 3 weeks, and the shortest period was 2 days. *Number and Character of Stools.*—In 46 cases, the number of stools per day, before treatment, was from 10 to 15; and in the remaining 71 cases, from 6 to 10. The general character of the stools was loose or watery; they were green, had an offensive odor, and contained varying amounts of curds, mucus, or blood. Mucus occurred in 63 cases, and blood was present in 18 cases before treatment. *Vomiting.*—This had been present in 70 cases. Many of these patients had been troubled with persistent vomiting, all food being rejected soon after it was taken. *Fever.*—This was present in 49 cases; the temperature ranged from 100.2 to 104.2 F. *Diets.*—Sixteen patients were breast and 101 were bottle-fed.

(6) Wien. med. Woch., 1913, No. 37, p. 2262.
(7) Jour. Amer. Med. Assoc., July 19, 1913.

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The most impressive facts, which stand out boldly as the result of this method of treatment, are:

The gain in weight, in spite of the number of stools.

The rapid change in color of the stools to yellow.

The rapid subsidence of fever.

Absence of mucus and blood from the stools at the end of 48 hours.

The fact that the hygienic surroundings of the patients and the degree of intelligence of the mothers had no influence on the results. A starvation diet, accompanied by purgation, is productive of loss of weight and strength, and serves to prolong the course of the disease; and further, such a procedure can no longer be advanced as a rational method of treating infantile diarrhea.

The digestive powers in infantile intestinal conditions, even when associated with fever, are not so impaired as to prevent the digestion and assimilation of a milk diet. This fact is corroborated in typhoid fever, where the high calorie diet, in contrast to the starvation diet, has reduced the mortality to a remarkable degree. Moreover, the cases herein recorded prove the value and rationale of continuing a milk diet in infantile intestinal conditions.

In severe cases, best results are obtained by administering a large number of the tablets during the first two or three days of the treatment.

The implantation method of treatment has progressed beyond the experimental stage, and the results of its use can no longer be questioned or disputed. In order to secure the best results, in using the implantation treatment, a pure culture of the true *B. lactis bulgaricus* must be employed; otherwise, disappointment will follow.

The treatment consisted of the administration of a pure culture of the true *B. lactis bulgaricus*—the Type A organism. One or two tablets were usually given every two or three hours; but, in severe cases, two or even three tablets were given every two or three hours *before* and *after* each feeding—making a total, in some cases, of 42 tablets in twenty-four hours.

Seventy-four babies were continued on their respective milk diets; among this number were four breast-fed

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babies, ranging in age from 12 to 15 months, who were removed from the breast and placed on bottle-feeding composed of equal parts of whole milk and water; and 23 babies between 15 months and 2½ years who were continued on their mixed dietaries of milk, cereals, soups, etc. This number also includes 12 babies who were continued on breast-feedings, and 35 babies who were continued on their regular milk mixtures or on their regular mixtures slightly diluted with water.

The remaining 43 patients were placed on a starvation diet of barley water for 24 to 48 hours, after which small quantities of boiled, skimmed or whole milk were usually added to the diet.

An initial dose of castor oil was given to 29 patients, but no cathartic was given during the course of the disease to the children on a milk diet.

Schwartz[8] records his *experience in 55 cases* of gastro-enteritis, treated by the same method.

The home conditions of these infants were for the most part wretched, as over 90 per cent. of the parents were very poor, ignorant and superstitious. The cases varied in severity from moderate degrees of infection—6 stools a day, to the most grave—20 and more passages. In a few of the babies the stools were blood-stained at the time treatment was begun. The diarrheas had been present anywhere from one day up to a month or more. From 3 to 10 lactic bacillary tablets a day were given to each baby, depending on the gravity of the illness.

Of the 55 cases treated, 16 were breast babies, 32 bottle, and 7 breast and bottle. The babies ranged in age from a few weeks up to two years; 47 were in the first year of life. In 33 children there was diarrhea but no vomiting; in 20 there were both vomiting and diarrhea; and vomiting was present alone in 2 cases. The stools were generally green, watery or curdy, foul, slimy and in a few blood-stained. A temperature over 99° F. was present in 20 cases. Some had as high as 105° F. Some of the patients received no treatment other than the tablets; no starvation, no purgation and no other medication. Seventeen cases received an initial

(8) Med. Record, Jan. 24, 1914.

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purge of calomel and castor oil and were kept on barley water alone for 24 hours or less. As a matter of fact, very few of the mothers of these infants actually kept the babies off milk even for this short period of time. Saline irrigations were used in 27 of the 55 cases and bismuth in small doses was administered along with the tablets in thirteen cases.

The results obtained were as follows: Forty-three children gained in weight outright; 2 lost; 3 gained and then later lost, and in 7 there was no change of weight recorded. Of the 43 whose weight increased 23 started with a loss. There were no deaths. In all cases the temperature came down to the normal within a few days, except where there was an associated condition, such as a bronchopneumonia. Within two or three days the stools became yellowish or brown, well-formed, free from curds, mucus, and blood. The number of stools sometimes decreased and sometimes remained unchanged. To the latter children, bismuth subnitrate in tablet form was given in addition to the lactic tablets with very marked decrease in the frequency of the passages. The tablets seemed to have but slight influence on the vomiting.

Acute Dilatation of Stomach. Stierlin[9] reports a case following the eating of roasted apples. The vomiting persisted continuously. Passage of the stomach tube released a large quantity of gas under great pressure, and gave some relief. The following day the condition recurred and the general condition of the boy became much worse. On account of the critical condition it was decided to do a gastroenterostomy. A Murphy button was used, and the result was a complete success.

Reviewing the ideas as to the etiology of this condition, Stierlin is inclined to the views of Braun and Seidel, who showed by animal experiment that a somewhat similar condition can be induced by deep narcosis, by section of the vagi, or section of the spinal cord. The process probably depends on a paralyzing effect of the narcotic on the stomach nerves, allowing a complete atony, though errors in diet must also be of some importance.

(9) Corr. Blatt. f. Schweiz. Aerzte, 1913, p. 1089.

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Duodenal Sounding. Wolff[1] says that the duodenal tube is a great aid in the severe vomiting of children. The weight curve rises very rapidly as soon as the food is able to reach the duodenum. The only difficulty is to determine whether the duodednum has been entered. To aid its course he uses no pressure but lets it glide forward by itself, and then controls its position by the fluoroscope and by aspiration, but even these methods sometimes fail. The most satisfactory test he has employed is to let the tube enter up to the 50 c.m. mark, and then let a little food enter. When the child retches, if no food comes out either through the tube or beside it, he is reasonably certain that the tube is lying in the duodenum. To stop the retching a pinch of anesthesin is very efficient or anesthesin and saccharin.

Intestinal Sand. Talbot[2] reports a case of intestinal sand with a chemical analysis of the sand. The writer cites the work of Laboulbène, who reported the first case of intestinal sand in 1873. He found a sandy substance in the feces resembling brown or yellow sand, which he believed was of vegetable origin. Since that time there have been many reports of cases in which intestinal sand was associated with one or more clinical manifestations, and attempts have been made to show that the sand was a part of various forms of diathesis.

More recently Myer and Cook came to the conclusion that intestinal sand was not a part of any clinical entity but that, in their own case, it resulted from the ingestion of bananas. They found that after eating bananas sand invariably appeared in the feces after 24 hours and often continued for several days. It came in large quantities at first (from 1 teaspoonful to 1 tablespoonful) and gradually diminished in amount. If the feces were not manipulated too much, the grains were often found in chains. These chains correspond in arrangement and shape to the cylindrical cells in the milk-ducts of the banana. These cells contained highly refractive resin balls or masses, which were suspended in a fluid rich in tannin. They believed that these balls were affected by the secretions of the stomach and intestine in such

(1) Therap. Monatsh., 1913, p. 846.
(2) Jour. Amer. Med. Assoc., July 26, 1913.

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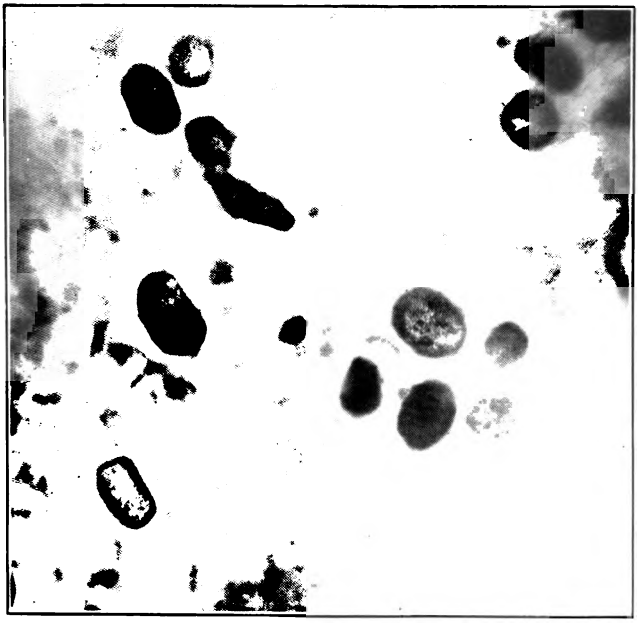
PLATE II.



Intestinal sand in feces, magnified 62½ times—Talbot (see page 58).

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a way that the resin was hardened and an insoluble tannate formed. They were unable, however, to reproduce the sand by artificial digestion or by placing the banana in fecal material. (See Plate II.)

The author has examined many hundreds of stools, both in the gross and under the microscope, during the past 5 years and has seen only two cases with intestinal sand. Both of the patients denied having eaten bananas within several months. The stools of many other children, who had eaten bananas, failed to show intestinal sand.

SCARLET FEVER.

Etiology. The cause of scarlet fever has never been definitely determined and the attempts to transmit it to monkeys have met with only very limited success. Kretschmer[3] believes that it is a streptococcic infection, though this assumption has not been proved or disproved with certainty. Many clinical facts seem to show that a special susceptibility on the part of the patient is an important factor in the development of scarlet fever, and that it may be regarded as an anaphylactic reaction to a streptococcic infection. The question of nutrition in the prophylaxis and treatment of scarlet fever deserves more attention than it has previously received. Overnourished and obese children are particularly susceptible to the disease. In treatment a mixed diet is preferable to a milk diet.

The "Döhle Inclusions." Gouget[4] remarks that over 20 years ago Döhle and Pfeiffer described as the cause of scarlatina certain formations within the leucocytes, which Gamaleia, Bernhardt and Höfer had found in the cells of different organs and which seemed to be protozoa. More recently (1912) Döhle announced that in 30 cases of scarlatina, in dried specimens of blood, he found constantly polynuclears containing inclusions of variable shape and size, staining like the nuclei. He believes these bodies are the degenerated forms of a spirocheta which is the causal agent of scarlatina. These inclusions have also been found by Kretschmer, and by

(3) Jahrb. für Kinderheil., September, 1913.
(4) Presse Méd., May 3, 1913.

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Nicoll and Williams in 45 out of 51 cases. Ahmed invariably discovered them on the 3d to the 10th day of the disease.

However, these inclusions are not limited to scarlatina, they are met with in nearly all infections. Loppmann and Hufschmidt assert they are of value in the diagnosis in the abortive and slight types of the disease. The exact nature of these inclusions is not yet settled. Bongartz believes they are nuclear fragments; Lippmann that they are the remains of cells ingested by the leucocytes.

Brinchmann[5], reviewing the subject of the Döhle leucocyte inclusion bodies, says that the work of the last two years has shown very definitely that they occur in other conditions. He repeated the observations on 150 cases and found them present in scarlatina especially, but also in diphtheria, meningitis, varicella, and rubeola. Examining the scarlatina cases, it is seen at once that these bodies are found in proportion to the leucocytosis and to the intensity of the illness. They are not found in the first day of the disease. They may be present for six weeks and are practically always present in every case of scarlet. These bodies take on different shapes, at times even resembling spirochetæ, but as they do occur in other diseases they cannot be considered as having to do with the etiology of scarlet fever. Probably they are formed by the protoplasm itself. They seem to have no relation to the fever.

Rumpel-Leede Phenomenon. This test was used by Richardson[6] in 210 cases of undoubted scarlatina, with positive results in every one. Of 15 cases of measles, 7 were positive, and of 8 examples of rubella, 4 were positive.

With a view of ascertaining how far the reaction was possible in cases other than scarlet fever, normal persons (13 in number), diphtheria (22 cases), whooping-cough (10 cases), chicken-pox (7 cases), influenza, pneumonia, and acute tonsilitis (1 each) were subjected to the test, and in no single case was a positive reaction obtained.

(5) Berl. klin. Woch., 1913, No. 27, p. 1248.
(6) Edinburgh Med. Jour., December, 1913.

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A domette bandage is tied tightly round the arm immediately above the elbow, the correct pressure being such that the pulse is just perceptible at the wrist. The bandage remains *in situ* for from 5 to 15 minutes; and at the end of that time, if the bandage has been properly applied, the arm should be markedly cyanosed. The bandage having been removed, the skin at the fold of the elbow on the side distal to where the bandage has been is examined for the reaction. This consists in the appearance of a widely varying number of minute petechial hemorrhages, fairly deeply seated, which do not disappear on pressure, and are, in fact, made much more evident by stretching the skin.

The conclusions arrived at in regard to this test are, on the one hand, that if no rash has been present there will be no reaction; this strongly suggests that if the test is negative the case will not be one of scarlet fever. On the other hand, if a rash of scarlatiniform nature is present on the body, there will almost invariably be a positive reaction, but, as has been shown, in the case of drug rashes, serum rashes, etc., the reaction is negative very soon after the rash has disappeared, while in measles and rubella the reaction does not persist beyond the end of the first week. On the whole, therefore, a positive reaction obtained when a scarlatiniform rash is present must be weighed up along with all the other facts of the case.

That the test is of the greatest value in the diagnosis of scarlet fever from the 4th or 6th day up to the 14th or 16th day or later can hardly be doubted, for it is during this period when the typical "red strawberry" tongue has lost its diagnostic appearance and desquamation in many cases not yet become evident, that it may be otherwise impossible to arrive at a definite diagnosis.

Again, in all doubtful cases—cases where there has been only slight constitutional disturbance, where the rash is transient, the throat a little congested and the tongue never showing the typical red strawberry appearance—it cannot be questioned but that the Rumpel-Leede phenomenon is of value as an additional disagnostic sign.

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Pulmonary Complications of Scarlatina. While these complications are exceptional they are met with nevertheless. In 111 cases admitted to the Hôpital Trousseau in 6 months, R. Porak[7] found them in 8 instances. Two were especially notable: (1) Multiple abscesses of the lung and pyonpneumothorax; (2) pulmonary infarct from thrombosis.

Gerstley[8] confirms the work of Pospischill and Weiss, that diet is of no importance in the development of a nephritis in scarlet fever. Of 306 cases he placed half the number on a milk diet, half on a full diet; 40 cases of nephritis developed. Of these, 19 were on a full diet, 21 on a milk diet. His results agree also with those of Pospischill and Weiss, that those children on a full diet were happier, livelier, and looked better than the exclusively milk-fed children. A study of the blood findings in these patients showed those on a milk diet to suffer more as regards loss of HCl and red cells than those on the full diet. The meat diet seemed to have especial influence on the red corpuscles. Many children upon getting out of bed showed a sudden aggravation of their blood condition. These children usually had positive von Pirquet reactions.

Fatal Purpura Following Scarlet Fever. Biernacki and Dykes[9] report a case of fatal purpura, developing at the end of convalescence. It was most malignant, with extensive lesions in various parts of the body and the loose tissues were edematous and tender.

Early in the attack it seemed likely that the lesions would become gangrenous, but the patient died before any breaking down had occurred; also it was noticed before death that at points on the right leg and left arm the purpura was beginning to retrogress.

At no time during the course was there any bleeding from the mucous surfaces.

Hemiplegia. Savy and Favre[1] report a case of scarlet fever, which was suddenly complicated at the end of the eruptive stage by a right-sided hemiplegia, with complete aphasia, ending in death in coma.

(7) Péd. Pratique, March 5, 1913.
(8) Monatsh. f. Kinderheilk., 1913, p. 12.
(9) British Med. Jour., Oct. 11, 1913.
(1) Lyon Méd., May 25, 1913.

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"Reiteration" of Scarlatina. Clement and Roueche[2] report 2 new cases of recrudescence of scarlatina. The latter author in his thesis collected 9 instances of late secondary scarlatiniform eruptions in children convalescing from scarlatina. In the 2 cases referred to the eruption was accompanied by general bucco-pharyngeal symptoms, such as would lead one to suppose there was a new attack coming on sometime after the first. The secondary eruptions are accompanied by the same general premonitory signs—saburral state, fever, etc., the same bucco-pharyngeal symptoms, the same peculiarities in the progress of the eruption. And what is especially important, the changes in the tongue. For these reasons the authors believe that there is a new scarlatinal eruption, a recrudescence, or—to adopt Marfan's expression—a "reiteration" of the scarlatina.

Wolfer[3] gives the scarlet fever statistics during the course of a year in cases not treated specifically. He had—

185 mild cases with no deaths,
43 medium cases with no deaths,
13 severe cases with three deaths.

These three were complicated once with bronchopneumonia, once with purulent arthritis and once with sepsis. This gave a total mortality of 1.2% and of 5.3% for severe cases.

Gigon's 453 cases showed a death rate of 1.77%. The cases of Gigon were about the same as the author's as regards severity and complications. As regards therapy Reiss and Jungmann report excellent results in 12 severe cases with convalescent serum, as regards drop in temperature, better heart action, and generally bettered condition, but no effect on secondary infections was noted. Bjockstein used Moser serum in 82 cases, Szekeus a polyvalent streptococcus serum in 16 cases with apparently good results. Klemper and others used salvarsan, claiming that it exerted a beneficial influence on temperature and general condition. In 49 untreated cases the mortality was 24%. In 60 cases treated with salvarsan the mortality was 8.3%.

(2) J. de Méd. de Paris, May, 1913.
(3) Corr. Blatt f. Schweis. Aerste, 1913, No. 17, p. 513.

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Milne got no great results with eucalyptus oil. Jochman treated some patients with streptococcus vaccine, some with the antistreptococcus serum and some with both, and decided that the combined therapy was the best. He got no results from the vaccine alone.

The author concludes that his material from two different epidemics shows just as good results as to mortality as do the specifically treated cases.

Serum Treatment. In 1912 Reiss and Jungmann published their treatment with the serum of convalescents. Their conclusions were unconvincing and elicited much criticism. C. Rowe[4] has repeated their experiments, using the serum of patients convalescent from scarlatina, between the 21st and the 28th day of the disease. Only otherwise healthy persons, in whom Wassermann's reaction was negative, were thus utilized. From 100 to 200 c.c. of blood were withdrawn and stored in glass cylinders for 24 hours at room temperature, for the serum to separate out. This was now treated with a 5 per cent. solution of carbolic acid, one drop of which was added to every 10 c.c. of serum. This was kept on ice until wanted, but was never more than three weeks old before use. The technic of the injections was sometimes that adopted for salvarsan, small quantities of saline solution being injected before and after the serum. The author gives temperature charts of 5 cases thus treated. In every case the temperature was over 103° F. From 20 to 90 c.c. of serum were injected. The charts invariably showed a fall by crisis within a few hours of the injection. To compare the action of the serum of convalescents with that of healthy persons who had never contracted scarlatina, 5 cases of scarlatina in which the temperature was 103° F. or more were treated with normal serum. The results were similar to those of the first series of cases. In both the fever and the general symptoms showed rapid improvement, the temperature usually falling practically to normal after a few hours. The pulse fell with the temperature, and in a few hours the patient would fall fast asleep. In 24 hours the rash would be less, and two days after the injection it would

(4) British Med. Jour. (Epitome), Feb. 7, 1914.

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usually have disappeared. The sore throat and the condition of the tongue usually persisted for some days after an injection. Desquamation either failed to occur or was less marked than usual. It was found that doses of 40 to 65 c.c. of serum were sufficient, and that, if necessary, a second dose of 20 to 40 c.c. could be given next day. Doses of 70 to 100 c.c. are apt to cause rigors. The treatment is not suitable when high fever has lasted for over 5 days and when scarlatinal sepsis is present. It is also contraindicated when severe inflammation of the throat is accompanied by necrosis, extensive glandular swelling in the neck, and purulent rhinitis.

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Moog[5] reviews the treatment with convalescent serum, and offers as a control 25 cases of scarlet fever treated with injections of serum intravenously. The serum was, of course, from normal people. It was used in doses of 80-100 c.c. in children and 100-180 c.c. in adults. In his cases he got results very much like those with the convalescent serum. The earlier the injection the better the result. After the 3d day serum therapy is not of much value. The most noticeable effect is on the temperature, which after 2 to 4 hours falls as in crisis, reaching its lowest point in 11-16 hours. Simultaneously pulse and temperature fall. Cyanosis disappears, the pulse becomes stronger and fuller and the sensorium free. The patients feel subjectively much improved, and even the exanthem seems to disappear more rapidly. This description fits the ideal course of the serum action and was obtained in 7 of the 25 cases. They were cases of moderate severity. In 13 cases the effects were not so outspoken when judged by the temperature curve, although improvement in the general condition was very evident. In some cases the temperature arose again, especially when complications appeared, and so once more we see the great resemblance of the action of normal serum to that of convalescent serum, *i. e.*, its principal effect being on the toxic scarlet fever and not the septic disease.

Two patients were lost, one whose heart was severely affected from the start, in whom there was only tem-

(5) Therap. Monatsh., January, 1914.

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porary improvement following the injection, the second from a necrotic throat on the 15th day, though marked improvement had followed the injection. In three cases there was no reaction, but these three did not receive enough serum and one had a tuberculous pleurisy.

As evidence that this serum reaction is not a coincidence he cites the case of two brothers, the sicker of whom got the serum. He made the more rapid recovery.

The writer then reviews all the work done on serum treatment of scarlet fever and remarks how very closely the description of the effects of the Moser serum coincide with the effects of the convalescent serum, and his own serum, and he suggests that after all, the good results obtained from these remedies may be due to the plain horse-serum itself.

Reiss[6] describes the treatment with serum of convalescents. In the 3rd to 4th week he takes 100-200 c.c. of blood from the veins of the arm of an adult and in a child proportionately less into a sterile glass tube. He then centrifuges it and mixes the serums of at least three persons and puts it in ampules up to 50 c.c. after adding *m.* v of a 5% phenol. Every serum must be tested for sterility and Wassermann. He injects intravenously 50 c.c. into a child and 100 c.c. for an adult. He got good results in 40 severe cases with this treatment. The change is more rapid and striking than in any other disease and he feels sure many cases were saved that would previously have been lost.

Koch[7] describing the use of convalescent serum, says that after an injection of 50-100 c.c. in an average of 11 hours the temperature fell on an average 4°, often resembling a crisis. In some it remained low, in others it went up again, in one case it rose and after the second injection fell as in a crisis. It had no influence on duration of exanthem, on beginning of scaling, nor on complications. It worked best in toxic scarlet fever, the chief effect seemed to be in bettering the general condition. No case of nephritis developed. He says it resembles the Moser serum in its action and he is convinced that it is of great value.

(6) Ibid., 1913, Heft 6, 430.
(7) Münch. med. Woch., 1913, No. 47, p. 2611.

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Koch[8] describes the technic of conserving convalescent serum. One part pure carbolic acid is dissolved in 15 parts of water, so that the concentrated solution thus made is 6.7%. To 100 c.c. of serum one should use 0.5 gm. of the concentrated carbolic solution, making the solution thus contain 0.033 carbolic. This is ⅓ the maximal single dose. This does not sterilize but inhibits any bacterial growth in it.

MEASLES.

Poelchau[9] in discussing the epidemiology of measles and methods to be used in its control, believes that the main factor in the spread of the disease is the school. Unfortunately, there is no law existing in Berlin which enables the school physician successfully to subdue one of these school epidemics. To facilitate matters he offers the following suggestions:

1. As soon as a case of measles breaks out, every scholar who has not had measles must remain absent for 10 to 12 days. This will absolutely prevent the reintroduction of new measles cases into the building by newly infected scholars.

2. The brothers and sisters of the child affected with measles, who have not had the disease, must be kept from school for 14 days. This does away with a very great source of contagion, for the brothers and sisters almost invariably contract the disease.

He believes that if these two measures are adopted, school epidemics can be very successfully controlled.

Diagnosis. Gruman[1] adds a point which may be of value. In some cases where Koplik's spots were absent, he found a little exudate on the tonsils, which at first might be confused with a lacunar tonsilitis. It consisted of punctiform and linear white efflorescences averaging about ⅛ in. in length, but lying on the raised portion of the tonsil. Usually in the following day or two, the general eruption leads to the diagnosis of measles. He believes the etiology to be the same as that of Koplik's spots, namely, a superficial epithelial necro-

(8) Ibid., 1913, No. 52, p. 2912.
(9) Klin. Ther. Woch., 1913, No. 28, p. 837.
(1) Münch. med. Woch., 1913, No. 3, p. 132.

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sis, and he found this little symptom a very valuable aid in making an early diagnosis.

Von Pirquet Reaction. V. Pirquet[2] in studying the relation of his reaction to measles, made careful observations on 2 cases with positive reactions in the measles ward by trying the reaction daily, and also on various parts of the body. He found that the fourth day after the beginning of the exanthem was the point where the hyposusceptibility to tuberculin was most marked. From then the susceptibility gradually returned until it reached its original intensity by the second week. By the sixth to eighth days the reaction had begun to make its appearance. A very interesting point was the great difference in the nature of the reactions of the neck and the back of the foot. Both came back at the same time, but while the reactions on the foot were very marked, even more so than on the arm, the neck gave only a very slight reaction.

The Blood Count. Mensi[3] has examined the blood in 17 cases of measles at various periods of the disease. The age varied from 16 months to 3¾ years. During the eruption there was almost constantly a leucopenia and an eosinopenia. Before the eruption appeared (2 to 8 days previously) the usual condition was one of leucopenia; sometimes the leucocyte count was normal, and exceptionally above the normal. The eosinophiles were rather rare. After the eruption was over, in 3 cases a moderate leucopenia persisted, and in two the eosinophiles were absent. In the only case where leucopenia was absent during the eruptive stage the child suffered from a streptococcal stomatitis, and in cases where the leucopenia was only slightly marked a bronchopneumonia was coexistent. One child who was suffering from pertussis (where hyperleucocytosis usually is present) showed well-marked leucopenia during the attack of measles. In opposition to Hecker, the author found that in the eruptive stage there was some diminution of lymphocytes, and just before the eruption a diminution in the number of neutrophiles. Further observations are

(2) Wien. med. Woch., 1913, No. 39, p. 2518.
(3) Gazz. deg. Osped. (quoted in British Med. Jour., Feb. 21, 1914).

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necessary before one can test the value of the blood count in the early diagnosis of measles, and, in any case, such a method would only be practically useful where a laboratory was within easy reach.

Hamburger[4] shows that one cannot distinguish ordinary measles from German measles by eosinophile counts. In an epidemic of measles, he found in six cases an eosinophilia present at the height of the eruption. This refutes the claim of Schwaer who believed the presence of an eosinophilia to be characteristic of German measles only.

Periodic Cycles of Virulence. Brown[5] has collected statistics showing the periodic cycles of virulence in measles in Washington, D. C. The following table shows the death rate per 100,000 inhabitants from 1890 through 1912:

Year.	Deaths from measles.	Death rate in 100,000 of population.
1890	13	3.9
1891	70	28.9
1892	2	0.8
1893	17	6.5
1894	2	0.7
1895	11	4.0
1896	69	25.0
1897	1	0.4
1898	20	7.0
1899	22	7.6
1900	45	16.1
1901	11	3.9
1902	15	5.2
1903	45	15.3
1904	4	1.3
1905	8	2.6
1906	28	9.0
1907	6	1.9
1908	2	0.6
1909	39	11.9
1910	4	1.2
1911	22	6.5
1912	7	2.0

Pneumonia Complication. Maier[6] takes up the question of the relation of hygiene to the morbidity and mortality of the measles pneumonia. In the years

(4. Münch. med. Woch., 1913, No. 38, p. 2120.
(5) New York Med. Jour., June 7, 1913.
(6) Münch. med. Woch., 1913, No. 14, p. 636.

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1906-08 inclusive 30.6% of his 222 cases died and, of course, the main factor was respiratory complications. In the last three years ending 1912, he cut his mortality down to 16.6%. Why this great difference occurred was at first difficult to explain. One would be tempted to explain it by a difference of the epidemic, but comparing statistics outside of the hospital shows there was no difference. The main factor in reducing the mortality was undoubtedly the complete rebuilding of the ward, giving much more sanitary and hygienic conditions. The changes consisted in building light, airy rooms, improving the ventilation, and a linoleum covering over a cork floor. The side rooms were all greatly improved and convenient facilities for washing and disinfecting provided. Gowns were provided for all physicians and nurses. The brilliant results from these hygienic improvements are shown by the fact that in the three years following their installation, 68 less children died than in the preceding three years.

Lutz[7] in discussing rare pathologic findings in measles, claims that thrombosis may occur far more frequently than is now believed. Indeed, only a few writers have reported such cases. In a series of 22 autopsies on measles cases, he found in 8 a widespread thrombosis. In 6 the pulmonary veins were especially involved. Two of these six showed thrombi in the vessels of the brain, and five showed marked thrombosis of the right ventricle or its adjacent veins. In a seventh case the portal vein was thrombosed, and in the eighth, not only a branch of the portal vein but also several cerebral sinuses. The children were usually about 1½ years old.

H. C. Hoye[8] examined the mouths of 6 children in an institution who were infected with measles. The mouth in each case was in bad condition.

It is an interesting fact that many of the children, whose mouths were in good condition, and who were exposed to the infection, were not attacked by the disease, although they had not been made immune by a previous attack.

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(7) Berl. klin. Woch., 1913, No. 34, p. 1566.
(8) Bost. Med. and Surg. Jour., Jan. 22, 1914.

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The author hopes that other men, who have the opportunity, will observe the oral conditions found in cases of measles, occurring in their practice, and report them.

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DIPHTHERIA.

Epidemiology. Klinger,[9] in discussing the epidemiology of diphtheria, reminds us that it has the highest death rate of the diseases of children in Switzerland, and though the use of antitoxin has been a great factor in reducing mortality, still death often results from mixed infections. To reduce the mortality still more, one must first diagnose every case, especially the mild ones. A bacteriologic examination is most important, especially in chronic colds and pharyngitis of the nurslings. If the bacteriologic and clinical examinations do not agree, the bacteriologic test should be made once more to decide.

In cities where diphtheria is endemic, from 2-8% of people are carriers. In institutions sometimes 25-50% of inmates carry the germs in the throats. In children both sexes are equally affected. In adults women seem the greatest carriers—9% against 3% men. That these carriers are a real danger, he proves by quoting several epidemics due to them. Such carriers make fumigation of the house of no value in homes where there are several children. Whenever he finds a child harboring bacilli, he isolates it from school, making pharyngeal and nasal cultures every 8 days, until two are negative.

In many cases, however, the diphtheria germs carried are avirulent. Still we must be very careful.

To rid a throat of organisms, applications of every possible antiseptic have been made—vaccine, injections of serums, pulverized serums have all been used. Klinger tried injections of a spray of bolus alba mixed with boric acid solution to coat the throat and change the lymph stream. In some cases his results were very good.

What to do with carriers is difficult to say. They should be discharged from the hospital, but kept isolated in the country.

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(9) Corr. Blatt f. Schweis. Aerste, 1913, No. 21, p. 641.

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Hereditary Predisposition. Spring[1] takes up the subject of diphtheria from the standpoint of a hereditary disposition. He reports observations made in a Swiss village, isolated from its surroundings, with inhabitants marrying while very young. In this way his statistics are subject to as little criticism as possible and he was able in some cases to observe 3 generations. He cites 14 families where the parents and children suffered from diphtheria and contrasts this picture with 10 families where parents and children remained immune. He believes in these observations to have found strong support for his view that a hereditary disposition of the body toward the diphtheria organism plays an important part in the contracting of the disease.

Sykes[2] remarks with regard to diphtheria that mortality and morbidity seem higher among children with light eyes. Eyes can be divided into three types:

1. The simplex eye. This is either blue or gray, but no noticeable stroma pigment can be seen on the iris.

2. The duplex medium. Here both retinal and stroma pigment are visible. The background is blue or gray, but the stroma pigment is seen in small granules.

3. The duplex dark. Eyes of this type have so much stroma pigment that the retinal pigment is observed and the iris appears brown.

In a total of 1,163 children he found:

The simplex type	29.8%
The duplex medium	35.9%
The duplex dark	34.3%

In a study of 257 cases of diphtheria he found that the patients with the simplex type of eye seemed the most susceptible in every way.

Statistics of 679 cases of scarlatina showed the same results, but not quite so strikingly.

Prophylaxis of Diphtheria. L. Martin[3] points out that the prophylaxis of diphtheria comprises several indications, and if these are carefully followed out in each case proved bacteriologically and clinically, it will enable a successful effort to be made to lower the ravages

(1) Ibid., 1913, p. 1559.
(2) Lancet, 1913, p. 1538.
(3) Bull. Méd., Jan. 28, 1914.

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of this terrible disease. First of all there must be rigid disinfection during and after the disease; then systematic examination of the throats to recognize slight and abortive cases; next bacteriologic examination of the exudates to detect the "carriers." In the same family, there are about 50% of carriers, in schools during the times of epidemics there may be from 25 to 40% of such carriers. Lastly, preventive serotherapy should be resorted to at once in very young children, and may be used under certain conditions in older children and adults.

Diphtheria Bacillus. Berthlein[4] shows that diphtheria bacilli can take on many mutation forms. Those growing on glycerin-agar in large colonies produce a diffuse turbidity in bouillon, and on the bottom and sides of the test tube form a very delicate coating. Those growing on the agar as small transparent colonies form large coarse flakes at the bottom of the tube and leave the rest perfectly clear. He could also differentiate forms of diphtheria bacilli by their reaction to the Neisser stain, some having many, some only very few granules.

Virulence tests showed a marked difference in these organisms, as well as the ability to form toxin. He is now conducting experiments to see what relation these mutation forms of virulent organisms may have to the production of diphtheria antitoxin.

Obliteration of Arteries in the Limbs Following Diphtheria. This is infrequent and Bailly[5] has been able to collect but 17 cases to which he adds a personal one. Obliterations of the large arterial trunks in the limbs occurs exclusively in malignant or submalignant cases of diphtheria, complicated by cardiac lesions. So far they have only been seen in children. They appear suddenly in the course of the 2d or 3d week; and generally involve the lower limbs, only one as a rule, though exceptionally both are attacked.

Three types can be distinguished: (A) Sometimes death ensues a few hours or days after the obliteration before any further lesions have time to develop. (B) In other instances, the circulation is re-established in a few

(4) Berl. klin. Woch., 1913, p. 1017.
(5) Presse Méd., Feb. 14, 1914.

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hours or days, but this transient ischemia is generally followed sooner or later by permanent ischemia due to a new obliteration of the same or another limb, and ending in gangrene. (C) In the majority, circulation is but imperfectly re-established, dry gangrene invades more or less of the limb and calls for amputation.

This obliteration of the limb arteries may be preceded, accompanied or followed by symptoms denoting obliteration of other trunks, especially the pulmonary and cerebral arteries, the abdominal aorta, the splenic, renal or hepatic arteries.

Prognosis is grave, over one-half succumb to the cardiac complications. In the rest recovery only ensues after amputation of a portion of the limb.

It is uncertain as yet whether the cardiac thrombosis and the consecutive emboli are due to the diphtheritic intoxication or to some secondary infection.

Treatment, above all prophylactic, consists in the early, intensive and prolonged employment of serotherapy. When arterial emboli develop, all left is palliative treatment, limiting the gangrene as much as possible (use of hot air) and avoidance of secondary infections. After the line of demarcation has formed amputation may be performed, but only after the cure of the diphtheria is complete.

Antitoxin. Schick,[6] discussing the skin reaction of diphtheria toxin as a test for the use of antitoxin as a prophylactic says that many children have antitoxin in the blood and could be spared prophylactic injection. It has been shown (Lowenstein, Michels, and Schick) that intracutaneous injection of diphtheria toxin produces typical skin reaction. Use 0.1 c.c. of a mixture 1/50 of *m. l. d.* to guinea pig of 250 grams. In good injections one sees at once a white wheal. Marked redness like von Pirquet for 48 hours, though color is lighter. When the reaction is negative, the presence of antitoxin is assured.

A positive reaction may still be present with antibody present, however (hypersensitiveness, trauma, etc.). As patients sick with diphtheria have no antitoxin in blood,

(6) Münch. med. Woch., 1913, No. 47, p. 2608.

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a negative reaction in doubtful cases speaks against diphtheria. Newborn have antibodies in 84% and negative reaction in 93%, here injection is superfluous. Immunity sinks—at first year is 50% and from 2-5 years is 40%. The reaction remains unchanged for about four weeks.

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Beyer[7] discussing the administration of antitoxin says Donitz-Roux, van der Velde have shown that serum given subcutaneously is absorbed very slowly, taking sometimes 2-3 days. Morganroth recommends intramuscular injections. He speaks of various reports of intravenous administration, but these are not given in *comparison* to subcutaneous. He made comparative studies and found that subcutaneous injections needed twice as much antitoxin as intravenous to influence temperature and local findings. The fever sank more rapidly from intravenous, and local findings slightly favor intravenous, though both cleared up in about 4 days.

B. Hahn and Sommer[8] have been able to produce antitoxin in the blood, 100 days after the first injection of the new Behring diphtheria remedy,—antitoxin in sufficient amount to be protective. At the site of injection in many cases the skin was red and infiltrated, and also fever and headache occurred, but there was no relationship between these reactions and the quantity of antitoxin formed. As an index of the degree of immunity conferred is very important, the authors turned to an intracutaneous method. The reactions they graded as:

0—A redness 1/5 in. in diameter.
I—Redness and infiltration of 1/5–3/5 in. in diameter.
II—Redness and infiltration of 3/5–1 in. in diameter.

Injections were made in the skin between the shoulder blades in young children, so as to prevent them scratching and influencing the picture.

Previous experience has already shown the great variability in the reaction of various children to the injections, not to be explained by age, sex, nor previous attacks of diphtheria. Probably a family disposition was the most important factor. For this reason they used

(7) Ibid., 1913, No. 34, p. 1867.
(8) Deut. med. Woch., 1914, No. 1, p. 13.

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their weakest mixture which gave a reaction 1 with very mild constitutional symptoms. This could be increased on the 3rd and again on the 5th day if no reaction was obtained.

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In a few cases they used a stronger mixture. Experiences in a hospital are of doubtful value as regards the prophylactic value of the remedy, for as soon as a case of diphtheria is found it is isolated, but the observers made a very excellent use of the epidemic that flourished in several German villages. Of 633 made completely immune only 2 were taken sick, one with an abortive attack, and the other with a negative throat culture. Of those partially immunized (255) 2 cases developed, and of the insufficiently immunized (209) 1 case was found.

Some objection has been raised against the proceeding, as it might cause anaphylaxis if serum is used later. This objection is valueless according to the writers. Also the argument of a negative phase, they found not to hold good.

Schreiber[9] in discussing the prophylaxis of diphtheria justly states that antitoxin as a therapeutic agent is by no means ideal, both on account of the subsequent danger of anaphylaxis, also because of the short duration of the resulting immunity. He has also been trying the v. Behring preparation in sufficient dosage to produce from 100-250 units of antoxin in the blood. Injections were made either subcutaneously or intramuscularly. In 40 cases they were harmless, local reactions being no greater than with tuberculin, and in only 2 cases were the adjacent lymph nodes enlarged. In 5 cases there was a slight temperature.

The effect appears usually on the 23-25 day. This is, of course, an important objection, and makes one ask, "Is there first a negative phase of increased susceptibility?" This question has not as yet been answered, though evidence seems to preclude this.

Two other points of interest as regards prophylaxis against diphtheria, Schreiber believes to be the presence of bacilli in the urine, and also in the respiratory tract.

(9) Ibid., 1913, p. 928.

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As regards the active treatment of diphtheria, he rarely gives over 10,000 units and prefers injecting the serum intramuscularly. In doing the latter, however, one must be careful not to enter a vein and as evidence he quotes a case, where anaphylactic shock apparently followed. In case one is at all suspicious of an existing hypersensitiveness to the serum one should inject ¼-½ c.c. subcutaneously and wait for 8 hours. If a tendency to anaphylaxis exists an urticarial wheal will form. As regards the serum eruption, he saw it benefited in a few cases by the use of adrenalin. For mixed infections he has tried neosalvarsan intravenously and locally with good results.

Lactic-Acid Bacillus Spray. H. B. Wood[1] reports the results in 5 cases of diphtheria carriers by the use of a lactic-acid bacillus spray. A one-day or two-day culture on agar was washed off in sterile normal salt solution and used in a sterile atomizer. The live organisms were required; hence, no antiseptic was used in the spray or on the mucous membranes. These cases, which had been treated by various chemical antiseptics without avail, yielded readily to the spray. The success was rapid and marked, but with only a few trials no definite statements can be made. This suggestion is hereby offered that others may try the spray, as the staphylococcus is now being used for overriding local bacterial infections, so that its usefulness may be measured or the inadvisability of its use demonstrated. When unexpectedly encountering a case of rural diphtheria, the physician, if without antitoxin or antiseptics, may perhaps find some advantage in swabbing or douching the nose and throat with ordinary sour milk.

Following the suggestion of Wood, Nicholson and Hogan[2] used the lactic acid spray in 9 diphtheria carriers to overcome the Klebs-Löffler bacilli. Live sprays of lactic acid bacilli and in some cases sprays and swabs of lactic acid bacilli were used.

They obtained good results by this form of treatment and conclude: The results of the use of the lactic acid bacillus and sour milk in these few cases are encouraging

(1) Jour. Amer. Med. Assoc., Aug. 9, 1913.
(2) Ibid., Feb. 14, 1914.

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enough for us to make a further study in this direction. With the use of it and the intravenous method of administering antitoxin, the patients are kept in the hospital a shorter period of time than formerly. Before a definite conclusion can be reached in regard to the effect that these organisms have on the Klebs-Löffler bacilli and the cause of the antagonism between the organisms, however, a large series of cases must be studied.

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Staphylococcus Spray Treatment. W. A. Womer[8] working along the line of Alden and others who employed the spray treatment in carriers with good results, reports his observations in 42 cases. The spray consisted of a bouillon culture of *S. aureus* at least 12 hours old or a fresh suspension in salt solution. Only one strain was used. This organism was obtained from the throat of a child of a family in which 5 other children presented positive diphtheria throats, this one alone being negative and furnishing a pure culture of *S. aureus*. One member of the family had diphtheria, the others all receiving prophylactic doses of antitoxin.

Two classes of patients were treated: those who had showed clinical symptoms and still harbored the bacilli, and those who had not presented any symptoms but were healthy carriers.

Of 22 cases of diphtheria treated with the spray, 5 cases showed two negative cultures before thirty days, while of 22 cases not sprayed, 4 cases cleared up before thirty days. This would seem to indicate that the spray was not of much help in clearing up the throats.

In 20 healthy carriers treated with the spray, 7 cases showed two negative cultures before thirty days, while of 20 cases not sprayed, 4 cases cleared up before sixty days—not a very encouraging showing.

Of 42 throats treated with the spray, 12 cases cleared up before thirty days.

Of 42 throats treated without the spray, 8 cleared up before thirty days.

He concludes the use of the spray caused no unpleasant symptoms. The use of the spray did not appreciably lessen the period of quarantine. The preparation and

(8) Jour. Amer. Med. Assoc., 1913, p. 2293.

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distribution of the spray entails a large amount of work if there are many cases. Apparently most of the carriers do not spread the disease after sixty days from the day the disease begins. Public health officials could work more effectively if they had some practical method of determining the virulence of diphtheria bacilli found in the throats of carriers.

Alden[4] reports favorable results in the treatment of 16 carriers by the staphylococcus spray. The culture used was a composite one made by mixing equal portions of three different strains of *S. aureus,* isolated from throat-cultures. These were grown on agar and afterward transferred to broth. The material sent out was 30 c.c. of an eighteen-hour broth culture grown at 99.5 F. In view of his results the author thinks that the following conclusions are warranted: No patient having had diphtheria should be released from quarantine until at least two consecutive negative cultures are obtained from both nose and throat, and ear if symptoms are present. Antitoxin will not free the patient from the carrier condition, but some local application is necessary to rid the throat and nasal passages of *B. diphtheriæ.* In 15 of 16 cases the spray effectively cleared the throat of *B. diphtheriæ* after other methods had failed. Apparently no harm resulted to the patient from the use of the spray.

PERTUSSIS.

Wassermann[5] takes up once more the subject of whooping cough, as it plays such an important part in the mortality of childhood. He believes in spite of the pessimistic descriptions given by most text-books, that treatment is of some avail. As a specific treatment has as yet signally failed, one must resort to symptomatic remedies.

Since veronal has such a beneficial effect upon the vomiting of sea-sickness, following the suggestion of Rowland, the author tried this drug in pertussis. The result was surprising. Not only the vomiting disappeared, but the whole illness seemed to take on another

(4) Ibid., June 14, 1913.
(5) Therap. Monatsh., 1913, p. 727.

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feature. He believes, however, that the effects were due only to sedative action of the veronal. Of the older drugs used quinin alone seems to stand the test of time, and it also seemed to act as an anti-spasmodic. On the strength of this Winternitz combined the two in the combination he called "Chinenol." The writer tried this combination and can only report good results. The vomiting ceases, the paroxysms become less. If one gives quinin and veronal separately, one should give veronal in doses of 1/10 of the adult dose, and quinin in doses two to three times that of the veronal. It is well to remember that some cases of nephritis have followed an overdose of veronal.

[One should not allow himself to be unduly influenced by new drugs advocated for the cure of whooping cough. Nearly every remedy in the pharmacopeia, has at one time or another, been praised as a specific whooping cough remedy.—ED.]

The continued interest in sedatives led to the production of a new drug, "Bromural," by Sollmann. The drug seems harmless and the writer combined it with quinin. In doses of 0.3 *t. i. d.* it relieved severe pertussis very markedly.

Pauli[6] also reports a number of cases of pertussis treated with the synthetic combination of quinin and veronal (Chinenol). He gave it in doses of 0.1-0.2 put up in tablets. Though the course of the disease was not shortened, the paroxysms were lessened in number and severity, vomiting decreased and the patients improved markedly as to general condition.

Sylvester[7] calls attention to the high mortality in whooping cough. Ten thousand cases die annually in the U. S., and the mortality is approximately 77. The writer reports 8 cases which terminated in cerebral disorders, and believes that these cases were cerebral hemorrhage. In 2 of these cases a meningitis also developed.

The Pathologic Lesion. Mallory[8] reports his pathologic section studies in whooping cough. He found minute bacilli packed in large numbers between the

(6) Münch. med. Woch., 1913, No. 39, p. 1880.
(7) Bost. Med. and Surg. Jour., March 19, 1914.
(8) Ibid., Sept. 11, 1913.

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cilia of the epithelial cells lining the trachea. Better sections and stains showed the organisms to be minute bacilli. They were present in great numbers, dozens to a hundred or more, over the surface of each cell.

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Lung tissue from three other cases was obtained and showed similar organisms between the cilia of the cells lining the bronchi. The bacilli were also found free in the bronchial secretion and enclosed in polymorphonuclear leucocytes, but they were never found within the alveoli. The broncho-pneumonia which so often complicates whooping cough, seems to be due entirely to other contaminating organisms.

The action of the bacillus pertussis seems to be largely mechanical. It interferes with the normal movements of the cilia and therefore furnishes a continual irritation which excites the coughing.

The author's experimental work is doubtful because of the similarity between the organisms causing whooping cough—the Bordet-Gengou bacillus, and that causing distemper in the lower animals—the *B. bronchi septicus*.

Further experimental work is evidently needed in order to clear up the subject. The two organisms closely resemble each other morphologically.

Diagnosis by the Complement-Deviation Test. Friedlander and Wagner[9] present a preliminary report to record the fact that they have succeeded in making the diagnosis of whooping-cough in all stages—catarrhal, paroxysmal and convalescent—by the complement-deviation test.

The writers describe this technic as thus far developed and tabulate the results obtained. Several details of the work are reserved for future communication.

When Bordet and Gengou described the bacillus of whooping-cough in 1906, they used the complement-deviation test to control their bacteriologic findings. From this time on, it has been known that the blood of patients in the late stages of pertussis, during convalescence and for some time thereafter would give a positive test, showing definite deviation of complement. More recently it has been shown that in the later stages of atypical cases

(9) Jour. Amer. Med. Assoc., March 28, 1914.

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of pertussis, that is, paroxysmal cough without a whoop, it is possible to determine the specific pertussis character of the infection by means of this test.

The writers' own results lead them to the opinion that the complement-deviation test is of the very greatest value in the diagnosis. With the method they have used, it has been possible to make a diagnosis of pertussis in the catarrhal stage (subsequently confirmed by the clinical history). Nine patients were admitted just as the children were beginning to whoop; that is, in the first days of the paroxysmal stage. Their test was positive in all of these cases.

It will be recognized that the early diagnosis of such a scourge as whooping-cough, particularly when occurring in institutions in which children are segregated in large numbers, is a matter of great importance. Again, it is a matter of record that the success of vaccine therapy depends in large measure on the time of its application. The earlier the vaccine is given, the better the results. If it be possible to diagnosticate whooping-cough in the catarrhal stage surely and definitely, its rapid cure seems assured.

While this is to be considered as a preliminary report, purely, the writers call attention to the following details: The antigen must be fresh. In each instance they have used 72-hour growths on ascitic fluid agar. They have invariably used active antigen. They have always used fresh active serum. Their material has been drawn for the most part from cases in their own wards at the Cincinnati Hospital. This will explain why they have not had more cases in the catarrhal stage, as the children are usually not admitted before the onset of the paroxysmal stage. In this connection, however, it is of interest to note that nine of their positive cases were in the first week of the whoop, and three early in the second week, as shown by their carefully recorded clinical histories. Every case examined in the paroxysmal stage has given a positive reaction.

In no case have they had a positive reaction when the patient has not had either a pertussis infection or a history of pertussis within four years. The one case, in the catarrhal stage, which did not give a positive reac-

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tion, was tested at the very beginning of the cough. The other two cases in the catarrhal stage, both giving positive reactions, occurred in the private practice of one of them. Both of these children subsequently developed typical attacks with pronounced whoop.

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Vaccine. Kelsall[1] summarizes his results with vaccine on 30 soldiers suffering from pertussis. The vaccine used was one prepared from the Bordet-Gengou bacillus by a commercial house. The author summarizes his results as follows: Pertussis vaccine constitutes the most potent and successful remedy at our command for the treatment of this disease, and possibly also for its prevention. It renders the paroxysms milder and less frequent. It shortens the disease, and is a great aid in the prevention of complications. The dose should be larger than hitherto recommended, at least in children of 5 years and older.

PAROTITIS.

Etiology of Parotitis. Bonazzi[2] observed 2 epidemics in different environments in which he noted a circumstance to which attention has apparently not been called as yet. In a school with 400 inmates there were 90 cases. In this epidemic the author was very careful about prophylactic measures: isolation, disinfection of the hands, and especially repeated irrigation of the mouth with antiseptic solutions. However, he soon found these measures were of little avail, for he himself contracted bilateral parotitis, and the nurse had an attack on the right side. Both Bonazzi and the nurse some 3 weeks previous had septic conditions of the face, one a small abscess in the lower lip, the other a furuncle on the right ala nasi. This led Bonazzi to examine the skin of the pupils and he found there were solutions of continuity on nearly all of them or recently healed foci. However, chaps and scratches are common at the time of this epidemic (March) and even those pupils who did not contract the disease showed some lesions on the face. So he did not attach much importance to these facts.

(1) Therapeutic Gaz., Jan. 15, 1914.
(2) Sem. Méd., Nov. 26, 1913.

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Nevertheless, about a year later he had occasion to observe an epidemic in a totally different environment, and found that of 39 patients, 18 had had within a fortnight some wound on the lips, nose or ears. In 11 other patients there had been a sore throat, and in 7 of these 11 even during the parotitis, Bonazzi was able to detect a marked hyperemia of the mucosa of the palate, the velum and the tonsils. These facts seem to show the importance of an intact skin in the prophylaxis of parotitis.

The *causal agent of infectious parotitis* has not yet been determined.[3] According to Pasteur and Roux the blood is sterile, and though Laveran and others isolated a micrococcus from cases, they were unable to reproduce the symptoms by inoculation. Nicolle and Conseil have frequently examined the fluid from the inflamed glands without being able to detect the presence of any microorganism by the microscope or by the ultra-microscope, but recently they have published a few experiments to show that the fluid contains an infective agent, presumably a filter-passing virus, capable of bringing about symptoms suggestive of mumps. A small quantity of blood-stained fluid (about ⅛ c.c.) was obtained by puncture of the swollen parotid of an infant, and was immediately injected into the parotid of a young monkey. No local reaction followed. On the 27th day afterwards the animal had a high temperature, with rigors and restlessness. The fever, after lasting for 7 days, subsided. During this time daily examination of the blood failed to reveal the presence of any parasite. At no time was there any appreciable swelling of the parotid. In a second case, in a child, the inflamed parotid on the fifth day yielded about ¼ c.c. of fluid on puncture. This, on inoculation into the gland of a second monkey, though producing no local reaction, was followed by a fever lasting from the 16th to the 19th day. In this case there was no swelling of the parotids or of the testicles. More fluid was obtained from three children suffering from mumps; half of it was injected into the parotid of a third monkey, and the other half into the

(3) Editorial Brit. Med. Jour., April 25, 1914.

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second monkey, which had now completely recovered. In the latter no fever or any other abnormal symptom whatever resulted, but in the former a fever started on the 26th day and lasted 4 days, unaccompanied by any general symptoms, but with a slight swelling of the parotid injected and a painful impotence of the temporo-maxillary joint on the same side. No parasite was found in the blood, but during the fever the blood count showed a great increase of mononuclear leucocytes (50%).

The injection of a minute quantity of parotid fluid into the gland itself or of relatively larger quantities into the peritoneal cavity of other monkeys did not produce fever or other symptoms. These few experiments seem to suggest that the serous effusion in mumps, when introduced directly into the parotid gland of monkeys, is capable of bringing about a fever lasting 4 to 7 days with an absence of marked general symptoms, though generally without appreciable swelling of the parotid. Feeble though the experimental infection may be, yet it is none the less specific, seeing that it protects against a subsequent inoculation. As a matter of fact, in children the parotid may not be sensibly swollen in cases occurring during an epidemic of mumps. The long period of incubation of the experimental disease accords well with that of the natural malady, and the mononuclear leucocytosis of the former agrees with that of the latter.

The Blood and Cerebrospinal Fluid. A. Feiling[4] from a study of the blood in 40 consecutive cases of mumps reaches the following conclusions: (1) That the blood shows definite changes in the corpuscular content; (2) that these changes consist (*a*) in a slight increase in the total number of leucocytes, and (*b*) in a lymphocytosis which is both relative and absolute; (3) that this lymphocytosis is present on the first day of the disease and persists for at least 14 days; (4) that the occurrence of orchitis does not invariably alter the blood picture; and (5) that the changes in the blood are of distinct diagnostic value in differentiating mumps from other inflammatory swellings of the parotid or submaxillary salivary glands and from cases of lymphadenitis.

(4) Lancet, July 12, 1913.

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One case, with symptoms resembling meningitis, showed in the spinal fluid 2,500 leucocytes per cubic m.m., 96% being lymphocytes. No micro-organisms were found and complete recovery ensued.

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TYPHOID FEVER.

Aphasia in Infantile Typhoid. Brelet[6] relates the case of a child aged 27 months, which during a serious attack of typhoid was aphasic for 3 weeks, though showing no other evidence of meningeal or cerebral complications. During convalescence the aphasia disappeared completely. Typhoid aphasia is almost confined to childhood, it appears at the height of the disease, rarely later; sometimes during a recurrence. It is a complete aphasia, lasting a longer or shorter time, from a few hours to 2 months, on the average 3 weeks. Hence it is a transient aphasia due to slight toxic lesions or to circulatory disturbances of the nerve centres. It must be distinguished from the aphasia associated with other cerebral and meningeal symptoms, and which has an entirely different prognosis.

[It is an old clinical observation that aphasia, which may be said to be functional in nature, occurs after the protracted fevers of infants and very young children. It lasts for a short period and recovery of speech occurs when normal strength returns. This form of aphasia is not peculiar to typhoid. Ed.]

POLIOMYELITIS.

Trumpp[8] offers a contribution to the epidemology of poliomyelitis by reporting 3 cases. Little Henrietta was taken sick on Nov. 6, 1912, with an attack involving her left arm. From Nov. 15 to 17 a recurrence involved her right arm. On Dec. 23-27, 1912, the entire family came together, including a brother who had been out in the country. On Jan. 17 to 20, 1913, there was a second reunion. On Jan. 21 to Feb. 8, 1913, Fritz was taken

(6) Progrès Méd., 1913, p. 361.
(8) Münch. med. Woch., 1913, No. 19, p. 1029.

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ill with an attack of the disease and on Feb. 10 Leopold was seized with it, being confined till Feb. 19, 1913.

Trumpp simply uses these cases to illustrate the contagious nature of the disease. He warns us that where several children in a family are involved, we must be on the lookout for hysterical imitations in the other children and cites an example, in which by causing the youngster to show how strong he was, he caused all the symptoms to disappear.

Kling and Petterson[9] determined to test persons around acute poliomyelitis cases, to see whether they carried the virus, and for this purpose used washings from the nose, mouth, and stomach. The monkeys injected did not develop the acute disease, but died from a lingering ailment. Microscopic examination of their spinal cords showed degenerative processes and injection of an emulsion of the cord produced the disease in a second series of animals.

As Flexner, Clark, and Fraser were able to reproduce poliomyelitis in their first series of animals, the authors determined to repeat the experiments, thinking perhaps that they had not used enough of the washings for injection. By experimenting they found that large amounts of fluid could be concentrated by heating to temperatures below 116° without destroying the virus. With this new technic the disease could then be directly transmitted from the washings of patients in contact with poliomyelitis patients, to monkeys.

Josefson[1] says that for a nurse to become affected with poliomyelitis is very rare. During 1911 when 3,000 persons were affected in Sweden, only one nurse contracted the disease. The writer thought it well worth while to determine whether the infection can be carried by inanimate objects or if it is limited to carriers. To prove his point he gave a very sick girl and a sick boy compresses to use as handkerchiefs for a week. To another sick girl he gave a little tapestry work, and he allowed a picture book and flies to circulate in the ward.

Extracts of all these different objects were made in sterile salt solution and injected intraperitoneally and

(9) Deut. med. Woch., 1914, No. 7, p. 320.
(1) Münch. med. Woch., 1913, No. 2, p. 69.

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intraneurally (sciatic) in monkeys. The experiment with the handkerchief was clinically positive and confirmed by autopsy. With the book the experiment was doubtful, but with the handwork the experiment was again positive. With the flies one monkey died of tuberculosis. A second developed symptoms of poliomyelitis, but autopsy was negative. At any rate Josefson was able to show that the virus can be carried by inanimate objects.

Cassel[2] in discussing acute poliomyelitis and encephalitis believes that this disease often exists in forms where it is unrecognized. He quotes 3 cases of complete facial paralysis in children and offers the hypothesis that these are due to poliomyelitis. The condition, of course, may exist in the newborn from birth injuries. It may result from otitis media and involvement of the facial. It may be post-diphtheritic, or may be traumatic from injury to the facial nerve during an operation. It may come from central disease as in meningitis and encephalitis and it may occur as the so-called rheumatic facial paralysis. In the past few years we have had many reports from careful observers during poliomyelitis epidemics, of acute feverish conditions in children which last a few days and end with a complete paralysis of one or more cranial nerves. Examinations have shown that these lesions are usually in the nuclei of the pons. But when in other conditions a group of nerves is usually involved, it is especially characteristic of poliomyelitis to select one single nerve and generally the facial.

The prognosis is not good. In spite of energetic electrical treatment there was no improvement.

That poliomyelitis is a contact infection, he believes, for in 6 cases two groups of 2 each lived in the same houses.

For prophylaxis we should have compulsory notification, rigid isolation, and disinfection. Healthy brothers and sisters must be kept at home, as they may be carriers.

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(2) Deut. med. Woch., 1913, No. 51, p. 2507.

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SYPHILIS.

Discussing the treatment of hereditary syphilis Mueller[3] decides that the permanent disappearance of the Wassermann reaction is the only criterion as to whether the child is cured. To decide which was the best treatment he divided his children into three groups.

1. Those getting only mercury.
2. Those treated with salvarsan.
3. A combined treatment.

In the first group of cases, he gave bichlorid injections in doses of 0.003 alternating with the proto-iodid internally. In older children he added the inunctions and injections of the salicylate. A single cure lasted six to eight weeks, during which the child received 12 injections of the sublimate (2-4-6 mgs.).

The second group received neosalvarsan into the veins of the head. Two injections in a period of 14 days were given in a dosage of 0.015 pro kilo of body weight and to be repeated in two months. He got absolutely no bad effects from the salvarsan except occasionally a slight exanthem, which was absent on those children treated with mercury.

Children of luetic parents he divides into three classes.

1. The very severely infected ones, dying shortly after birth.
2. The children who have progressed very nicely under their cures, but who succumb to another infection. These children seem to have absolutely no resistance and constitute the largest group.
3. Those making a complete recovery. In these latter cases the skin eruption clears up quickly, then the spleen and glands disappear, while the nasal changes may last for months.

Using the Wassermann as a control he found that with either treatment, though the clinical symptoms cleared up rapidly, repeated cures were necessary to cause a permanent disappearance of the reaction. In some cases the treatment had to be continued for three

(3) Therap. Monatsh., 1913, Heft 6, 706.

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to four years, and even then the ultimate prognosis was none of the best, as shown by his statistics.

Mentally normal	37.7
Slightly deficient	35.9
Markedly deficient	17
Idiots	9

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On this account he is now using mixed treatment as follows:

a. For two weeks two sublimate injections per week.

b. Third week an injection of salvarsan.

c. During the third and fourth weeks the sublimate is continued.

d. In the sixth week two neosalvarsan injections.

e. During the seventh and eighth weeks the mercury again.

Under this severe treatment the children do well and the cure should be repeated in two to four months.

The results of the combined treatment are not advanced enough to state.

Influence of Heredosyphilis on Cerebral Development. Hutinel[4] shows that heredosyphilis plays a rôle in the development of several affections of the infantile nervous system—hemiplegia, diplegia, amblyopia and mutism, convulsions, mental backwardness, idiocy. He advises that the possibility of a specific etiology should always be borne in mind and the Wassermann carried out either on the blood or the spinal fluid.

Grulee and Moody[5] report their results in 9 cases of congenital syphilis by Lange's gold chlorid test. The authors believe that the test may be of value as an aid to the clinical diagnosis. The most marked reactions occurred in dilutions of 1:40 and 1:80; in certain instances the reactions extended into the weaker dilutions, but this was not characteristic, and in every instance the most marked reaction occurred in the dilutions given above.

In the cases of suspected congenital syphilis, with 2 exceptions, the reaction was the same.

Salvarsan. Simpson and Thatcher[6] report their results with intravenous injections in 40 children with con-

(4) Péd. Pratique, Sept. 25, 1913.
(5) Jour. Amer. Med. Assoc., July 5, 1913.
(6) Brit. Med. Jour., Aug. 30, 1913.

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genital syphilis, varying in age from 1 month to 11 years. The cases were not specially selected in any way, but were taken as they appeared in the out-patient department. When there was any doubt as to the true nature the diagnosis was always established by a positive Wassermann reaction.

Salvarsan is a potent remedy, and with proper dosage and technic can be used with safety in the case of the youngest child. In very severe cases, however, such as those with pemphigus, extreme wasting, etc., the dose should be reduced from 0.01 gram to perhaps half that amount. In 3 of the most severe cases death ensued within 60 hours, and a smaller dose, repeated afterwards, if necessary, would have been safer. In comparison with mercury, salvarsan gives much better results, especially in the severer cases. After giving an injection it is wise to continue the mercurial treatment, as a combination of the two seems to be more efficacious. Some cases, however, which did not attend again for three or four months, had done well with salvarsan alone. In all the older children mercury and iodid had been previously given, with very slow improvement (especially in eye cases). After salvarsan was given improvement was much more rapid, but it is always advisable to carry on the mercury and iodid treatment also after the injection. In doubtful cases of congenital syphilis it is better to take the blood from the mother for a Wassermann than to submit a weakly infant to such a procedure.

TUBERCULOSIS.

Schelbe[7] believes that the study of tuberculosis in children has made more advances than all the remaining branches of pediatrics combined. Still our knowledge of the spread of tuberculosis remains limited for two reasons: Firstly, much tuberculosis in children escapes observation on account of the difficulty in diagnosis; and secondly, many children do not receive medical treatment until they are almost moribund. As regards tuberculous infection in the large city, by means of the

(7) Deut. med. Woch., 1913, No. 23, p. 1083.

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v. Pirquet reaction we have made considerable progress. Vienna heads the list with 94% of all children at the age of puberty giving positive reactions. In Bremen 44% are positive at the age of puberty, while of the new pupils admitted only 8% show the reaction and after the first school years this increases to 32%. The source of these mild infections remains hidden.

Our knowledge of the mortality in childhood is also limited. Hospital statistics are of value, but still it is easy to imagine that mortality in these institutions filled with the weak and undernourished children is higher than in the country.

The diagnosis of tuberculosis in children may be very difficult. In joints, it may take the form of a diffuse rheumatism not responding to salicylates. In the peritoneum one may suspect a chronic nutritional disturbance from the large abdomen, the grey skin, the weakness and poor musculature.

Involvement of the lymph nodes may come from many causes besides tuberculosis, and scrofula is often wrongly diagnosed. Unless the tuberculin reaction is markedly positive one should hesitate in making the diagnosis. Even phlyctenular conjunctivitis may be due to staphylococci.

More difficult yet is the diagnosis of hidden foci, particularly the bronchial glands. If they are markedly enlarged, an expiratory crow, sympathetic symptoms, and signs of stasis in the veins of the face make their appearance. Percussion of the vertebral column gives some dulness. If they have caseated or calcified the *x*-ray is of value, but often fails.

In meningitis tuberculosa the history is important, for during the first clinical examination every symptom may be absent. Titration of the fluid with permanganate is of value. Increased power of reduction speaks for the diagnosis. A formerly positive skin reaction becoming negative is also strong evidence in favor of the diagnosis.

The greatest difficulties are in the tuberculous lung infections. The beginning is not characteristic. In general one can say the younger the child, the more acute the disease. After the first year, one sees the tendency of the lungs to heal, developing slowly. The main points

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in the examination are the general appearance and history, the cough, fever, expiratory crowing, dyspnea and positive tuberculin reaction. After the first year the diagnosis become more difficult, for all these symptoms, including emaciation and general appearance, may be present in a non-tuberculous child.

The best single method we have is the v. Pirquet reaction. If this is negative, we have three possibilities—first, the organism is free from tuberculosis; second, that the infection took place within the preceding few weeks and the organism has not as yet had time to build antibodies; and, third, that a miliary tuberculosis exists.

In the above we must also exclude the acute exanthemata. If the reaction is positive it shows that the patient has at one time been affected with tuberculosis, but not necessarily that the process is active. In the first six months a positive reaction is more likely to mean an active infection. One can not tell also whether the infection is bovine or human in type, as an infected organism will react to both. All other methods of tuberculin diagnosis are inferior to this. The finding of tubercle bacilli in the blood suggested that here an even more delicate means of diagnosis was at hand, but these findings have not been confirmed, and animal experimentation was negative. The author was unable to infect any of the 29 guinea pigs inoculated.

Prognosis.—This depends mainly on the age. In the first three months the disease is always fatal. In the second three, the outcome is a little more hopeful, and breast milk is of no great value as a healing factor. After the first year, one can say that the child may live. After about five years the disease becomes less severe and general, and more localized. Here the prognosis depends chiefly on external causes as social relations, nursing and nutrition. After puberty the disease resembles that of the adult in type.

Therapy.—The tuberculin treatment in children has been often tried but with no positively definite good results. One must try this still more before reaching definite conclusions. We must not forget that different children react very differently to injections. Medical treatment is still in a state of empiricism. Almost

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every form of medication has been tried, including electro- and roentgenotherapy.

The one sure thing that we know is that physical-dietetic treatment is of great value if we can improve the appetite. Any process which takes the child from the sick room, where he is exposed to continual secondary infections, is of great value.

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Prophylaxis.—We know that in most cases the disease is contracted from a tuberculous adult. We know that the majority of children contract the disease before the fifth year. With this knowledge we have our prophylaxis. The child, during the first four years must not live with tuberculous individuals.

The idea of comparing tuberculosis and syphilis Schelbe believes very unfortunate. One may have a tuberculous infection and still not have a clinical tuberculosis and again as regards immunity, it has not been demonstrated as yet in tuberculosis, except in animals.

Rohmer[8] is of the opinion that tuberculosis of childhood has been and should be very extensively studied, as it gives us ideas as to the development of the disease in the adult. Von Behring believed that the adult tuberculosis had its origin while the child was in the cradle, and v. Pirquet with his skin reaction has done much to confirm this idea. That tuberculosis in the child has its origin first in a primary focus in the lungs and then extends to the bronchial glands is shown quite definitely by Parrot, Kuess, Albrecht and Ghon. From here it spreads by the blood and lymph through the body. The lungs are, of course, affected and caseous peribronchitis, broncho-pneumonia and cavity formation result. This is the usual tuberculosis of the nursling, often ending in a general miliary tuberculosis or a tuberculous meningitis. In these nurslings the Pirquet reaction is a valuable aid in diagnosis.

What is the prognosis of the nursling tuberculosis? Formerly the disease was considered fatal in from two to five months. Since the Pirquet reaction, however, we know now that many cases do recover, 24% according to Schick. Also the nature of the involvement is important, the pulmonary type being far more serious than

(8) Klin.-Therap. Woch., 1913, No. 28, p. 829.

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the affection of the skin, bone or peripheral lymph node. In his statistics he thinks 50% of his cases showing positive reactions in the first year, recover.

Between the ages of 2 to 6 years death takes place not so much from the generalized tuberculosis as from tuberculous meningitis. In the second year this makes up 80% of the mortality of tuberculosis. The acute miliary and pulmonary forms gradually decrease in frequency. Pulmonary and bone infections usually are mild and chronic.

Between 6 and 14 the mortality decreases, but still remains higher than the other acute diseases. With the onset of puberty the typical chronic pulmonary tuberculosis makes its appearance and runs usually a more rapid and unfavorable course than in the adult. Before puberty one should be careful in making a diagnosis of pulmonary tuberculosis alone.

How does the tubercle bacillus enter the body? The great mass of evidence speaks for the fact that the infection is extrauterine, and results from contact with tuberculous patients. One can usually trace the source of infection in a child, as the number of people with whom it comes in contact is limited. Whether tuberculosis of the child results in the phthisis of the adult is still an open question. Behring, Röhmer have shown experimentally in animals that those infected once react more in the nature of a pulmonary phthisis upon reinjection, and many others, including Naegeli, Hamburger, Ranke and v. Pirquet also support the view that the infection dates from childhood, and becomes active again during a period of hyposusceptibility, as for instance, with measles.

As the result of these observations, where must our efforts in fighting tuberculosis be concentrated? Not in treatment of the adult, not in hygiene, tuberculin and care of the affected adult. Our work must be directed to the nursling, to spare him from infection, to isolate him from those infected, and to get his brothers and sisters already infected away from him, and out into the country.

Von Pirquet[9] discussing tuberculosis in childhood lays some emphasis on the comparison made by previous ob-

(9) Münch. med. Woch., 1913, No. 25, p. 1530.

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servers that tuberculosis and syphilis are much alike as regards their course. Just as syphilis has three stages, *i. e.*, the primary lesion, the general systemic symptoms and then the ulcerative destructive lesions; so tuberculosis has a primary point of infection, secondly, general constitutional lesions, and, lastly, showed ulcerative destructive processes as evidenced by chronic pulmonary phthisis. As regards the point of primary infection, certainly in Vienna at least, the bacilli seem to enter the lungs and to proceed at once to the bronchial glands. In 1,060 autopsies Albrecht found only 7 with primary tuberculosis of the bowel. Interesting is it to note that in rare cases where the skin is first infected the regional glands are also soon involved. That this primary lesion in children is very common indeed is shown by the fact that great numbers of apparently healthy babies give positive tuberculin reactions. Hamburger and Monti in 509 children found positive reactions in 9% of the cases in the second year, increasing to 94% in the thirteenth to fourteenth years.

As regards clinical symptoms during this primary stage of the disease, the first evidence is usually obtained from the bronchial glands. One's attention is called to the hollow barking cough, somewhat resembling pertussis. If dyspnea exists it is expiratory and is associated with the cough. Inspiration is not audible and is attended with retraction of the thorax. The best means of diagnosis is the *x*-ray, though this is by no means infallible. When positive, the radiogram shows the shadows of the enlarged glands to the right of the spinal column. Those on the left are obscured by the heart. Primary pulmonary tuberculosis, *i. e.*, from aspirating the contents of a caseating gland into the lung alveoli, is rare. It causes symptoms of a tuberculous bronchitis or pneumonia with a chronic course and hectic fever. Fifty per cent. of cases, however, have their first symptoms in the bronchial glands.

The second stage of the disease is the generalized tuberculosis. This is by no means a necessary part of the picture, however. It usually proceeds quite rapidly and in the majority of cases death results from tuberculous meningitis. When the serous membranes are af-

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fected we get thin or fibrinous exudates. In a few cases the process may go on to the development of scrofula.

The third stage is the chronic pulmonary tuberculosis, or the chronic process anywhere. The pulmonary type is especially likely to follow measles, pertussis, and broncho-pneumonia, and it differs from the adult type in its greater tendency to heal. The diagnosis of the third stage may be easy or difficult, depending on its localization. If in the bones, joints, skin or meninges it is often typical. If, on the other hand, it remains exclusively in the lungs, the diagnosis may remain obscure, unless one can find tubercle bacilli. An *x*-ray photograph may be of considerable assistance.

Tuberculin reactions are always a great aid. First the skin reaction should be tried, and then the intracutaneous injection of 0.1 c.c. of a 1% solution of old tuberculin. The younger the individual the more significant is a positive reaction as regards the diagnosis of an active process, but at all ages a positive reaction shows that the individual has at one time had tuberculosis. Points to be remembered as regards tuberculin reactions are: 1. They are absent in miliary tuberculosis; 2. They are absent in measles; 3. They are absent if there has been a previous treatment with tuberculin.

The prognosis of tuberculosis in childhood in its first stage depends on the age of the patient, getting better the older the child. In the first year it is bad, while by the fourteenth year it is reasonably good. In the second stage the result depends to a very great extent upon the degree of the involvement. In the third stage the condition of the patient is the important factor in determining the outcome of the disease.

In prophylaxis the important point is to isolate the child from the affected person. If the mother has a severe tuberculosis, she should not be allowed to nurse her baby. If she has only a mild case, v. Pirquet thinks it is safe to nurse the baby, taking, of course, all possible precautions to prevent respiratory infection of the child.

Treatment.—The great effort of therapy should be to aid the natural tendency of the body to heal. This is done by improving the general condition, which in turn depends to a great extent upon the appe-

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tite. Sunlight, fresh air, a proper well regulated diet, and sanitarium treatment are of infinite value. These principles should be followed in all stages, though in open manifest tuberculosis the patients should at times be confined to their beds. This does not have to be done as constantly, however, as was previously taught, especially for children. During the second and third stages tuberculin is of great value to chronic cases.

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Tuberculosis in the Nursling. This is generally pulmonary in the beginning, according to Ribadeau-Dumas[1], and to detect it the laboratory is of great assistance in addition to the clinical picture. The cutireaction is of the highest importance, especially when positive. After a rather torpid onset, more marked phenomena are manifested, there are either slight variations in temperature or rises to 102.2 to 104°, with emaciation. Tuberculous lesions of the skin frequently appear, or in the bones, joints, etc. The localization is generally in the middle portion or base of the lung. An instantaneous radiogram furnishes invaluable evidence, it shows the involvement of the tracheo-bronchial nodes, which nearly always accompanies the pulmonary lesion, sometimes a few miliary granules may even be seen on the plate.

The prognosis in this type of tuberculosis is serious; however, recovery may ensue, provided the child be placed under excellent hygienic conditions. A small amount of raw meat should be given at once, the sun cure renders great services. In some patients it may be well to use radiotherapy on the mediastinal nodes, especially if these are causing compression.

Apical Tuberculosis. Sluka[2] says that involvement of the apices of the lung is not at all frequent in children. The suspected child is usually pale, emaciated, with a narrow, long thorax, flaccid, weak musculature, very slight subcutaneous fat and is brought to the doctor for persistent anorexia, and a hacking cough. These cases when first examined give very indefinite physical findings, so there is often a discussion among the examining physicians as to which apex is affected. The advent of the *x*-ray rather put a stop to the miscellane-

(1) La Clinique, Jan. 2, 1914.
(2) Wien. klin. Woch., 1914, No. 8, p. 173.

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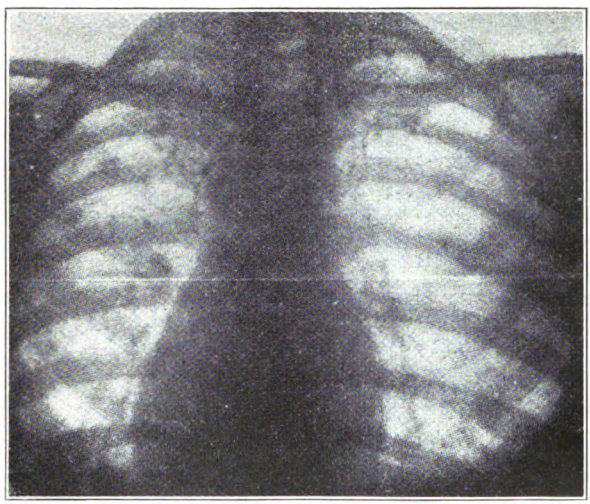
PLATE III.



Case of apical tuberculosis—Sluka (see page 98).

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ous diagnosis of "apical catarrh" and showed that many of these suspected children had perfectly normal lung relations. Careful examination of the skiagram will also in the great majority of cases confirm the fluoroscopic investigation. By apical tuberculosis, Sluka, of course, means the typical apical tuberculosis of the adult, not the involvement of the whole upper lobe as a part of the picture of a general tuberculosis. (See Plate III.)

In 6 years' experience with fluoroscopic work Sluka has come across 3 cases with typical apical findings. The first child was 13 years old and had coughed up blood for 1½ years. This child came from a large group of children who had been diagnosed as cases of apical tuberculosis, and in whom the radiographic examination of the lung had been absolutely negative. All these were so-called "weak children," with the physical findings described above. On account of the weakness of the muscles there are usually postural anomalies of the skeleton, as low-hanging shoulders, flaring shoulder blades, kyphosis, scoliosis and lordosis. These children are usually pale, but blood examination is negative. The vasomotor mechanism is very labile, and upon slightest psychic stimulation they blush. Many have positive facial phenomena and very active knee jerks. They are inclined to catarrh, but evening rises of temperature are not common. Some of these cases may show enlarged bronchial glands.

Sluka then shows a very rare finding in which a true tuberculosis of the hilus proper existed.

When scoliosis is present with a slight cough one must still be very conservative about diagnosing tuberculosis, for the scoliosis in itself may be the cause of the dulness, even if the pulmonary findings are normal.

Tuberculosis Due to Circumcision. L. E. Holt[3] reports an interesting case of genital tuberculosis following circumcision, according to the Jewish ritual. The author has collected 41 cases in the literature and presents a brief review of these.

Infection With the Bovine Bacillus. Mitchell[4] studied 78 consecutive examples of tuberculous cervical

(3) Jour. Amer. Med. Assoc., July 12, 1913.
(4) Brit. Med. Jour., Jan. 17, 1914.

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nodes in children, and summarizes his findings as follows:

Cow's milk containing bovine tubercle bacilli is clearly the cause of 90 per cent. of the cases of tuberculous cervical glands in infants and children residing in Edinburgh and district, and is responsible for by far the larger proportion of tuberculous cervical glands in children during the milk drinking period of life (0 to 5 years).

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The concentration of attention on the existence of human sources of infection has in the past quite overshadowed the evidence that the drinking of milk is an important factor in the infection of children with tuberculosis. Regarding the channels of infection, the faucial tonsils have in tuberculosis of the upper deep cervical glands an importance not hitherto well enough recognized or understood—they act not only as most frequent portals of entry for the tubercle bacillus, but in a large proportion of cases a well-marked tuberculosis of the upper deep cervical glands is secondary to a small tuberculous focus in the tonsil. The high percentage of faucial tonsils in which the bovine virus was present is further striking proof of the frequency of tuberculous cow's milk as a source of infection.

The results of Mitchell's investigations can be verified by several correlative factors: (1) The age of the patients; the importance of investigating a large number of consecutive cases of the disease in young children has not been sufficiently recognized. (2) The family history of tuberculosis. (3) The almost universal practice in Scotland of feeding children with unsterilized cow's milk. (4) The great prevalence in Scotland of tuberculosis in dairy cows, and, in conjunction with this, the present very inadequate veterinary inspection and the gross ignorance of the farmers in matters relating to bovine tuberculosis. (5) The fact that about two-thirds of the Edinburgh daily milk supply comes from small byres situated in rural districts round the city, where there is practically no supervision. Greater facilities of infection with the bovine virus are thus afforded in the country compared with the town. Of the children in his series harboring the bovine tubercle bacillus, almost 50

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per cent. had been born and brought up in the rural districts round Edinburgh.

Tuberculous Meningitis. Mandelbaum[5] describes a case which was clinically a tuberculous meningitis, but in which the spinal fluid was perfectly clear and negative to all tests. After death, as an autopsy was refused, he made a lumbar puncture and to his great surprise he found the fluid turbid, and a smear showed it filled with an enormous number of large mononuclear cells, with abundant protoplasm. Inside of these cells were great numbers of tubercle bacilli. Lymphocytes and polynuclears were also present, the latter also phagocyting the bacilli. He was able to confirm this observation in 8 cases. He believes the explanation is in the wandering out of the non-motile macrophages from the diseased tissue, in these cases from the pia mater. In cases dying of tuberculosis without meningeal involvement these findings were not present.

Pazedborski[6] reports a case of a child of 2 years coming to clinic with severe vomiting in which several Ascaris lumbricoides were obtained. The temptation to attribute the vomiting to these was very great, but in a few days the child returned suffering from a definite tuberculous meningitis.

Anti-Tuberculosis Crusade in France. Ickert[7] reviews the work that has been done in France to combat tuberculosis. With the idea that the disease has its origin in childhood, Grancher of Paris in 1898 advocated removing the healthy child, living with infected parents in a tuberculous environment, out to the country. This idea was not adopted until 1903. Since then this has been done and two excellent results have been accomplished. 1. The child is removed from the unhygienic home, from the misery of the city, and the danger of contagion from the parent. 2. In a clean hygienic home, with proper care, out in the country, the child becomes a new being, morally and physically. In some instances the children are sent to peasant families, in others the city itself provides the quarters.

(5) Münch. med. Woch., 1913, No. 22, p. 1195.
(6) Berl. klin. Woch., 1913, p. 1978.
(7) Deut. med. Woch., 1913, No. 46, p. 2255.

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The results after ten years' experience have been most excellent. In the 1,000 cases from Paris treated in this period, only 1 died from tuberculosis. Many of these children entered deficient mentally and morally and only nineteen of fifty came up to normal standards. The children should be taken as early as possible and not allowed to return home until they have grown up.

The cost of maintenance of a child is 24 cents per day. This is obtained by requisition from the state, gifts and collections and contributions by the parents. These institutions will also care for the children of tuberculous working people if they will pay the full expense.

In 1912 an advance was made in Germany by the founding of such an institution in Chemnitz. The purpose is the same as the French, children being admitted after they have passed the age of 6, but it differs in that children already slightly infected are admitted also. The writer thinks this system is the most valuable advance yet made in the struggle against tuberculosis.

Therapy in Children. Eckert[8] discusses cures in children. Tuberculosis may manifest itself in the child as a local disorder of the glands, bones or skin, and it may be a miliary involvement. The chronic pulmonary phthisis is rare. Mortality curves show that the curve of miliary tuberculosis reaches its apex in the second year, that of chronic phthisis only starts to rise at puberty. Numerous experiments have shown that by increasing an animal's immunity with either a virulent culture or very small amounts of virulent organisms, one can confer some immunity upon the animal and an infection which at first would give rise to a miliary tuberculosis now only causes a chronic local phthisis. This gives us our cue as to therapy in children, which is of a threefold nature.

1. To decrease the danger of acquiring an infection,
2. To heal tuberculous disease foci,
3. To increase the natural resistance.

Tuberculin is of interest in the latter two conditions. Koch showed that it apparently dissolved tuberculous tissue, the process causing the so-called focal reaction. To produce such a reaction is now considered very dan-

(8) Therap. Monatsh., 1913, Heft 10, 720.

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gerous, particularly in a child, which has had no acquired resistance, as it may lead to a miliary tuberculosis. The main use for tuberculin is to increase the child's immunity. We know it increases leucocytosis, and that under its use the body undergoes a change in its ability always to use more and more of the remedy, showing at any rate an increasing immunity to some of the products of the tubercle bacillus. Clinically the appetite improves, the body weight increases and the general condition improves. To get this effect, however, it is very important never to give enough tuberculin to cause the dangerous focal reaction.

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Effect of Iodin. Cramer,[9] reviewing previous work of tuberculosis, shows that iodin has a special affinity for tuberculous tissue. As chronic disease also affects the blood picture, in our therapy, we must consider this feature also. The older remedies of iron and arsenic are well known. Later lecithin was employed on the grounds of its marked effect on body growth and cachexia. Thus to combine lecithin with iron, arsenic, and iodin would be a useful procedure. This has been done by Haase & Co. (Berlin) in the form of *"Eiseniodocitin mit arsen."* Each tablet contains 0.0075 iodin, 0.0015 iron, 0.0410 lecithin, and 0.0002 arsenious acid. They can also be procured without arsenic. He tried these tablets in his institution for a period of 4½ months, his children averaging from 2 to 6 years in age. There were 13 boys and 9 girls and they were affected with scrofula, rachitis and anemia. The smaller children received 2 tablets a day, the larger ones 3.

Under this treatment glands, skin eruptions and the general condition improved rapidly and markedly. In one girl a corneal ulcer healed very shortly after beginning the treatment.

RHEUMATISM.

Chronic Rheumatism in Children. This was described by Cornil as far back as 1864. Hutinel[1] observes that the obscure feature is the etiology—it has been at-

(9) Deut. med. Woch., 1913, No. 22, p. 1045.
(1) Jour. des Praticiens, Dec. 6, 1913.

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tributed to infections, to toxemias, in some cases there is a history of tuberculous or syphilitic antecedents or infections of the digestive tract, etc. Nevertheless the exact cause is obscure in most instances. There are 2 types: one follows repeated attacks of acute rheumatism, the other one develops in an insidious manner; there are intermediate cases with subacute onset and successive attacks. The small joints, metacarpophalangeal and phalangeal are the first to be attacked; next muscular atrophy appears, the atrophied muscles then retract and the clinical picture is almost the same as that traced by Charcot for the chronic type in adults.

The prognosis varies, sometimes the children grow progressively better; at others the retractions increase, the patients become tuberculous or succumb to some intercurrent disease. Treatment consists of residence in a dry and healthy locality, massage and mobilization of the joints, sojourn at saline warm springs (in France, Dax, Bourbonne, etc.), occasionally opotherapy may be resorted to, especially the thyroid form.

DISEASES OF THE RESPIRATORY APPARATUS.

Empyema. Holt[2] compares the siphon treatment with other measures for infants and young children. After experience in 154 cases he reaches the following conclusions:

Empyema of infancy has a high mortality under any method of treatment yet proposed. One of the chief obstacles to recovery is the difficulty in expansion when the lung is subjected to atmospheric pressure.

Aspiration, while occasionally sufficient to cure a localized empyema, is not to be depended upon as a means of treatment. The injection of bactericidal substances is not greatly superior to simple aspiration, and is open to the same dangers.

Rib resection is not to be advised in recent acute cases in patients under 2 years old. In chronic cases it may be necessary at any age.

Simple incision between the ribs with the introduction

(2) Amer. Med., June, 1913.

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of a single tube is sufficient in most cases to secure adequate drainage. It accomplishes in recent cases all that rib resection can do with less disturbance to the patient. Siphon drainage is to be preferred to any other treatment in infants, especially those under one year, giving not only proper drainage and facilitating expansion of the lung, but causing the least disturbance of the patients during the treatment and showing the highest proportion of recoveries.

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[Those who have had an extensive experience in the treatment of empyema, will agree that after the incision of the thorax and the introduction of the drainage tube, the difficulties have only begun. The method of European surgeons, and especially Perthes, of maintaining a continuous negative pressure, by means of an air pump-device, such as can be fastened to any faucet, is very strongly to be recommended in the after-treatment.—Ed.]

Broncho-Pneumonia. Arneth[3] recommends warm baths of about 104° as a most excellent routine treatment for broncho-pneumonia. He believes their great value lies in redistributing the blood, bringing it to the periphery. Every time the body temperature reaches 102.2° he orders a bath of 13 minutes' duration, giving not over three baths in one day. For temperatures over 102.2° he allows the bath to last only 5 minutes. Very rarely is the temperature of the child raised after such a treatment, but this does occur in a few instances when the child seems extremely feverish, and the vessels of the skin completely relaxed. The good effects of the bath seem to be in stimulating the skin, in increasing the appetite and the thirst of the patient and in improving his general condition. A loss of weight is often stopped, perhaps by the improved appetite. The effect on the skin seems distinctly individual. In some cases it is markedly reddened, in others it is unaffected. Respiration is accelerated during the bath, but slowed afterwards. The effect on the heart is unimportant.

"Silent" Areas of Hepatization. Text-books lay stress on the frequency of pneumonia in children charac-

(3) Deut. med. Woch., 1913, No. 39, 1868.

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terized at first only by general phenomena (fever, vomiting) and in which the usual signs (dulness, souffle, fine râles) do not appear until late—the 5th or even 9th day. It has been claimed that such types are due to central foci of hepatization.

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As a result of numerous radiograms, Weill and Mouriquand[4] assert that central pneumonia does not exist. The *x*-rays show that in these cases we are dealing with triangular cortical foci, which are silent to stethoscopic examination. These patches of hepatization, especially frequent at the apices, may be mute for the time being, this is usually the case, or, in exceptional instances, they may remain silent during the entire course. The exact pathogeny of this phenomenon is as yet unknown. By the use of the rays a diagnosis of pneumonia may be made early.

DISEASES OF THE CARDIO-VASCULAR SYSTEM.

Etiology. Baginsky[5] believes that much cardiac disease in childhood is due not only to rheumatism and chorea, but also to scarlet fever and diphtheria. In many of these latter cases a nephritis develops, but the kidney symptoms may be obscured by the symptoms of a weak heart. In the uremic condition of such patients venesection is particularly indicated on account of the weakened heart muscle. In a second case of uremia, on account of the great weakness of the heart, he did not dare to give the usual hot pack, but simply tried a lukewarm one, with excellent results. He allowed the patient to remain in the pack for an hour, and the result was reduction of temperature, diuresis, and diaphoresis, with general improved condition.

Functional Murmurs. Hochsinger[6] takes up this subject in answer to the questions raised by Schlieps, and shows that our knowledge has not progressed much past its position 22 years ago. Precordial murmurs, systolic in nature, without pathologic finding occur in every period of childhood, rarely before the first year

(4) Péd. Pratique, April 25, 1913.
(5) Berliner klin. Woch., 1913, No. 42.
(6) Münch. med. Woch., 1913, Nos. 25, 26.

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and most frequently between the 10th and 14th year.

They can be classified into:

1. Cardio-respiratory. These are loudest at the borders of the heart, are increased by physical and nervous irritation, are influenced by a change in position, and above all, disappear when the patient stops breathing after a vigorous expiration.

2. The true functional murmurs. These are extremely rare in early childhood. They are loudest over the base of the heart, are systolic in nature and occur very frequently during febrile conditions. To distinguish them from organic murmurs is often very difficult. Schlieps explains these as being due to an atonicity of the heart muscle. Hochsinger accepts this explanation as a cause of some murmurs, but refuses to classify these atomic murmurs with the functional ones, for he says that in many cases where functional murmurs are present it is impossible to demonstrate cardiac hypotonicity, empty blood vessels, or low blood pressure.

Endocarditis. S. W. Gilbert[7] gives the results of his study of 197 cases of endocarditis in children. Since the Social Service Department has been organized to supervise the management of the cases after leaving the hospital, the results have been markedly better. He concludes from his studies:

1. Acute endocarditis should be considered as acute over a much longer period than has been the custom.

2. Treatment should be carried out over months and perhaps years, until all possible signs of acute disease have disappeared, and even then, until adolescence is passed, at least a certain amount of restraint should be exercised.

Cardiac Dilatation and Hypertrophy; Arrhythmia. Nobécourt[8] states the increase in size of the heart and disturbances of the rhythm are far from always having the same importance and signification in children. In some instances they are associated with organic affections, at others they consist of simple functional troubles not attended by any serious prognosis. The principal causes of increase in the size of the organ are endo-

(7) Bost. Med. and Surg. Jour., July 17, 1913.
(8) Jour. de Méd. de Paris, Nov. 22, 1913.

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carditis, latent pericarditis, nephritis, hypertrophy of growth, dyspeptic states, anemia, excessive physical exercise.

Disorders of rhythm are common and consist of increase, decrease or irregularities of the systoles. These differ both from the diagnostic and prognostic standpoint. They may be merely a physiologic phenomenon, such as tachycardia, due to emotion, etc. Or they may be caused by toxic influences (salicylate of soda, digitalis). Lastly, they may be due to different pathologic conditions (arterial hypertension of acute nephritis, cardiopathies, infectious diseases).

As to bradycardia, this may be seen when there is abnormal excitation of the vagus (tuberculous meningitis, mediastinitis, etc). Or be associated with auriculo-ventricular dissociation, though these cases are but little known as yet in children.

[Bradycardia is frequently observed after the severe, exhausting fevers. This is true of scarlatina and typhoid, and may occur with perfectly regular cardiac action.—ED.]

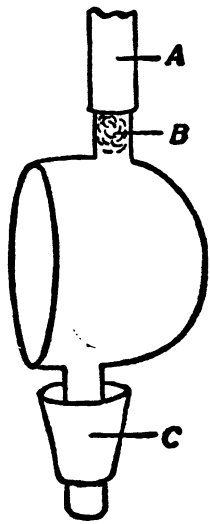

Fig. 2. Apparatus for use in making blood cultures in children: *A*, rubber tubing, to be used in suction by mouth; *B*, cotton; *C*, rubber cork to fit into test-tube of agar. The whole apparatus to be sterilized as it is after wrapping in gauze. This apparatus is practically identical with that used in the Finkelstein clinic, and described in this country by Blackfan, except that it was found more convenient to apply suction by mouth than by means of a pump (Gerstley and Fuller).

Blood Cultures. A simple technic is described by Gerstley and Fuller.[9] A specially made Bier's cup was used. (See illustration.) The method is simple, requiring almost no preparation. The best point for the incision was found to be between the vertebral column and the upper part of the scapula. It should be from 2/5 to 4/5 inch in length and deep enough to enter the subcutaneous tissue. Sterilization of the skin is accom-

(9) Jour. Amer. Med. Assoc., Jan. 31, 1914.

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plished by first cleansing a considerable area with alcohol, then applying a wide area of iodin, allowing it to remain three minutes and reapplying. Lastly, one removes iodin from the skin over which the cup is to be placed by tooth-pick swabs and alcohol. The latter prevents any iodin entering the culture-medium.

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The apparatus ready for use is wrapped in sterile gauze and sterilized with dry heat. Just as the incision is made an assistant unwraps the apparatus, fits it to a tube of melted agar cooled to 113 F., and it is applied. Slight suction for a minute or so will readily give 1 to 2 c.c. of blood. While the agar is being plated out, all superfluous iodin is removed from the skin to prevent blistering, and a gauze dressing applied. The wound heals in a few days. In a few cases Schleich solution was injected, but this constricted the blood-vessels too much, and, strange to say, without its use, except for the immediate pain of the incision, the infants seemed to pay little attention to the procedure.

THE DUCTLESS GLANDS.

Effect on Development. H. Gilford[1] attempts to correlate and associate the functions of the ductless glands and their influence upon development.

He states that by studying the extremes he is led to some sort of conclusion, however hazy, as to the normal action of the glands in question. We find that by virtue of their secretions, or in some more cryptic manner, they preside over certain correlations of the body. These correlations are exceedingly variable, and this variability is most apt to be shown when circumstances are abnormal. The adjusting mechanism of development is not only flexible, but is more or less reciprocal, so that a ductless gland both influences development and is itself influenced by the changes of general development.

In the harmony which is produced by the concerted action of the ductless glands we have reason to suppose that the leading part is played by the thyroid. This supplies a stimulus for the metabolism of the body as a

(1) Lancet, Sept. 6, 1913.

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whole. During infancy and childhood, when it is most important that the fires of metabolism should be controlled, the influence of the thyroid is checked by the thymus gland, by the lymphatic system in general, and perhaps by the pineal gland. These also bring about that delay of sexual activity which is so essential to the proper maturation and stability of the somatic faculties. Probably the first to break through this cordon of conservative influences is the adrenal system which awakens the dormant sexual organs and hastens the growth of the muscular and skeletal systems. At about the same time the skeletal system is still further stimulated by a secretion from the pituitary gland. This secretion quickens the development of every organ in the body, including the sex organs. These latter now ripen apace, and assisted by the combined action of the ductless glands, some animating, others restraining, carrying the development of the body in waves and tides to its flood.

Diagnosis of Enlarged Thymus. Sylvester[2] reports 6 cases of enlarged thymus, with symptoms of hyperthymatism. Although he believes that these cases are too few to admit of any hard and fast conclusions, nevertheless he thinks it fair to assume that—

1. We should be more on the lookout for enlarged thymus in cases of asthma, persistent bronchitis, and laryngeal or tracheal stenosis.

2. Inasmuch as the percussion outlines corresponded so closely with those shown by the roentgenograms, the enlarged thymus should be found on examination by the ordinary methods of physical diagnosis, of which threshold percussion is apparently accurate and satisfactory in the hands of one familiar with children.

3. Children showing enlarged thymus present two fairly uniform sets of respiratory symptoms:

a. Those due to pressure on the trachea, as shown by cyanosis, slow, labored breathing and supra-clavicular and substernum retraction.

b. Those presumably due to toxemia or hypersecretion of the thymus, namely, breathing of the asthmatic type

(2) Bost. Med. and Surg. Jour., April 2, 1914.

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characterized by fairly easy inspiration and long, difficult expiration, accompanied by râles.

4. Inasmuch as in all the cases treated the symptoms for which treatment was instituted disappeared when the physical evidences of enlarged thymus disappeared, there is a causal relationship between—

a. The enlarged thymus and the pressure symptoms.

b. The enlarged thymus and the asthmatic symptoms which were obviously not due to pressure, therefore probably due to hyersecretion.

5. Pressure symptoms and toxic symptoms may be combined in the same case, but those of the toxic type are more constant.

Status Lymphaticus. C. M'Neil[3] discusses the association of acutely fatal illness in infants and children with status lymphaticus.

1. In a group of 13 infants from two to four months old, nearly all found dead in bed, and all apparently well-developed and nourished, the lungs in every case examined (8) showed marked congestion, bronchitis, and broncho-pneumonia.

2. This was associated in most cases with hyperplasia, general or partial, of the thymo-lymphatic system.

3. These cases of sudden death in infants may, therefore, be described as cases of fulminant bronchitis and broncho-pneumonia, associated with status lymphaticus.

4. The same pathologic grouping was found in all cases examined of a very unusual series of fulminant broncho-pneumonia in boys from 10 to 16 years old.

5. The regularity of this association raises the question whether the fulminant nature of the illness in both groups may not have been due in some way to the influence of the morbid constitution usually termed status lymphaticus, the signs of which were unequivocally present in both groups.

6. There is some evidence that fulminant types of other bacterial infections—scarlet fever and diphtheria—are also accompanied by thymo-lymphatic hyperplasia or status lymphaticus.

7. In the two groups of fulminant pneumonia, thyroid

(3) Edinburgh Med. Jour., January, 1914.

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hyperplasia in a marked degree was present in every case examined (18).

8. This thyroid hyperplasia seems to have existed for some time before death.

9. The regular association of thyroid hyperplasia with thymo-lymphatic hyperplasia suggests that it (the former) may also be a mark of the same abnormal constitution or diathesis.

Banti's Disease. Grosser and Schaub[4] report the case of a child of 10 years coming to the clinic with the history of gastric distress of a year's duration. Examination showed nothing except a markedly enlarged spleen. There was no other adenopathy. The blood examination showed Hb. 30%, a red blood count of 1,860,000, and a white count of 2,200. The differential showed 29% lymphocytes, 71% polynuclears. After tuberculosis, syphilitic, and hepatic cirrhosis had been excluded the diagnosis of Banti's disease was made. As yet there had been no urobilogen in the urine. The child was anesthetized and the spleen removed. Pathologic examination of this organ confirmed the diagnosis. It was markedly enlarged, very firm, and consisted chiefly of fibrous tissue. This tissue was organized forming a network in the meshes of which were long and oval nuclei, surrounded by scanty protoplasm. The sinuses contained long, round, and cubical cells, in various numbers, with variously developed protoplasm, whose nuclei were poor in chromation. In the sinuses were also red blood cells and mononuclear leucocytes.

The study of the child's metabolism showed that although there was no negative balance before the operation, after the removal of the spleen the retention of nitrogen, phosphorus, and calcium increased markedly. The negative balances found by Umber were probably due to the fact that his patients were already in the stage where the liver was diseased.

Following the operation the general condition improved markedly and the Hb. and red cells increased in 5 months from 27% and 1,860,000 to 78% and 4,140,000; the leucocytes rose to 7,600. Recovery was complete.

(4) Münch. med. Woch., 1913, p. 276.

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DISEASES OF THE URINARY ORGANS.

W. A. Lurie[5] describes a simple method of collecting urine from female babies. He strapped a narrow cup from a cupping outfit to the abdomen and over the but-

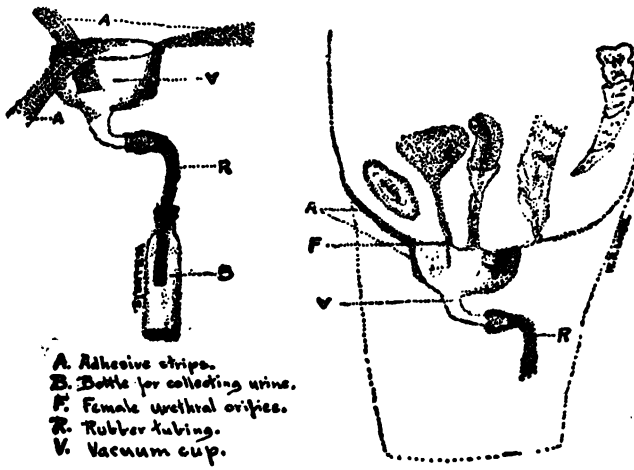

Fig. 3. Device for collection of urine from female babies (Lurie).

tocks in such a manner that the margins were in close approximation to the vulva. To the opposite end of the cup he attached a bit of rubber tubing, the other end of this was in a bottle which was either strapped to the leg or left in the bed. This simple device was satisfactory and required no watching.

Phenolsulphonephthalein Test. After experience in 14 cases of scarlatina, this is advocated by Fishbein[6] as a practicable and valuable test.

Rowntree and Geraghty in 1910 introduced phenolsulphonephthalein as a method of determining the functional ability of the kidney. They found that in normal persons from 40 to 60 per cent. is excreted after one hour and from 20 to 25 per cent. after two hours. In acute nephritis the activity of the kidneys may fluctuate

(5) Jour. Amer. Med. Assoc., June 28, 1913.
(6) Ibid., Oct. 11, 1913.

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greatly in 24 to 48 hours. In parenchymatous nephritis there is a marked decrease in the amount of drug excreted and in chronic interstitial nephritis a low output in all cases. Later they showed that the test is of value in that by showing a marked decrease in renal function, it indicates impending uremia when other signs are lacking. They conclude that intramuscular injections are better than subcutaneous. This work has been confirmed by Boyd, who examined a large series of cases, the test proving of especial value in cardiorenal disease, indicating to what extent impaired renal function was responsible for the symptoms.

In the cases reported by Fishbein the dye was injected intramuscularly. The bladder was emptied and specimens of urine collected after one hour and after two hours. The colorimeter was that described by Cabot and Young, which consists of a series of twenty tubes, containing 5, 10, 15, etc., per cent. of the dye.

There seems to be a general lowering of the renal function during the latter stages of scarlet fever. In nearly all uncomplicated cases examined from the third to the fifth week a total output averaging 55% was observed as compared with a normal of 65% to 85%. In the instances of acute nephritis, an increased output was observed in two, a lowered output in one. In several instances in which headache and nausea occurred, although no albumin was found in the urine the test showed a decreased function of the kidney. The practical value of the test as an aid in the treatment of this disease in which nephritis is so common a complication is apparent.

Nephritis. McClanahan[7] reports a case of acute nephritis, probably due to scarlet fever, in a one-year-old infant with congenital heart disease. The striking feature in the case was the polycythemia, the red cell count at one time being 8,140,000 and at another time 9,800,000. Hemoglobin was nearly normal.

Infections by B. Coli. Thompson[8] presents a detailed discussion of colon bacillus infection of the urinary tract based on the observation of 71 cases.

(7) Ibid., Sept. 27, 1913.
(8) Lancet, Aug. 16, 1913.

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The relative proportions of the two sexes affected, and the ways in which the clinical details differ in boys and girls, are among the most striking features of this infection. 1. In all the cases which have been published the number of girls is much larger than that of boys. Among Thompson's cases the girls formed 79 per cent. 2. In young infants, as Thiemich has pointed out, the illness begins more often with diarrhea than in older children. We also find that diarrhea is more frequently a marked symptom in boys than girls. 3. Further investigation shows that during the first six months of life far more boys than girls were affected, although after the sixth month girls largely predominated. When we take a larger number and analyze the ages and sexes of 224 babies under 2 years taken at random from 13 authors, we find that, although the numbers are less striking, there is still a considerably greater proportion of boys during the first six months than at any later age. 4. The extreme rarity of rigors at the onset of the symptoms in boys is noteworthy and interesting when compared with the frequency of this symptom in girls. Among 52 cases in boys of 2 years old and under Thompson only found the occurrence of a rigor mentioned in one or two instances, while in girls it is very common. 5. Mild cases are rare in boys. In male patients the attacks of pyelitis are apt to be severe, and there is usually in them a much larger proportion of cases of fatal pyelonephritis than among girls.

Symptoms.—These depend on the severity of the infection and the part of the tract affected. There may be no symptoms at all apart from the urinary findings, or there may be increased frequency of micturition or pain during the act. Much the most important cases of this infection are those in which the parts above the bladder are invaded—pyelocystitis, pyelitis, and pyelonephritis—and the striking peculiarity about their symptoms is the trivial and equivocal nature of the local manifestations and the extreme severity of the general disturbance—acute distress, prostration, fever, etc. In a few of these cases one finds the early symptoms those of cystitis only, and then the temperature runs up suddenly, often with a rigor, and the clinical features of

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pyelitis develop. In others, symptoms of pyelitis set in obscurely, while the child is very ill with bowel disturbance. Very often, however, the symptoms which we associate with acute pyelitis begin suddenly in the midst of apparent good health.

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The microscopic and chemical features are much the same whether the case is one of simple cystitis, pyelitis or pyelonephritis; but in pyelonephritis there is rather more albumen present than in pyelitis or cystitis and a few casts may be found. Little or no help is to be expected from the character of the epithalial cells.

The urine usually looks slightly cloudy or opalescent, is distinctly acid, and contains a considerable number of pus cells and bacilli of the colon group. On standing it remains cloudy for a long time, and a definite deposit is slow to form. Although the urine generally shows a marked acidity when passed, the reaction changes rapidly on standing, and in time becomes alkaline. On microscopic examination the pus is rarely large in amount. In colipyelitis there is often no pus to be found when the temperature first goes up. Sometimes the pus varies greatly in amount on different days, and may even disappear for a day at a time.

The differential diagnosis of acute colipyelitis depends on: (1) The presence of pus and colon bacilli in the urine along with the above severe general symptoms; and (2) the absence of any signs of organic disease outside the urinary tract which could account for the condition. A diagnosis of the exact distribution of the lesions in the urinary tract cannot be made with any approach to accuracy if the patient is a young child. Roughly speaking, patients who have pus and colon bacilli in an acid urine, with no rise of temperature and little or no distress, usually have cystitis only; remittent pyrexia with great general misery signifies pyelitis; while severe collapse with or without pyrexia often indicates a grave implication of the kidney. If a case of infection with high fever, which has been diagnosed as acute pyelitis, undergoes alkaline treatment thoroughly, and does not show a considerable fall of temperature within 48 hours of the urine having become alkaline, this signifies that the kidneys are badly affected.

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Treatment.—In ordinary acute cases large quantities of fluids should be administered. The bowels should move adequately and, if necessary, sodium phosphate should be given for this purpose.

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The other important forms of treatment are: (1) Alkalization of the urine; (2) administration of antiseptics; (3) the use of serums and vaccines. The aim of the alkaline treatment is to render the urine alkaline and to keep it so for a week or two after the pus has disappeared and the symptoms have ceased.

[In a considerable experience in the treatment of pyelitis of infancy, we can concur in the observation that some of the severest cases which have come under our observation have been noted in male children; that treatment with large doses of citrate of potash gives satisfactory results; lastly, we have not observed any striking effects from vaccine therapy.—Ed.]

Pyelitis. Glaser and Fliess,[9] in discussing pyelitis of children warn us that even if a pyelitis is discovered in a feverish child, one still should not overlook an otitis media, which may cause no subjective symptoms. They cite two cases: In the first one a pyelitis was discovered. The temperature remained high for over two months, then symptoms of general sepsis appeared and the child finally died. At autopsy, besides a generalized sepsis, a double otitis media was discovered. In a second child with pyelitis, the child developed meningitic symptoms. The spinal fluid and also examination of the middle ear were negative. After two weeks the child died, and on autopsy besides a severe nephritis a double otitis media was revealed. In both of these cases repeated examinations of the ear drums had been negative, and the children had had absolutely no symptoms suggestive of middle ear disease.

In a third case of continued fever during a pyelitis, although repeated examinations showed scarcely more than a redness of the ear drums, and in spite of the fact that most pediatricians are not very enthusiastic about paracentesis in young children, the authors did a paracentesis. The temperature dropped as in a crisis, and

(9) Deut. med. Woch., 1913, No. 30, p. 464.

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from the pus pneumococci were obtained. This finding rather would support the view advocated by Finkelstein and others, that in many cases colon bacilli are not the primary cause of a cystitis, but the secondary invaders; and that an otitis media may be the predisposing cause of the cysto-pyelitis.

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DISEASES OF THE NERVOUS SYSTEM.

Diagnosis. Ambal[1] reviews some of the clinical points which may interest the physician in judging of the condition of the nervous system of the child. To get an idea of the intelligence we have a valuable aid in the Fröbel technic, which consists of excellent material in the form of pictures, games of blocks, of letters, and of mosaics adapted to the child's years. Although many psychically abnormal children are perfectly normal physically, still physical examination can often aid us in revealing many muscular incoordinations. Children under 3 generally use their muscles when they do mental work. One should observe whether this is present in older children.

The reaction of pulse and respiration to the prick of a pin will give an index of the irritability of the vegetative nervous system. Of course the Chvostek sign must never be overlooked. Faulty nervous control is shown by sudden severe sweating and shivering on undressing, and a marked irregular erythema following slight irritation to the skin. Exaggerated genital irritation, as shown by an unusual feeling of shame and especially in hypersensitiveness of the lower abdomen and thigh to light pressure or stroking, speaks for masturbation if no other cause is evident. In sexually normal children these regions are no more sensitive than the breast or the head.

Meningitis. H. Koplik[2] discusses the diagnosis and treatment of epidemic meningitis in children.

The writer calls attention to the difficulties of diagnosis in young infants, especially those cases complicated by penumonia. He finds, as did Flexner, that the

(1) Berl. klin. Woch., 1918, p. 1109.
(2) Jour. Amer. Med. Assoc., June 7, 1918.

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mortality is high, and for that reason urges that an early diagnosis by means of lumbar puncture be made. In 8 cases which did not respond to treatment by the ordinary injection of serum through a lumbar puncture, ventricular puncture was resorted to without success. In some cases, especially young infants, the injection of the serum seemed to do more harm than good. He also calls attention to those cases which after apparently being cured develop a progressive hydrocephalus.

Curable Meningeal States in Children. Comby[3] states that MM. Guillain and Baumartner showed a child at the Paris Medical Society which had presented meningeal symptoms with coma, yet recovered, though the cytologic findings led to the suspicion of tuberculous meningitis. Comby then gives the details of 2 personal cases which in all probability corresponded to the meningeal form of acute poliomyelitis (Heine-Medin's disease). He has seen 8 similar cases in a few months. Some children showed the clinical picture of tuberculous meningitis most often cerebrospinal. The spinal fluid remained clear and contained lymphocytes. It is possible that some of these cases of curable meningeal states have been mistaken for a cured tuberculous meningitis. From a diagnostic standpoint the examination of the spinal fluid is important. In tuberculous meningitis the lymphocytes are very numerous; in the curable form they are few in number.

Barnes[4] reports 7 cases of cerebrospinal meningitis which were of an atypical character. He presents the following facts as worthy of mention:

1. That cervical opisthotonos was one of the very last signs to develop.

2. The contraction of the recti and other abdominal muscles, noticeable in all the cases.

3. In several of the cases the symptoms for a week or more could have been mistaken for any other disease on account of the absence of the classical symptoms of meningitis.

4. The disproportion between the pulse-rate and temperature, particularly noticeable in 3 cases.

(3) Arch. des. Mal. des. Enfants, January, 1913.
(4) Interstate Med. Jour., September, 1913.

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5. The dilatation of the pupils produced in all cases when Kernig's sign was being elicited, also in several instances when the head was being flexed upon the chest.

6. The complete covering of the palate with herpes vesicles in 2 cases.

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7. The ability to produce the rash in true cerebrospinal meningitis with the electric light and reflector, which phenomenon could not be induced in meningitis due to other organisms.

8. The necessity for prompt examination, and re-examination of the spinal fluid.

9. The importance of making a leucocyte count.

Little's Disease. Hertzell[5] shows that with careful, proper and patient treatment, a very great deal can be done for children suffering from Little's disease. A child of 12 was admitted to his institution. She was markedly deficient mentally, was totally unable to stand, and when the child with the assistance of other people tried to walk, the toes were simply dragged along the floor. The especial weakness seemed to be in the muscles of the lower leg. To develop these and to relieve the spasms in the other muscles, active and passive movements and warm baths were tried. A very great aid in the treatment was a contrivance consisting of two canes fastened firmly together, at a distance of about 1½ feet from each other. With this apparatus, the child learned to support herself in 4 weeks and move about the room. To relax the spasm of the muscles creeping exercises were instituted. After 2 months of this treatment the child is now able to move absolutely unassisted about the room, the facial expression is much clearer and the intelligence improved. Hertzell believes that much of the success of such treatment is due to giving the children exercises that they themselves enjoy.

Oxycephalus. Küttner,[6] considering the subject of oxycephalus, believes the fundamental cause to be a premature synostosis of the cranial bones. The sagittal and coronal sutures are particularly concerned. The process starts early and causes symptoms about the end of the first year, being only very rarely congenital. He

(5) Berl. klin. Woch., 1913, p. 1064.
(6) Münch. med. Woch., 1913, p. 2209.

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PLATE IV.

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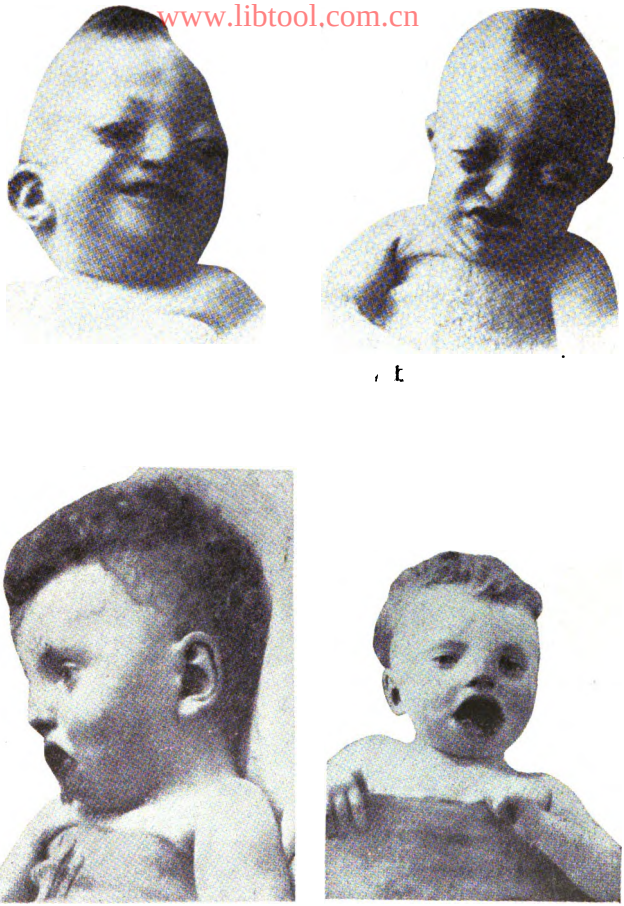

Cases of oxycephaly—Küttner (see page 120).

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cites two cases, one of which he operated. The skull was extremely thin, and was perforated by many small holes, as if made by a trephine. This child died of a pneumonia and on autopsy, a marked internal hydrocephalus was discovered. Küttner then discusses the cause of the ever-present optic neuritis. Some men believe it due to a narrowing of the optic canal, others lay great stress on the presence of a basal meningitis. This, however, does not explain why the optic nerve should always be involved. Probably the best explanation is the increased intracranial pressure. (See Plate IV.)

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Tremor. Lo Re[7] reports 3 cases of tremor in young children, with details as to state of the cerebrospinal fluid in each case. (1) A child, 26 months; well up to 12 months; since then it suffered from chronic dyspepsia, and at the time of admission showed rhythmic movements of the right upper extremity, with very slight rigidity. Kernig and Babinski signs both absent. The tremor became general after a few days, and resembled a chronic shiver. Lumbar puncture gave a fluid with normal pressure, containing ⅓ gram albumin, 99% lymphocytes, and 1% large mononuclears. Bacterioscopic examination negative. The child recovered in a few days. (2) Child, aged 17 months; dyspeptic and rickety. On admission there was generalized tremor. Kernig and Babinski negative. Lumbar puncture, normal pressure, albumin ½ gram per cent., lymphocytes 91.5%, large mononuclears 7.5%, and polynuclear 1%; no bacteria. This was on March 9th. The tremor varied, sometimes better, sometimes worse. On April 13th the child was readmitted, and then showed definite rigidity, and lumbar puncture showed ½ gram albumin, 82.30% lymphocytes, 11.5% large mononuclears, and 6.19% polynuclears. The child died of bronchopneumonia on April 23rd, and a chronic fibrous cerebrospinal pachymeningitis was discovered, also an acute cerebral leptomeningitis. (3) A child, aged 14 months, also suffering from chronic dyspepsia and generalized tremor. Lumbar puncture gave ½ gram albumin, 97.22% lymphocytes, 1.85% large

(7) Rif. Med. (quoted in Brit. Med. Jour., Jan. 31, 1914).

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mononuclears, and 0.9% polynuclears. This child recovered.

The author points out that all three cases suffered from chronic dyspepsia, and that probably there was a chronic poisoning from intestinal toxins. In reply to the objection that hundreds of babies suffer from chronic indigestion and yet do not display symptoms of meningism, he assumes that the cases that do are predisposed to neurosis by inheritance or otherwise.

Chorea. Grabois[8] discusses the etiology of chorea based on a series of 136 cases in Hutinel's service. He concludes that the conception of chorea as a neurosis is giving way to that of chorea as a meningo-encephalitis. In the majority rheumatism should be considered as the cause of this encephalitis; in others scarlatina, measles, or mumps. The arguments advanced in favor of a tuberculous origin are not very convincing, the same holds good for syphilis. The frequency of cardiopathies, of rheumatism and other infections, the nature of the lesions in the neuraxis do not plead in favor of syphilis.

Chorea ensues after some infection, generally rheumatism, in children with a predisposed nervous system, and here is where syphilis may possibly intervene. Hutinel has recently pointed out that a given germ which in a healthy brain might have no effect, would readily affect one the defensive power of which is compromised or lessened.

Langmead[9] calls attention to the slight nervous manifestations of early cases of chorea misinterpreted or unrecognized by teachers and parents.

In regard to the treatment the author states that the essential part of treatment during the active stage is *rest* both for the body and for the mind. The child should be put to bed in a quiet room, preferably darkened. When other children are treated in the same ward screening is distinctly advantageous. All sources of excitement should be prohibited, and visits of friends and relatives should be avoided as far as possible.

He recognizes no specific medicinal remedy. He be-

(8) Gaz. des Hôpitaux, Nov. 25, 1913.
(9) Lancet, Dec. 20, 1913.

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lieves that there is a logical basis for the administration of salicylates, but does not believe it necessary to give 400 to 500 grains of sodium salicylate in 24 hours, as recommended by D. B. Lees. On the other hand, he advises one to be on the watch for salicylate poisoning, the symptoms resembling an acid intoxication. At the Hospital for Sick Children the author had the opportunity of watching the effect of treatment by drugs on chorea. In one ward very large doses of sodium salicylate were being given in every case. In another arsenic was extensively tried, while in a third no drug treatment was relied upon, and many of the patients received no so-called specific for the disease. Two years' observation of the cases in the different wards failed to convince him that the patients improved more rapidly in one than in another, and, indeed, some of the most satisfactory cases were those in which no special drug took any part in the treatment. Chloral and bromids are particularly useful where there is loss of sleep, and have a very special indication in those patients who, with extremely active movements, begin to show signs of exhaustion from loss of sleep.

Tetany. Last[1] reminds us that though our knowledge of tetany is only of recent date, still it is one of the most common conditions of infancy. All symptoms and manifestations point to a mechanical and electric hyperirritability of the nervous system. The disease does not start out of a clear sky, but grows upon a prepared soil, as shown by the fact that many apparently normal children (especially the artificially fed) give positive Trousseau, Erb, and Chvostek signs, and in such a child, a sudden, often very trivial cause will precipitate the acute condition. This leads us to change our view of the condition, considering it rather a diathesis, and naming it the spasmophilic diathesis. In considering this disease two questions enter our minds: First, what change takes place in the body of a child to give it such a diathesis; and how does the child differ from the normal? Secondly, what precipitates the acute condition?

In considering the first question one cannot overlook

(1) Deut. med. Woch., 1913, p. 1087.

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the fundamental observations of Finkelstein that only 27% of breast fed and 55.77 of artificially fed children show the Erb sign. What can be simpler than to lay the blame on cow's milk and indeed simply taking away the cow's milk in many cases caused all dangerous symptoms to cease. Simple experiments then excluded the casein, sugar, and fat, as the cause of the trouble and laid the blame on the whey. Metabolism work then concerned itself with the salt elements and investigated mainly the calcium. Stoelzner believed that a calcium poisoning was to blame. Others thought the main facts to be a calcium deficiency in the body. In favor of the latter view is first the frequent association of spasmophilia and rachitis; second, the known fact that calcium quiets nervous excitability.

As regards the first point, Kassowitz claims there can be no tetany without rickets. In rickets during the florid state we know there is a negative calcium balance. Again the frequency curve of spasmophilia is identical with rickets as regards the season of the year, the different food disturbances affect both alike, and lastly both are influenced in a like manner by phosphorated cod liver oil. On the other hand, a negative calcium balance of the body would not necessarily mean a deficiency in every organ and direct examination of the nervous system became essential. Quest, followed by several Italians, and Aschenheim showed that in the brains of these children there was a true calcium deficiency. The latter, however, believes the main point is not so much the calcium deficiency as the changed relations between the alkaline earths and the alkalies. Schabad showed the good effects of phosphorated cod liver oil were due to increasing calcium retention, though this only took effect if the calcium balance was negative. Rosenstein and others have shown that giving of calcium solutions will temporarily reduce the electrical excitability, but only for a very short time. The author, however, asks why we must always limit ourselves to considering the calcium and brings up again the idea of Aschenheim that the trouble lies in changed relations between the various salts. Rosenstein, for instance, was able to increase the electrical excitability in some cases

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by giving sodium chlorid. The author cites a case of a child developing an edema and then suddenly showing a tetany. The relation of sodium chlorid to edema is well known.

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The relation of the parathyroid glands to spasmophilia is not as yet settled. Erdheim showed changes in the parathyroid glands of all children affected and Escherich adopted this view. It is difficult to conceive, however, that the small hemorrhages discovered should have the same effect as total removal of the glands. Again, if the glands have been injured during birth as Escherich suggests, why do months sometimes elapse before symptoms appear? Lastly, recent observers showed that in some cases of tetany no hemorrhages existed and vice versa. Still we must not forget the two important points that removal of the parathyroids induces tetany, and, secondly, that the parathyroids are concerned in calcium metabolism.

Metabolism experiments have shown, in experimental tetany, an increased calcium excretion, and led the discoverers, MacCallum and Vögtlin, to believe the parathyroids governed calcium metabolism. This, of course, applies only for the experimental disease.

The writer thinks that in our search we should turn to still other organs and considers the adrenal and the thymus. Quest proved that adrenalin increased calcium excretion and Hirschfeld showed adrenalin to be increased in the blood of spasmophilic children.

As regards the thymus Klose and Vogt report that following its removal the bones take on changes like rickets, and electrical excitability increases. Clinically we know that the fatty, pasty children, those with status lymphaticus, are especially likely to be affected with tetany. Perhaps, after all, the problem is one of the interrelation of the glands of internal secretion.

The Genital Glands in Dementia Precox. Many psychiatrists have advanced the theory that dementia precox may depend on some morbid process in the genital glands. Unfortunately necropsies are still few in number. Obrégia, Parhon and Uréchia[2] in 12 cases were

(2) L'Encéphale, February, 1913.

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able to study the testes and ovaries at necropsy. They found no marked changes, and as a result of their investigations conclude that the appearance of dementia precox bears no relation to any disorder in the internal secretion of the sexual glands. Many facts, among others the blood changes, show that like general paralysis, dementia precox is a general disease, and not an affection localized in the brain alone.

Mongolian Idiocy. Kellner[3] has had 10 cases of mongolianism under observation in an asylum and discusses the condition. He emphasizes the fact that the whole picture is finished at birth. He found that these cases had 10 points in common which were: (1) Deficient mentality, (2) microbrachycephalus, (3) small stature, (4) speech disturbances. These may vary from absolute speechlessness to the ability to use a few words. Echolalia was present in one case. (5) Slit eyes, but with no epicanthus. (6) Large fissured tongue. (7) A small broad nose. (8) A marked flaccidity, and abnormal motility of the joints, and often associated with this a loss of the finer movements. Many mongols cannot climb stairs. (9) A weak cardiac apparatus. This is simply one of the manifestations of the general muscular weakness, and accounts for the cold extremities. (10) The poor nourishment of the skin of the hands and feet also predisposes to eczema. (See Plate V.)

One of these cases was combined with myxedema. Degenerate ears were present in five. Eight of the 10 were males. That these children are always good natured and that they are great mimics is, of course, well known. Three of the 10 were late-born children of elderly parents.

The prognosis is very bad, most of the patients succumbing to intercurrent infections to which they are very susceptible, their resistance being especially lowered by the weak circulatory apparatus. Many do not pass the stage of childhood.

(3) Münch. med. Woch., 1913, p. 748.

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PLATE V.

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Cases of Mongolian idiocy—Kellner (see page 126).

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DISEASES OF THE SKIN.

Cutaneous Affections in Childhood. In discussing this topic, A. Schalek[4] states that skin diseases, especially of the acute type, occur proportionately more frequently in children than in adults. Local and general conditions combine to reduce the normal resistance of the skin and to increase its susceptibility to pathologic changes. Exposures to injurious external agencies of mechanical, chemical and microbic nature are more common at this age. Lack of proper hygiene influences the condition of the skin considerably. Keeping the skin clean and soft is the best prophylaxis against trouble, but unfortunately there are wrong conceptions about this matter even among intelligent people. Quite a number of eruptions are directly due to dirt, this acts on the skin mechanically and chemically, producing dermatitis and eczema and, by harboring pus cocci, inducing secondary infections. On the other hand, the modern tendency to carry the use of water too far also does a great deal of mischief. A great factor in the prevalence of skin diseases in older children is the public school.

The instability of metabolism and elimination in childhood are frequently contributing factors. Their direct connection with urticaria is well known. The association of indigestion of fat and sugar with acute inflammatory eczemas has recently been pointed out. Whether we believe skin eruptions to be purely local or not, the regulation of gastro-intestinal functions is always an important item of our therapeutics. Most of the breast-fed infants affected with eczema suffer from some dietary mistake. The feeding may be insufficient, excessive or irregular. If insufficient, the fault may be that the mother's milk is lacking in the necessary percentage of proteins and fat. More often it will be found, however, that the milk is too rich and that the child is fed too often. Even under normal conditions the fat is not absorbed entirely and the normal feces contain about 10% of it. In abnormal cases the percentage of undigested fat may rise to 75%. Infants' food should also

(4) Jour. Amer. Med. Assoc., July 19, 1913.

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contain a sufficient amount of water to increase the secretion of pepsin and HCl and to assist the digestion. This is frequently neglected in breast-feeding. Constipation and diarrhea can often be traced to faulty feeding and retard the recovery from skin diseases. If the necessity arises, weaning must be resorted to and every means should be taken to find an artificial food of the right proportions. It must be remembered that the appearance of the child is often deceiving and that even if it appears stout and of the right weight signs of anemia may be in evidence and an examination will show the blood below par. Irregular and too frequent feeding is another frequent cause of digestive disturbances.

The diet of older children also needs careful supervision. The mistake of allowing them to partake indiscriminately of whatever food is served to adults is commonly made. The control over the eating is still more important when the children are affected with skin diseases, and at times a plain milk diet becomes imperative.

Disturbances of the nervous system have more to do with causing skin diseases than is generally appreciated. The connection of dentition and eczema is probably due to such a cause. Rest and sleep are essential for the cure of acute skin diseases in children.

The nomenclature is just as unsatisfactory as in adults. Such names as pemphigus neonatorum, lichen urticartus, etc., do not convey any meaning as to the pathology, symptomatology or etiology, often presume a classification which is doubtful, and are of no practical value.

Adamson groups the skin diseases of children according to the etiology: (1) congenital affections, (2) affections due to physical causes, (3) affections due to local parasitic action, (4) affections due to toxemias and general microbic infections, (5) affections of nervous origin and (6) affections of unknown origin.

In addition to the etiology another feature might be utilized. Many affections appear at certain periods either exclusively or by predilection. The reasons for this are known in some cases, while in others no satisfactory explanation has been brought forward. For example, the fact that *Microsporon adouini* attacks the hair of children only is stated in every text-book. Neither do

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we know why such diseases as prurigo, urticaria pigmentosa, etc., should occur in children only. By combining the usual period of occurrence of the skin diseases with their etiology whenever known, however, a grouping may be made incorporating exclusive characteristics of this age.

Such a classification would cover in a general way four groups: (1) Congenital affections, like nevi, ichthyosis, etc.; (2) affections occurring during infancy and childhood only, such as pemphigus neonatorum, urticaria pigmentosa (the etiology of most of these is unknown); (3) affections predominating during childhood, among which belong impetigo contagiosa and the acute exanthematous eruptions, which are due to the higher susceptibility and the lower resistance of the skin of children which permits the injurious action of micro-organisms and irritants; (4) all other affections which occur likewise in adults and are due to the same agencies.

In regard to the therapeutics two general rules might be laid down:

The first is the correction of any causative or aggravating complication. In regard to the internal administration of drugs, it is better to do too little than too much. There are only a very few drugs which have any direct action on the skin. Those used for adults, arsenic, mercury, etc., must be used with great caution, partly on account of their general effects, partly because the child's skin is much more liable to drug dermatitis, which might complicate or disguise the original trouble. The drugs usually needed are simple and indicated by the internal complications. An occasional purge with calomel or some other laxative, some iron tonic, and possibly a diuretic is usually all that is necessary. Antipyretics and opiates should be avoided as much as possible. The second general rule applies to the local management. It should be rather conservative than aggressive. The natural tendency of the skin is to recover to a normal condition if given a chance. Protection of the diseased skin is of the utmost importance, avoidance of irritations of whatever nature, exposure to air, water, heat or cold, scratching, the action of physiologic and pathologic secretions, from old and dried-up applica-

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tions, etc. The number of the local applications which are necessary is limited. The efficiency of the treatment does not depend so much on the knowledge of a great many different remedies as on the skill to recognize the indications and the proper method of application.

Erythema Nodosum. Moro[5] brings forth evidence to disprove Pollak's statement that erythema nodosum is developed on a tuberculous basis, and that all cases react to tuberculin. Moro tried tuberculin reactions on 30 cases of this disease and in 4 of them got absolutely negative results.

Eczema. Hoffa[6] says that we must not let our ideas of the exudative diathesis carry us too far from the local treatment of eczema. Tar preparations are invaluable, and perhaps the most successful of all our local remedies is diacetyl amidoazotoluol, a scarlet red derivative put up under the name of "pellidol." As a 2% ointment pellidol has given very encouraging results, especially in the intertrigenous forms of eczema, and working equally well, both in hospital or dispensary practice.

Etiology of Febrile Herpes. According to A. Veillard[8] the zoniform eruption of febrile herpes follows the general law for the localization of zonas, *i. e.*, it is located along the distribution of the arterioles. As a rule, the arteries with their vasomotor, motor and sensory nerves form one leash, hence the eruption will follow the course of the nerve. The facial and temporal arteries, on the other hand, have a distribution distinct from that of the trifacial, their accompanying nervous leash does not contain any fibres from the trifacial, only those from the vagus and the sympathetic. Hence febrile herpes denotes a lesion involving the vagus, and is seen in herpetic angina or zona of the throat, in pneumonia or zona of the pulmonary vagus, in cerebrospinal meningitis or zona of the meningeal arteries, etc. Thus febrile herpes is always in relation with some affection of the same kind involving some area innervated by the vagus, it indicates the pneumococcic or meningococcic nature of the affection.

(5) Münch. med. Woch., 1913, Nov. 21, p. 1142.
(6) Deut. med. Woch., 1913, No. 25, p. 1209.
(8) Pédiatrie, Jan. 31, 1914.

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MISCELLANEOUS.

Fever in Children. Pisek[9] groups the febrile diseases which are most apt to cause confusion in diagnosis in three main groups:

(1st) Those in which the diagnosis may be cleared up by a thorough physical and clinical examination.

(2d) Those in which the disease is in its early stages and has not developed sufficiently, and in which the diagnosis is mainly made by exclusion.

(3rd) This group is made up of diseases less commonly seen, though important from the standpoint of treatment.

In the first group, placed in the order of their relative frequency, are: 1st. Otitis media. 2d. Empyema (encysted). 3d. Urinary infections. 4th. Malaria. 5th. Infections of heart and pericardium. 6th. Glandular fever.

In the second group: 1st. Tuberculous meningitis. 2nd. Typhoid fever. 3rd. Onset of the exanthemata. 4th. Acute poliomyeloencephalitis.

The third group (calling for attention less rarely in this regard): 1st. Frontal sinusitis in childhood. 2nd. Pharyngitis in *infants.* 3rd. Obscure abscess formations. 4th. Intestinal infections of a latent type.

J. Phillips[1] calls attention to the fact that in the treatment of various disorders in children, one of the most puzzling problems that confronts the physician is the determination of the cause of continued fever. The most common causes are classified by the author as follows:

1. General infectious diseases—typhoid, malaria, tuberculosis, influenza, septicemia, syphilis.

2. Infections of the nose with its accessory sinuses, the ear and tonsils. This would include naso-pharyngitis, infections of the antrum, the ethmoidal and sphenoidal and frontal sinuses, otitis media with or without mastoiditis, and chronic tonsilitis.

3. Oral infections, particularly pyorrhea.

(9) Amer. Med., June, 1913.
(1) Cleveland Med. Jour., September, 1913.

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4. Glandular inflammations—cervical adenitis or inflammatory conditions of the mediastinum and retroperitoneal glands, tuberculous peritonitis.

5. Diseases of the lungs and pleura, especially empyema, bronchiectasis and abscess of the lung.

6. Chronic endocarditis and pericarditis with effusion.

7. Chronic appendicitis, constipation, colitis, starvation.

8. Infections of the urinary tract and vagina.

9. Diseases of the bones and joints.

10. Anemic conditions—pernicious anemia, Hodgkin's disease, leukemia, infantile scurvy.

11. Heat congestion due to insufficient radiation as seen in premature infants.

12. Chronic diseases of the brain and meninges.

To determine the condition present, a careful history and physical examination is very essential. It seems scarcely necessary to emphasize the importance of examination of the ears and the urine and yet nothing is so frequently neglected. The difficulty of obtaining in the ordinary way a specimen of urine in a baby, probably accounts for the neglect of this part of the examination, and yet this is easily overcome by the use of a small catheter, which should always be a part of the physician's equipment. Blood, sputum and spinal fluid examinations are also necessary to clear up the diagnosis of the obscure conditions.

The Roentgen-ray has been invaluable in the diagnosis of diseases of the bones and joints, lungs, mediastinum, and abdominal conditions. The author emphasizes the importance of rectal examination. With one finger in the rectum and the hand on the abdomen, the lower part of the abdomen can be thoroughly explored without any pain, if the finger is well lubricated and passed into the rectum very slowly.

Abdominal Pain. Among the very numerous causes of abdominal pain in children, Moro[2] claims that a neurosis which may be named pseudo-appendicitis or recurring navel colic is not at all uncommon. One rarely sees children during the acute stage of such an attack,

(2) Münch. med. Woch., 1913, p. 2827.

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but the parents usually give the following history: The child is seized very suddenly with severe abdominal pain, most marked either in the navel or the epigastrium. The attack may come on right in the midst of play, and is absolutely without any etiologic factor. The child becomes very pale, but rarely vomits and has no fever. Occasionally the temperature may reach 100°. The attack may last from a few minutes to several hours, and is very likely to recur, sometimes periodically every 2-3 months. On examination these children have no findings in the abdomen except frequently a diastasis of the recti. They are usually neuropathic in constitution, suffering from constipation, meteorism, periodic vomiting, migrain, asthma, enuresis, vasomotor disturbance, and orthostatic albuminuria. They may have pains in the legs, the back, and the head, and hyperesthesia of the scalp and nails.

That this condition is also a neurosis is shown by the complete response to suggestive treatment. Belladonna pills are very effective, but a little plaster applied to the umbilicus seems to effect the cure.

Lockwood[3] says as an operating surgeon he is usually summoned to cases in which an acute abdominal inflammation has been diagnosed and considered to be of the dangerous type which requires an operation.

But other cases are seen by physicians and by those in practice which in their judgment are likely to recover without an operation. This side of the question has not had the attention it deserves. Even when he has come to the conclusion that the local and general symptoms are subsiding he has the patient watched almost hour by hour, and surgical help at hand, until it is certain that the attack has subsided. If an acute appendicitis has been diagnosed, it is undoubtedly safer for an experienced surgeon to remove the appendix than to leave the patient. He never ceases regretting a case in which he left a patient only to be summoned days afterwards to open an extensive abscess.

The organization of operations is so complete that an emergency operation can be carried out as well as any other, and he questions whether the risks are greater.

(3) Brit. Med. Jour., Sept. 27, 1913.

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The risks are the risks of the disease, and not the risks of the operation. How often has there not been delay, although the appendix has been perforated or gangrenous?

In the acute abdominal inflammations of children, the first 24 hours are all important. Within 24 hours the clinical signs which point to the severity and danger of the attack are sure to have manifested themselves.

The clinical signs are never the same, but there is always at least one danger signal:

(1) A sudden acute onset in the midst of health, followed by an elevation of the pulse and temperature. (2) A progressive increase in the pulse-rate. (3) A rapid pulse which intermits. (4) A simultaneous and progressive increase in the pulse and temperature. (5) A rigor. (6) A leucocytosis. (7) Acute abdominal pain. (8) Abdominal tenderness, especially when its extent is known to be increasing. (9) Abdominal rigidity. (10) Pain during micturition or defecation. (11) Retention of urine. (12) Abdominal distension and intestinal obstruction.

An acute inflammation beginning in the pelvis or in the right flank is oftenest overlooked.

Bone Infections. Koch[4] writing of infections of bone says that while we have long known that the liver and spleen are intimately related to the blood circulation, we have usually overlooked the fact that the bone-marrow is also vitally concerned. Indeed, the bone-marrow resembles the spleen not only in its histology but also its pathology. It stands to reason that the effect must be very different in a growing organism, or an adult one, must be far more serious as regards the ultimate result, and from its intimate relation to blood distribution, the bone in the child is a frequent focus of infection.

There seem to be special localizations in the bone-marrow which appeal to microorganisms, particularly near the bone-cartilage border, as for example the well-known osteochondritis syphilitia, tuberculosis, etc. The author has already shown that in many other diseases of children organisms are found in the bone-marrow, without, however, causing changes in the bone. In some of the cases, nevertheless, microscopic changes are evident,

(4) Berl. klin. Woch., 1914, p. 269.

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often much resembling the early stages of rickets. These findings were so striking that he determined to try animal experimentation.

He started with rabbits, his first object being to determine the distribution of the organisms. In many cases, where only a very few bacteria existed in the circulating blood, they were found abundantly in the bone-marrow, and especially in the places of predilection. The most important point was in the endosteal blood system in the marrow spaces near the bone-cartilage border. The second place was in the large venous spaces of the marrow of the metaphysis; sometimes the entire lumen is stopped up. A third place is in the periosteum.

Of the germs the streptococci deserve special mention. While, like *B. anthrax* and pneumococci, the focus finds its origin in one vessel, the streptococci multiply rapidly while the others tend to remain more localized. Indeed, the spreading along the lymph spaces to periosteal and periarticular tissues reminds one of the streptococcus of erysipelas. Thus we see clinically in rheumatism the first invasion as a periarticular process, and any serous fluid in the joint as usually sterile. The joints are usually well protected by the cartilage capsule.

The bone is especially predisposed to bacterial growth for two reasons: the end-arteries in the periosteum, and the sluggish circulation, with many anastomoses in the marrow.

He sums up his experimental work by showing that the chief change in the growing bone is an injury to the cartilage-bone border. From the destruction of the bone substance the marrow increases in amount, the diameter of the cartilage and the periosteum increases and the real zone of growing cartilage cells becomes smaller. These changes seem so typical of rickets that Koch believes he has discovered something of great importance and proposes to continue the work.

Epidemic Cervical Adenitis. Pruen[5] reports on epidemic of sore throat associated with enlarged tender cervical nodes and endocarditis. He believes this to be identical with similar epidemics on the continent and in America, and that it is a new or hitherto unrecognized

(5) Brit. Med. Jour., Feb. 21, 1914.

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infectious disorder caused by the streptococcus, probably a new variety.

Tonsils. Dick and Burmeister[6] endeavored to determine (1) whether or not there are toxic substances in the tonsils; (2) if present, the nature of those substances, and (3) the factors influencing the degree of toxicity. The material for study was obtained from a series of 32 tonsillectomies. The tonsils were received in sterile gauze, extracts were then made by grinding them in a mortar with 10 c.c. of salt solution. The extract thus obtained was either centrifuged or filtered through paper and examined as follows: Blood-agar plates were made by adding 1 c.c. of goat blood to 7 to 9 c.c. of agar; the plates were allowed to harden, and one drop of extract to be examined was smeared over two plates by a platinum spatula; after incubating 18 to 24 colonies were examined grossly and microscopically. The extracts were injected into animals. It was noted that of animals injected with toxic extracts the rabbit usually exhibited, besides the symptoms noted, a marked exophthalmos and contracted pupils. Post-mortem examinations were made in nearly all cases. In no instance were evidences of embolism or thrombosis found. The coagulation of the blood was delayed.

The extracts were prepared and injected in some cases immediately on removal of the tonsils. A few of them were prepared after freezing the tonsils for 24 hours; most of them were made a few hours after removal. The toxicity was apparently not affected by these varying conditions. The symptoms and changes in the animals resemble very much the conditions found in anaphylactic shock in rabbits, guinea-pigs and dogs. A few tonsils were apparently harmless in the doses of extract used. A search for the underlying factors was made by comparing the toxicity with the bacterial flora, structural changes and the amount of sediment, *i. e.*, parenchyma, obtainable. The bacterial flora was the only factor that seemed to bear any relationship to the toxicity of the extract. In 10 cases in which relatively non-toxic extracts were obtained there was only one in which typ-

(6) Jour. of Infect. Dis., September, 1913.

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ical punctate hemolytic streptococcus colonies were present. In the remaining 23 cases, from which highly toxic extracts were obtained, there was only one in which typical punctate hemolytic streptococcus colonies occurred fifteen times in large numbers. In 3 additional cases large colonies of hemolytic staphylococcus was found three times. Hence the toxic extracts were usually obtained when typical hemolytic streptococci were found on the plates in large or predominating numbers.

The Cause of Enlarged Tonsils and Adenoids in Children. Ashby[7] advances a new theory as to the cause of adenoids and enlarged tonsils and offers a treatment based on the theory. The writer found by microscopic examinations that adenoid tissue is present in the nasopharynx of every fetus after the age of 6 months.

The mere presence of adenoids does not constitute a disease, and they only become pathologic when they hypertrophy and cause trouble. In infancy and childhood the lymphatic structures are at their maximum exactly at the time when enlarged tonsils and adenoids are commonest, and it is one of the functions of the lymphatic tissue to form the lymphocytes. Now it is a peculiar fact that children with enlarged tonsils and adenoids rather have a diminution of lymphocytes, and there is also an increase in the total number of leucocytes. For this reason it looks as though the enlargement of tonsils and adenoids were an attempt on the part of Nature to supply the deficiency in the other lymphoid tissue of the body. At the age when enlarged tonsils and adenoids are commonest (2 to 5 years) the lymphocytes are normally beginning to decrease from the high percentage found in infants to the adult standard, and again, the thymus is also decreasing in size. The writer thinks these two facts support the view that the adenoids and tonsils are an attempt to augment the lymphoid tissue of the body. It is also a common fact that when the enlarged tonsils and adenoids are removed carefully by a competent surgeon before the age of about 5 years they are very liable to recur, so that Nature, as it were, makes a second attempt to raise the amount of

(7) Brit. Med. Jour., May 31, 1913.

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lymphoid tissue, or at least supply the body with some secretion from the lymphoid tissue, which it needs at this age.

The author believes that if we could supply these children with lymphoid tissue artificially, there would be no need for the enlarged tonsils and adenoids, and in consequence they would go down. Up to the present time he has treated about 30 cases of enlarged tonsils and adenoids with this lymphatic gland extract, (Burroughs, Wellcome & Co.), gr. v. *t. i. d.* No bad effects have been observed, and nearly all the children have improved in a very satisfactory way; the snoring and noises in breathing have disappeared, and the tonsils have diminished in size.

[We are inclined to the belief that the above deductions are not conclusive.—ED.]

Baines and Campbell[8] from a study of a large number of cases of albuminuria present the following conclusions:

I. That 3.2% of children with hypertrophied tonsils show an accompanying albuminuria with a mild nephritis.

II. That in the vast majority of cases, the pathologic condition rapidly clears up after tonsillectomy.

III. This condition is most frequent during mid-winter and early spring.

IV. Spinal curvature plays a very small part, but when present, may be an accessory etiologic factor.

Lead Poisoning Due to Rubber Sheet. Frank[9] relates the case of a nursling of 6 months, breast-fed and in good condition, which suddenly began to lose weight. In spite of all efforts the cause could not be ascertained, the emaciation continued and in 3 weeks the baby was in a distressing condition. At this time a new symptom made its appearance and led to the diagnosis. This was an intense stomatitis, showing the possibility of lead poisoning. After an investigation of everything about the child, it was found the rubber sheet protecting the bed contained lead. After this was removed, cure ensued in a few weeks.

(8) Amer. Med., June, 1913.
(9) Münch. med. Woch., May 27, 1913.

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ORTHOPEDIC SURGERY

JOHN RIDLON, A. M., M. D.

WITH THE COLLABORATION OF

CHARLES A. PARKER, M. D.

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ORTHOPEDIC SURGERY.

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Qualifications of the Orthopedic Surgeon. Shaffer[1] gives an interesting record of orthopedic surgery as he has seen it, covering a period of fifty years. He closes as follows:

The orthopedic surgeon should know more than his instrument maker. He should be able to devise the apparatus needed. He should be competent to direct its manufacture. He should know how to alter and adjust it to the conditions for which it was devised—in short, he should be able absolutely to control the situation. How many men practicing orthopedic surgery today fulfil these conditions? Not many!

And why? First of all comes the lack of facilities for proper preliminary education. Then again Shaffer is afraid that it is considered by some of our best-known men that mechanical work is *infra dig.* They are willing that the instrument maker should measure for, and after manufacturing it, adjust the apparatus to the patient. Another reason is that since the advent of aseptic surgery, operative measures have come to the front, and mechanical means have been relegated to the background. An important reason lies in the ever ready, often useful, but generally baneful, plaster-of-Paris bandage. Shaffer thinks it safe to say that 90% of the non-operative deformities of childhood can be more scientifically treated and more intelligently handled with properly constructed apparatus, than by the use of the gypsum bandage—and, he is sure, ultimately with much better results.

A cynic might say, in the present status of affairs—for an orthopedic surgeon must necessarily be an operative surgeon—that all that is needed to transform a general surg ⁊ into an orthopedic surgeon is for the former to become an adept in the use of the plaster-of-

(1) Jour. Amer. Med. Assoc., Oct. 25, 1913.

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Paris bandage. That this criticism can be made with some degree of justice, so far, at least, as the operative treatment of deformities is concerned, emphasizes the weak point of the present-day orthopedic surgery; that is, the lack among those practicing it of a thorough training in the thing which has been the most important formative influence in orthopedic surgery, which distinguishes it from general surgery, and which, if orthopedic surgery is to exist as a distinct branch in the future, must be cultivated and progressively developed —the intelligent and scientific use of apparatus.

[There is much that is true in what Dr. Shaffer says. On the other hand, he exhibits a narrowness that is surprising in one who has been in active practice in a metropolitan city for the last quarter of a century—Dr. Shaffer has been in orthopedic surgery in New York for fifty years. The Editor sees no advance, even some retrogression, in Dr. Shaffer's attitude since he began to learn orthopedic surgery under him more than thirty-five years ago.

It is true that the young men in orthopedic surgery seem drifting away from mechanical aids and into more and more operative work. There are several reasons to account for this fact. Chief among them is the lack of long training in an orthopedic institution having a well-equipped instrument shop on the ground and a chief surgeon and competent and willing to teach the use of braces. Next is the fact that a pretense at teaching orthopedic surgery by lectures is made in most medical schools at the present time, when it is a fact that orthopedic surgery can not be really taught to undergraduate students in a course of lectures. To this may be added that comparatively few of the teachers of orthopedic surgery in medical schools know the details of the manufacture and use of braces. The real orthopedic surgeon must be of patient, plodding, mechanical turn of mind, satisfied to get what money the patient has in small brilliant and quick results and not tempted by the fees which cutting operations offer.

No man can do satisfactory brace work without a competent brace-maker near at hand—at least in the same town. Today thousands upon thousands of cripples are

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being treated more or less well, who thirty years ago would have had no treatment at all, by men who make no claim to being orthopedic surgeons, having had no orthopedic training. Such men can not and ought not to use braces in the majority of their orthopedic work. They must operate more often than necessary and they must use plaster-of-Paris.

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In condemning the use of plaster-of-Paris Shaffer is talking about a subject in which he is relatively inexperienced. During the more than seven years that I worked as his assistant I never saw him use plaster-of-Paris over half a dozen times. As a means of perfect immobilization no brace ever devised or used by any man is as efficient as a properly applied plaster splint. One might just as well say: "Never use a brace;" as to say, "Never use plaster-of-Paris."

The truth is that in some cases of tuberculous joint disease a brace is best; in other cases a plaster splint is best; and in still other cases a brace should be used in one stage and a plaster splint in another stage. To know only one way to treat hip disease is to be as ignorant as not to know how a case will get on without operation.

All the operations I remember seeing Shaffer do were two or three tenotomies and one sub-trochanteric osteotomy. That hundreds of unnecessary operations are being done today is true; but it is equally true that hundreds ought to have been done thirty years ago that were not done.]

Causes of Limping in Children. Sever[2] addresses so interesting a paper to "the general practitioners" that we quote liberally.

"Limping in Children. It is an almost daily experience with me to see a child at the hospital brought there on account of a limp in one leg of greater or less duration. It is also a common story to hear the parents state that the trouble is all in the knee. With the child stripped, an observation of the gait will, as a rule, at once disclose whether the trouble is in the knee, hip, or ankle. A further examination, with the child on its back on the table, will localize the trouble, which is generally in the hip.

(2) International Med. Jour., No. 2, 1914.

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"Now pain in the knee, without anything to show for it at that point, usually means hip. The obturator nerve in its course to the inner side of the knee runs directly over the anterior portion of the capsule of the hip, and any disturbance in the hip-joint means pain in the knee. Do not fail, therefore, to examine the hip when pain in the knee and a limp are complained of, for this omission is one of the most common errors made. The hip-joint is usually found affected by tuberculosis in these cases, and the child usually has a joint which is painful, irritable, and a leg which is flexed by spasm, and which shows considerable limitation of motion.

"Another not uncommon cause of limp is found as a result of a fall or injury to the leg by muscle strain. In these cases there is usually a slight limp, of short duration, the onset sudden after the injury; and an examination shows generally at most but a very slight limitation of motion at the hip, especially in the direction of outward rotation and hyperextension. The *x*-ray of the hip joint usually shows nothing abnormal. These cases probably represent a condition of moderate synovitis of the hip-joint, analogous to 'water on the knee,' and readily clear up with rest in bed and a flannel spica.

"Identically the same symptoms may be found in other children, with often similar histories, but the children are always much too large for their age and generally quite obese. The *x*-ray shows a slipped epiphysis, and the best method of treatment is to apply a plaster spica, with the leg slightly abducted, and prevent weight-bearing by supplying crutches. More severe cases of this class require forcible abduction of the leg under ether, followed by plaster-of-Paris, and later a metal splint which will keep the leg abducted.

"There are numbers of other conditions which cause limping in children, and which are generally more obvious than the ones of which I have spoken—namely, congenital dislocation of the hip, coxa vara from rickets or fracture of the neck of the femur, infantile paralysis, and affections of the knee and ankle. These conditions I shall not discuss here, for I wish to call attention in detail only to the ones of which I have spoken, as being the ones likely to be overlooked.

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"Tuberculosis of the spine will also cause a limp in the following way: If a psoas abscess has developed it will probably cause a certain amount of flexion of the leg and irritation about the hip muscles, so that when the patient attempts to walk, he will exhibit a certain hesitancy for which the cause can be found on examination. As a final caution, never fail to examine the spine and iliac fossæ of any child brought to you for a limp unless the cause is perfectly obvious."

"Lateral Curvature of the Spine. This subject is at present much before the orthopedists, and is one of great importance. It is to you, however, and particularly to those of you who are doing school inspection work, that I wish to emphasize the following points: Every child who carries one shoulder higher than the other probably has some kind of a lateral curve; every child, and this is especially noticeable in girls, who has so-called 'high-hip,' and generally the dressmakers are the first to discover it, probably has a lateral curve. The observations of these two points alone will do much to insure a proper examination of the backs of these children, stripped to the hips, and, if a lateral curve is found, to insure its proper treatment.

"Congenital Club Foot. Now you are all familiar with congenital club-feet, and it may seem strange to you that I should refer to apparently so simple and well known a condition. But when I tell you that a club foot improperly treated is one of the most difficult and lasting problems we have to meet, it will not seem too strange that I wish to emphasize certain points in the treatment.

"Club feet can be adequately cured and normal feet obtained if the child is given adequate treatment early enough. By that I mean within the first eight weeks of its life. This can be done without operation. Do not tell parents to wait until the child is one, two or three years old before having anything done, but tell them to start treatment at once. Time lost at the start can never be regained, and the earlier treatment is begun the more normal the foot which the patient will have later in life. This I know from long experience with many club feet.

"At the Children's Hospital, the earlier we get a case the better we like it. These cases have a plaster cast

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applied without ether, and it is renewed every two weeks at first and at longer intervals later, until the over-correction is easily held, when a brace is applied. The plaster cast is applied and allowed to harden with the foot held in as much of an abducted, everted and dorsally-flexed position as possible. Each time it is renewed there should be a distinct gain in the position, that is, in the young babies. The knee is flexed to prevent the cast from twisting on the leg, which would allow the foot to go back to its former position. Too much padding should not be used, for the foot will slip inside of it. The circulation should be most carefully watched, and it is often advisable to bivalve the plaster cast before allowing the child to go home. The parents should be instructed to watch the color of the toes and note any undue swelling, and should report for observation frequently. By applying these casts every two weeks the most severe deformities can be over-corrected, and by over-correction only can any club-foot be cured. Over-correction as applied to a club-foot means a foot well everted, abducted, and capable of full dorsal flexion. Later, when the over-correction is complete, massage, a light brace for six months to a year to hold the over-correction, and constant use of the foot in weight bearing, if the child is old enough to walk, are the measures indicated."

[The Editor commends this treatment of congenital club-foot to the general practitioner because it is likely to do some good, and because it will cure a considerable number of cases. Its most important advantage is that it does no harm. The general practitioner or the general surgeon who attempts to treat congenital club-foot invariably does not cure it, and by too early operation makes the ultimate cure exceedingly difficult. Within the week we have seen a child five years old who has been continuously under the care and treatment of an eminent general surgeon—none better—since he was six weeks old. He still has well-marked equino-varus deformity. He was operated on when six months old, and wore a plaster splint for six weeks! Since then braces. No child can be cured by braces. No child should be operated on until he has learned to walk well. And in no

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case should the plaster splints be discontinued for so long, that the foot can be passively returned to the original deformed position. There are just two rules for the cure of club-foot: *First*, make the foot straight. *Second*, hold it straight till it stays straight. In a child that walks this may be for only four months; or it may be for four years.]

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TUBERCULOUS JOINT DISEASE.

Diagnosis. Brackett[3] says:

The problem today is quite a different one from that of former days. Given a suspected joint, the first step is to determine the presence of disease. The task is comparatively easy and formerly it ended the question; but today the problem begins where it used to end. The second step is to determine whether the disease is of a tuberculous or non-tuberculous origin, and this is the one of importance, for on it the principle of treatment and the questions of prognosis will depend, and it is a question often of very great difficulty and frequently one impossible to decide. For the positive proofs, it is necessary to use all the laboratory tests at hand, and for just this reason, viz., that these tests are positive and rather definite in the answers they give us. There is danger now that the study of this clinical picture, in its more accurate detail, may fall into disuse, and it is far too valuable an aid for us to allow it to do so. For example, the tendency is to look at the *x*-ray before making a careful clinical examination of the case, and to ask for the tuberculin and other reactions before first weighing the clinical evidence, and it is extremely difficult to give the clinical side its real importance, after these other sources have biased our opinion. It is on account of the importance, as well as the frequent difficulty, of making this distinction between the tuberculous and non-tuberculous, that leads to this plea for emphasis on the study of the clinical side, and which appears to be in danger of neglect.

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(3) Boston Med. and Surg. Jour., May 8, 1913.

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Here are the things he would have us do:

- **History**
  - Slow development
  - Remissions
  - Residual
    - Limp
    - Deformity
  - Pain—slight.
- Joint involved—Knee
- **Local signs**
  - Capsular swelling
  - Flexion
  - Atrophy
  - Pain—slight
- Duration—One year
- Ankylosis—Motion
- Temperature—98.6 to 99.6

Urine

Color	Reaction	Sp. Gr.	Albumen	Sugar	Sediment
High	Ac.	18	0	0	Negative

- **Blood Examination**
  - Hem. 80%
  - Whites 5,900
  - Reds 5,864,000
- **Reaction Tests**
  - von Pirquet — Positive
  - Tuberculin — Temperature + 3° c. 1 mg.
  - Wassermann — Negative
  - Luetin
  - Neisser — Negative
- **Naso-Pharynx**
  - Tonsil — Negative
  - Teeth — Negative
  - Nasal cavity — Negative
- **Gastro-Intestinal Tract**
  - Acidity — Negative
  - Constipation — Present
  - Ptosis — Negative
  - Stools — Negative

Some Common Fallacies. Gillette[4] reports on an experience of twenty-five years covering 4,010 cases; among other things he says:

The opsonic index has not been employed from a diagnostic point of view. The von Pirquet cutaneous and

(4) Jour.-Lancet, Jan. 1, 1914.

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the ophthalmotuberculin reaction of Calmette have not been of satisfactory assistance in diagnosing these cases, some cases reacting where no tuberculosis could be found, and some others not reacting where tuberculosis existed.

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The general and local reaction following subcutaneous injections of Koch's original tuberculin has in some instances resulted quite disastrously. This was in the early days, however, when we no doubt gave too large doses. Gillette has demonstrated by operation and examination that it does not always give a reaction in early and mild cases of tuberculosis, and often no reaction in advanced cases. There are men who claim that by handling it judiciously, it is of immense value for diagnostic purposes, and some few for treatment, but Gillette is sure his experience has demonstrated beyond a doubt that it is not to be depended upon, and at present it is not employed in his work, and incidentally not by many men who have a large orthopedic practice or clinic.

He also has found that an *x*-ray picture can never be depended upon to show the entire extent of the tuberculous invasion; and that operation for the removal of the tuberculous focus in children always does more permanent harm than good; and the extent of the "bony involvement is not in any way by the abscesses and sinuses, or *vice versa*."

It is most unfortunate that we do not call the abscesses effusion just as we do in a pleural cavity, for this is really all they are, until a mixed infection occurs. It is a fact that designating them as abscesses instead of effusion has led many and many physicians to intervene surgically, earlier than they would if the term tuberculous effusion were employed rather than abscess.

As long as this effusion or so-called abscess does not in any way interfere with the patient constitutionally, by causing temperature, or interfere with the application of proper mechanical supports, we leave it entirely alone, for it does no harm so long as it remains a typical tuberculous effusion, surrounded by a protecting connective tissue, called in early days pyogenic membrane.

It is seldom necessary to make an open incision. Gillette has never made an open incision in a tuberculous effusion, which was not sooner or later, within a few

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weeks, followed by a mixed infection, with high temperature and general sepsis, and in a few instances, general tuberculosis and death, and yet in hundreds and hundreds of these cases where there is no evidence of mixed infection, the abscess will finally disappear without any aspiration, and hundreds will and do spontaneously and gradually work their way to the surface and open without any evidence of pain, fever or any other inconvenience to the patient except the saturation of the clothing or the bed sheets. Gillette has tried opening these abscesses or effusions and then suturing carefully the opening after the pus has been evacuated and the sac thoroughly cleansed, and I have made an open incision, and injected iodoform emulsion, and various other chemicals, after draining, but these operations have been followed by high temperature. Gillette has related this to general surgeons, especially abdominal surgeons, and they very frankly stated that they thought there must be something wrong with his technic. In answer he has turned these cases over to them for operation, and in every single instance, their results have been no better than Gillette's, until several of them have acknowledged to him the fear they have of opening into a cold abscess, preferring to leave it to Nature as long as it does not cause constitutional symptoms or interfere with mechanical treatment.

Bone surgery in children and bone surgery in adults are very different. The time to judge as to the end-result in a case of excision of a joint is in growing people, not when the wound is healed and the patient discharged from the hospital, but when the patient is twenty-one years of age, for then only can one know the end-result. Gillette has seen as much as six inches shortening following hip excisions, and unless mechanical treatment is employed there is almost sure to be flexion deformity in the lower extremity, and in some cases an absolutely useless limb.

He has repeatedly heard in medical schools and at medical meetings, "A plaster-of-Paris cast is a cheap dressing, a convenient one, and easily applied." Gillette wishes to state right here that one of the most difficult courses to teach at the University of Minnesota is the

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course in the making and use of plaster-of-Paris bandages, their proper application, not only the act of applying them, but when and where.

There are many surgical instrument makers who are today manufacturing orthopedic braces and supports, who have not the slightest idea of the pathology of the disease for which they are making the braces, and from the manner the braces are worn it is evident that the doctors who order them have not the slightest idea of their mechanical use. In short, a doctor has no more right to send a patient to an instrument maker for a brace than he has to send him to a druggist, asking him to advise a remedy. If the doctor does not know what kind of a brace his case requires, he certainly does not know when the brace is fulfilling its functions properly, nor how to readjust it if it is not. Gillette has no quarrel with the instrument maker. We cannot get along without him. He does not wish to prescribe, but prefers to make braces under a doctor's direction, and they frequently so inform the doctor. The doctor in turn insists, or he sends the patient to another instrument maker.

Gillette then goes on to condemn the use of all injections into tuberculous joints and sinuses, including the much vaunted "bismuth paste," with the exception of iodin.

A Comparison of Operated and Non-Operated Cases.

Orr[5] reports 50 cases from Dr. John P. Lord's service in the Nebraska State Hospital. It has been some years since Orr began to be impressed with the fact that patients with joint tuberculosis coming under their observation who had previously been operated on were, as a general thing, much more seriously disabled and that the active stage of their disease was much more prolonged than even the advanced cases in which the patients had not previously resorted to surgery.

Orr's intention is to compare, in patients operated on and those not operated on, the periods of active disease process and the amounts of resultant deformity. He has therefore checked up recently a series of fifty patients of this character, of whom he had satisfactory records

(5) Jour. Amer. Med. Assoc., Oct. 11, 1913.

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for the purpose. Orr has attempted to determine the actual period in each during which the disease may be said to have been active. In many cases this was of necessity a matter of estimate, but he has tried to be fair and liberal both to those operated on and to those not operated on. The results of this study show a wide margin of advantage for the patients not operated on. In fact, although the information used is somewhat difficult to determine for statistical purposes, the patients not operated on have done so much better than those who were operated on that the tendency of the conclusions is inevitable, even if a measure of inaccuracy in the original figures should exist.

Orr found, for example, that of all patients operated on before coming under his care at the Nebraska Orthopedic Hospital and in his private practice and all patients not operated on, the patients operated on averaged a period of active disease much more than twice as great. It is difficult to arrive at any very satisfactory conclusions regarding the amount of difference in the resulting deformity, but conclusions based on estimates as fair as he is able to make them indicate that the patients operated on suffer an amount of deformity greater than the patients not operated on, which also approximates 50%. This fairly agrees with his conclusion as to the length of active disease, for active disease over twice the period would naturally mean more bone and joint destruction and correspondingly a greater deformity.

Operation in adults especially is perhaps most frequently invoked as a time-saving expedient. In the patients studied this proved to be a fallacy, as these patients were disabled much longer than the average of patients conservatively treated. Those who did not recover primarily from the surgical operation still thought their treatment practically over, and went or were allowed to go about with the usual result—mixed infection and continued trouble.

Results of Operative Treatment. Tubby,[6] in 1902, collected the statistics from four children's hospitals in London. He says as to the results of treatment:

(6) Lancet, July 19, 1913.

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On these 218 patients 415 operations were done—that is, nearly two operations on each patient. In one case it is recorded that a child was operated on 18 times, in another 12, in another 11; and in one instance Tubby met with in a surgical clinic in Germany in the year 1888, a child had been operated on 35 times, and was apparently as far off cure as ever.

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As a result of all this suffering of the children and expenditure of time and labor by the surgeons only 68 of the 218, or 31.2%, were said to be cured; 128, or 58.6%, were relieved—and relief is no cure in tuberculosis, since half cures are worse than none at all. In 13 cases the result was doubtful or the condition of the patient unchanged, and nine patients are known to have died in hospital.

Results so disappointing as these led Tubby to reconsider the whole question, and in 1903 he expressed the views that—1. Urban hospitals are not suitable places for the treatment of tuberculous children. 2. Operation as a routine treatment has failed. 3. Other methods of treatment must be found. 4. Treatment conducted in urban hospitals is wasteful and dangerous: wasteful because the financial resources of the hospital are not used to the best advantage, considering the results attained; and dangerous because such children are often sent from the hospital with tuberculous discharges, which are a cause of dissemination of the disease among those around them.

[The Editor sincerely hopes that every man doing any surgery whatsoever will seriously consider these statistics and learn from them a much needed lesson. For years we have taught that the best results had, from operating on tuberculous joints in children, are ultimately worse than the worst results of no treatment at all.]

Results of Joint Excisions. Occasionally in an adult having tuberculosis of the knee it may seem wise as a time saving measure to excise the joint. Osgood[7] reports on twenty-eight cases done at the Massachusetts General Hospital.

(7) Boston Med. and Surg. Jour., July 24, 1913.

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Their technic is as follows:

A two to four day preparation is given to the knee joint, which has preferably been previously fixed in plaster for at least one month and the disease rendered somewhat quiescent. On the table, benzin-iodin skin preparation is given and an Esmarch or tourniquet applied. The table linen is carefully draped so that extreme flexion of the knee may be carried out without risking the asepsis. The leg below the knee is separately covered and rests on the top of the table covering.

A U-shaped incision is planned, extending from just above the inner femoral condyle downwards across the patellar tendon an inch above the tubercle and upward to above the outer femoral condyle. Before the skin is cut through three tiny cross scratches are made, one at the lower limit of the incision and one on either side. The purpose of them is to facilitate accurate skin flap reposition at the close of the operation. The incision is now carried down to the bone, dividing the patellar tendon. The edges of the wound are swabbed with tincture of iodin of full strength. The proximal end of the patellar tendon is seized with double hooks and the flap containing skin, fat, patella, diseased tissue, and upper cul-de-sac is quickly dissected back, the knee being gently flexed as this dissection is being carried out. Much of the tuberculous tissue is removed as the lower end of the femur and the upper end of the tibia are isolated. A quick dissection of the upper cul-de-sac is made. Calculating the desired angle of fixation, for a standing occupation 10°, for a sitting 30°, the lower end of the femur is sawed off with a flat saw. Only sufficient bone is taken to reach above the disease. The upper end of the tibia is next sawed off and a quick dissection of tissue in the posterior capsule is made. The patella is removed or its under surface sawed off. No attempt is made to remove more than the evident mass of diseased soft tissue. The bone and soft part surfaces are swabbed with pure tincture of iodin. The tourniquet is removed and the bleeding controlled.

It has been the custom in the Orthopedic service for the last four years in the absence of a sinus or a mixed infection, to fix the bone ends by means of malleable iron

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bone plates, one on either side of the joint, or by means of the aluminum wire clamps devised by Dr. L. A. O. Goddu, usually three in number, one on either side and one in the middle. With the plates and wire clamps steel wood screws with threads carried up to the heads are used. After the plates or clamps are applied they like to be able to lift the leg by the foot and have the apposition remain firm. The patellar tendon is sutured and a few stitches taken through the deep tissues. The skin flap is sutured in place. If the oozing is considerable rubber tissue wicks are sometimes inserted in the upper corners of the wound. The leg is put up in plaster-of-Paris. In the absence of irritation the stitches may be left for two weeks, and a second plaster applied at least by the end of the fourth week.

In four weeks from the operation in the favorable cases they hope for the union to be quite firm, and under these circumstances the patients are discharged in these casts on crutches.

Since their attempts have been directed to ensuring close apposition of the bone ends from the start, they have remarked two things. One is that these patients usually have little pain following the operation, frequently requiring no morphia, and second, that firm union seems to occur in a shorter time than they had formerly been accustomed to expect. These seem to them to be advantages.

End-Results of Bone Plating. In order to compare the end results of the excision of the knee for tuberculosis, in which metal plates or clamps were used to hold the bone ends in close apposition, with the cases of simple excision, Osgood has traced the twenty-eight excisions for tuberculosis of the knee joint done in the Orthopedic Service during the last five years. In twelve of these cases no metals were used to hold the bone in apposition. That is, a simple excision was done, chromic catgut or kangaroo tendon occasionally being used to hold the bones together. In two cases silver wire suture was employed. In fourteen cases aluminum wire clamps or bone plates were used, in eight the aluminum wire clamps devised by Dr. Goddu, and in six the malleable iron bone plates suggested by Dr. Brackett.

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For purposes of comparison the two wired cases are grouped with the simple excisions, since a simple loop of wire can offer only slightly more fixation than that of catgut or kangaroo tendon, and in neither of the cases did it hold firmly enough to accomplish union. We have, therefore, by chance groups of exactly equal numbers each.

Of the fourteen simple excisions, including the two wired cases, four had a second operation for re-excision, and two of these and one other were subsequently amputated to save life. It is fair to say that these three amputations were in cases either secondarily infected when they entered the hospital, or which became so after leaving the hospital on account of discharging sinuses. Four had sinuses before the operation, and nine after. Pain persisted several months after the operation in five cases. Eventual union occurred in six. The time of union was two months or less in two. The time of union was in three months or more in eleven, and there is no record of eventual union in five. In both the cases in which wire was used it had to be subsequently removed.

Comparing now the cases in which bone clamps or plates were used (in eight the clamps, in six the plates), none came to operation for re-excision. There was one amputation done outside the hospital in a case in which a sinus had become secondarily infected after an oil injection, and the wound from an excision done on his second entry apparently later broke down so badly after he left the hospital that a local physician amputated, whether with good cause or not they do not know. Two had sinuses before the operation; five had sinuses after the operation, one from a silk stitch; all are now healed but one. Pain persisted several months after the operation only in the amputated case and as a slight occasional throbbing in a case done four months ago. Eventual union occurred in thirteen. The time of apparent firm union was one month or less in six, two months or less in four, and three months or more in three. In five cases, counting the amputation case as one, the bone clamps or plates gave subsequent trouble, and were removed in four cases, in two of which previous sinuses had existed.

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Frequency of Tuberculous Infection from Human and Bovine Origin. Fraser[8] has made a most careful and painstaking study of 70 cases of bone and joint tuberculosis to determine the relative frequency of human and bovine tubercle. We need not describe his methods, for they appear to be beyond question.

He says:

On every occasion the diseased material was obtained by operation. The proportion of bone and joint cases in the series was practically equal—39 were instances of joint disease, 31 of bone disease. The age incidence was absolutely limited to 12 years and under. The cases were patients of the Edinburgh Sick Children's Hospital, and therefore may be said to have been drawn from a comparatively localized area. For two reasons the series may be considered unique—the age limit and the localized sources from which the material was obtained.

The age incidence has been absolutely limited to 12 years and under. This limitation is all-important, for in such an age group there are certain special distinctions.

1. The feeding is of a special type—milk, human or cow's, is the staple article of diet.

2. The lymphatic and absorptive arrangements of the abdomen are peculiar—a fact which is evidence of the high percentage of occurrences of abdominal tuberculosis (4 per cent., Thomson).

Bearing these facts in mind, there is much to be learnt from a study of the age tables of the series. The facts are best illustrated by dividing the age period into groups: Group 1, to 3 years; Group 2, from 3 to 6 years; Group 3, from 6 to 12 years.

In the first group the questions of milk feeding and unusual lymphatic arrangements have their strongest bearings. Twenty-eight cases were included in the first series; twenty-three of them were bovine and five were human. In the second and third series the proportions were more equal. In group No. 2 ten were due to the *human* bacillus, nine to the *bovine* bacillus. In group No. 3 eleven were human, while nine were bovine.

(8) Brit. Med. Jour., Apr. 12, 1913.

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As a matter of routine, the family history was noted in each case investigated. In 21 instances there was a definite history of pulmonary tuberculosis having occurred in some member of the family in which the child lived, and in 50 per cent. of these cases the child was actually living in contact with a consumptive.

The practical bearing is more evident when it is stated that out of the 21 above mentioned cases 15, or 71 per cent., were due to the bacillus of human tuberculosis.

In 52 cases there was definitely stated to be no family history of tuberculosis; 43 of these were bovine in origin, while only 9, or 17 per cent., were human. The difference is very striking, and the figures of the first group are explained by direct infection of the child from the consumptive patient with whom it stayed.

Practically speaking, the bovine bacillus is introduced into the body by a single route—that of infection from the alimentary tract, and the medium by which it is introduced is infected milk. As far as possible observations were noted of the source of milk supply in each of the above cases; 25 cases were nourished in infancy upon human milk, 41 were entirely fed upon cow's milk; in 3 instances the source of origin was doubtful.

Of the 25 cases brought up on human milk, in only 6 cases was the bovine bacillus found. The remaining 19 were infected with the human type. In the second group, those nourished upon cow's milk, out of a total of 41, no less than 37 were due to infection with the bovine bacillus. The remaining 4 were human. In the complete series there were 4 children less than 1 year old. All these children were nourished upon cow's milk, and in every case the bovine bacillus was the organism present.

Observations on Excision of Tuberculous Joints. Fenwick,[9] a general surgeon, interests us by the following statement:

Ten to fifteen years ago it was customary to treat surgical tuberculosis of joints almost in the same way as cancer. One was advised to operate and remove tissues widely—even amputate—as soon as the diagnosis was

(9) Brit. Med. Jour., July 19, 1913.

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made. In recent years, however, this practice has given way more and more to conservative measures, and particularly in surgical tuberculosis in childhood, of which Fenwick wishes more especially to speak. There is still no doubt that in adults, where time is important, and the production of a speedy result essential, and where growing epiphyses have not to be reckoned with, the more radical measures are permissible, and even advisable, but in children he is becoming more and more convinced that extensive operative procedures are rarely, if ever, called for, and when necessity arises for them it is due to some gross error in diagnosis or treatment at the outset of the disease.

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First and foremost of the dangers of the radical operative procedures is the danger of general tuberculosis and tuberculous meningitis.

At the annual meeting of the British Medical Association in Liverpool, in July, 1912, H. J. Stiles opened a discussion on the after-results of major operations for tuberculous diseases of the joints, and gave the results of ten years' operative work. He had performed a total of 205 excisions of the hip, knee, ankle, and elbow joints, and out of this number there were 25 deaths—a percentage of 12. The deaths occurred, roughly speaking, from a few weeks up to one and a half years after operation and were chiefly within the first six months. The great majority of these deaths were from tuberculous meningitis and general tuberculosis. In a recent paper on the results of joint excisions C. A. Morton states that 9 per cent. died within two months of the same causes. Granted that the cases subjected to excision were advanced, the mortality from general tuberculosis occurring after the operation was very high, and that in all probability, if conservative measures had been persevered with, the death-rate would have been lower.

[Reading through the rest of his paper we find that he is beginning to use some simple orthopedic appliances; that he still thinks Bier's treatment, iodoform emulsion and tuberculin are useful in some cases, and if carefully used not often harmful.—Ed.]

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POTT'S DISEASE.

Profile Radiograms in Early Pott's Disease. Calvé and Leliévre[2] urge the importance of radiographing spines in profile for early diagnosis of Pott's disease and for the sake of accurate knowledge of the progress of the case. The importance of this suggestion can hardly be overestimated. They show many beautiful pictures of their work, but unfortunately do not explain just how the patient is posed to obtain these profile pictures. We in Chicago have not been able to obtain such pictures. Plates taken obliquely are less satisfactory than those taken from front to back, with which we have had to content ourselves.

The antero-posterior pictures do not clearly show the compression of the front of the intervertebral discs in the early stages of the disease. It is not until some marked destruction of bone has taken place that we can see the change in our pictures.

Much can be learned from these profile pictures of Calvé and Leliévre. They show the necessity "of putting the affected portion of the spine in lordosis in such a way as to prevent the anterior wear and tear." They show that when the diseased (tuberculous) bone surfaces are separated by treatment in lordosis that the spaces do not fill in with callus for two or three years; that callus does not appear till five or six years, or even longer. They show a *posterior settling down.* In posterior settling down it is necessary to understand the bringing together on a level with the kyphos of the spinous apophysis, without the two fragments being separated, nevertheless, in front. The affected vertebræ in their posterior portions, remaining high, oppose each other. If one provokes a progressive lordosis one relieves, as we have already seen, the anterior portion, and moreover, according to the disposition of the neutral line, one establishes a strong pressure of the posterior portions of the vertebræ one on the other, and therefore by compressive ulceration, diminution in the height

(2) Amer. Jour. Orth. Surg., October, 1913.

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of the vertebral bodies in their posterior portion and possibility of bringing the spinous apophyses together; the vertebræ on account of destruction, change their shape; from cuneiform they become rectangular, the diminution in height having a tendency to equalize them in front as well as behind. It produces a slipping up and down of the posterior articular surfaces on each other; the superior fragment tips backward, and consequently the kyphos diminishes; moreover, the hyperextension prevents the slipping of the superior fragment as we have seen produced above. Therefore, in equal numerical destruction (three vertebræ), but thanks to a more extensive distribution of this destruction, the attitude is better and the kyphosis less.

The radiogram in profile permits one to count the number of vertebræ affected or destroyed. It determines exactly the limits of the focus, and shows from an orthopedic point of view that the gravity of a Pott's disease is not only measured by the function of the number of vertebræ destroyed, but depends also upon the treatment applied.

One picture shows a vertebra with two pedicles, an osseous block resulting in reality from the fusion of the osseous portions remaining healthy. The consolidation is osseous, without having been new formation. After the fibrous union, which is the first stage of cicatrization, there succeeds osseous consolidation, the last stage of repair.

The radiogram in profile shows in relief the other processes of cure, of which the result, from the orthopedic point of view, is to diminish or to compensate the deformities definitely acquired. An atrophy and incurvation of the spinous apophyses having the effect of diminishing the protrusion of the kyphos. An atrophy of the pedicles permits a very efficacious posterior settling down, an increase in the height of the vertebræ lying above and below the focus, compensating in part for the diminution in size caused by the vertebral destruction.

[This consolidation between the remains of two partly destroyed vertebral bodies, the Editor has been able to demonstrate in a front-to-back radigram, and was war-

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ranted in assuming the settling down of the posterior part of the column because the patient had no kyphos that could be seen or felt.]

Indications for Operative Treatment. Every additional fact as to the results of Albee's operation for Pott's disease seems worthy of notice. Thomas[3] makes the following report:

The treatment of tuberculous vertebræ by the non-operative method in the hands of most orthopedists terminates satisfactorily to the patient and to the surgeon in those cases which he can keep under control for a long period of time—say two or three years. There are cases, however, in which future health and bread-earning ability depend on:

1. Such control as the operative method seems in some instances to give.

2. A shortened period of recumbency which in a number of Thomas' cases has apparently been due to the added support of the bone splint. It is only fair to give the facts regarding the results, good and bad, of the work in this field, to those who may help to judge of the merits and disadvantages of such treatment, and it is hoped that those who have operated in one or two cases with unfavorable results will not consider worthless this new, under-the-skin splint before they have the data of many cases, based on observations extending over some years.

After two years of experimental work on animals and operation on twenty-seven patients taken as they came to the hospital, without selection, Thomas says:

1. The more vigorous in constitution, the better the risk, but it has been surprising how nicely, with the exception of one, each patient, among those whose condition was considered hopeless, stood the operation and convalesced to an improvement in the general condition.

2. The age of the patient is considered an important factor by some who fear that the graft *per se* may not grow, and may thus tend to deform the backs of those young patients whose spinal columns will continue to grow and, therefore, bow backward when held by an

(3) Jour. Amer. Med. Assoc., April 4, 1914.

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unyielding, non-growing graft. Believers in this theory would select only the adult spine for operation. Experiments are in progress to determine the growth or non-growth in length of the graft, and reports are in preparation for June, 1914.

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3. The position of the disease in the vertebral column is a contra-indication to operation: (*a*) in those cases involving the high dorsal and low cervical region if the knuckle is so sharp and high that the occiput touches it and prevents the necessary space for work, and (*b*) in those cases in which the disease is in the middle and upper cervical regions.

Selection of that operation which will best lend itself to the particular region diseased.—Thomas is inclined to select the lower dorsal, lumbar and sacral regions as the most favorable field for the Albee operation, and the middle and upper dorsal and lower cervical regions for the Hibbs operation, on account of the advantage given by the length, thickness and angle of projection of the spinous process in the different regions. Probably the most favorable position as offered by the spinous processes for the Albee operation, as far as ease of preparing the bed and firmly placing the transplant are concerned, is that of the lumbar and twelfth; sometimes, also, the eleventh dorsal vertebrae. In the Hibbs operation, when the base of a spinous process is fractured across, the end denuded and turned down into the space caused by the fractured base of the neighbor below, best results are obtained when the sixth and seventh cervical, and all the dorsal spinous processes, with the exception of the eleventh and twelfth, are selected. This is because their length and relative position to their neighbors makes them yield easily to the desired technic. When the kyphos is sharp and large, separating the spinous processes, the condition becomes more favorable for the Albee operation, even though the kyphos is in the dorsal region (Figs. 3 and 4).

4. When the amount of bone destruction is great, such help in ankylosis as comes from the graft is indicated more than in those cases in which the small bone destruction can more easily be replaced from the bodies of the vertebræ.

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5. The amount of callus formation and its ankylosing effect is the greatest element in the cure of these cases, and when it is large and strong enough to hold the back firmly, there is no need for placing a bone graft.

6. The control of the patient, as already indicated in this article, should be an indication for operative treatment in those cases in which the patients themselves or their parents persist in discontinuing treatment early, before the callus from the bodies of the vertebræ has had time to back up the support of the bone graft.

7. Other things being favorable, the desire of the patient or the parents to cut down the mechanical treatment a year or even a year and a half should be an indication for the operation on account of the aid it gives in accomplishing this wish.

Ten illustrative cases are reported in detail. One had increase of deformity, two were not improved, one was worse, one died of pneumonia and the other five were benefited by the operation. Thomas' tentative conclusions are as follows:

1. The operation is not severe. It is a double operation, and the length of incision is longer than in most operations, yet the recovery from the immediate effect is quick and the suffering is small.

2. Cases with discharging sinuses near the field of operation should not be refused operative treatment on account of the sinus, unless it lies within the field of incision.

3. Complicating pulmonary tuberculosis is not a contra-indication in all cases.

4. If the ends of the transplant are loose, they absorb. If they extend beyond the spinous process, that portion not attached will absorb back to the firm attachment.

5. Loose ends and broken ends, as in the middle of a bent graft, grow, when later, through fixation by position and quiet, they become attached.

6. The three cases complicated with Pott's paraplegia have not markedly improved. The longest time elapsing since the operation of a paraplegic case has been six months. During this time the position has been good, and such as to give hyperextension.

7. The young patients do better than the adults.

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8. The operation has a distinct place in the treatment of selected cases of tuberculous spondylitis.

9. Albee's method of operation is preferable in the large majority of cases on account of the location of the disease and the size of the kyphosis.

10. Operative treatment should be followed by months of perfect quiet for the transplant.

Value of the Albee Operation. Nutt,[4] as surgeon to the Sea Breeze Hospital, has had an opportunity to follow up the results in a number of cases of Pott's disease that had been subjected to Albee's bone-grafting operation.

Notes on fifteen cases are given to demonstrate that the operation can not be depended upon to cure these cases; that it does not always immobilize the spine; that it does not always prevent increase of the deformity, or cure or prevent the development of abscesses.

Nutt's conclusions are:

1. While he does not unqualifiedly condemn the operation on account of the poor results in some of these cases, he does not believe the claims which have been made for it have been substantiated (see illustration from Annual Report of Sea Breeze Hospital).

2. If alterations in technic, such as the implantation of a longer graft, and the extension of the period of postoperative use of external support, are to improve the results, then reports should be forthcoming two years after the operation and not before.

3. The danger in the use of the operation does not lie in the operation itself, but in the creation of a sense of false security, a feeling that a cure of a chronic disease has been produced, and a consequent neglect of other therapeutic measures.

Fixation by Half of Plaster Jacket. Packard[5] recommends in addition to prolonged recumbency that the spine have additional fixation by the posterior half of a plaster jacket.

(4) Jour. Amer. Med. Assoc., Nov. 15, 1913.
(5) Amer. Jour. Orthop. Surg., January, 1914.

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HIP DISEASE.

Ankylosing of Joint the Best Result. It is curious and interesting how little one comes to know of another's practice and methods from just reading published papers and discussions. Werndorff[6] of Lorenz' clinic presents a long paper attacking American principles and methods of treating hip disease, based on papers by Packard, Taylor and Bradford, and the discussions of these papers by Lovett, Ely, Wilson, Gibney, Albee and McKenzie. He says: "Traction or weight bearing, that is the question."

"For us, however, this is no longer a question for the specific reason that we look upon ankylosis as the most desirable end-result of the mechanical treatment of coxitis. On the decision, ankylosis or movable joint, stands or falls the question of the weight-bearing treatment.

"We, therefore, espouse the cause of an ankylosing therapy and we are convinced of our inability to win over the weight-bearing therapy of those who seek the welfare of coxitis therapy in a possibly movable joint. For this reason Werndorff considers it very necessary to accentuate the importance of ankylosing the hip-joint.

"It has not been very long since we ourselves believed in obtaining a movable hip-joint by the mechanical treatment of coxitis. He himself remembers—it is now perhaps nine years ago—that, led by the idea of securing a possibly movable joint, we nearly daily corrected the old, healed and contracted coxitides by the intra-articular redressment. Only through the results have we learned that the salvation of the hip-disease-afflicted individual is to be sought in just the opposite way—in ankylosing the joint.

"Not least, however, were we led to this new path by the failures of intraärticular redressment.

"We observed primarily local and general signs of reaction following the operation trauma. These hip-joints, intra-articularly corrected, were, for many weeks after operation, painful and very often showed local in-

(6) Amer. Jour. Orthop. Surg., January, 1914.

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flammatory phenomena; in many cases there occurred for weeks a rise of temperature and not seldom also abscess formation.

"It left no doubt, therefore, that these seemingly healed joints, damaged by the trauma of the intra-articular redressment, were again made sensitive. Recurrence of tuberculous hip-joint disease with all its painful and tedious suffering we observed often. All these experiences necessarily led to the conclusion of obviating the operative trauma, thus originating the extra-articular methods of correction, which we have since used in all cases of joint contractures, following healed tuberculosis.

"Since it was an established fact with us that even a seemingly healed joint, after traumatisation of its components, would nearly always react with local inflammatory phenomena, often with actual recurrence, we were compelled to leave the intra-articular redressment and choose an extra-articular method of correction, which, while leaving untouched the previously diseased area, would correct compensatorially in sound tissue. We were, therefore, forced to subtrochanteric osteotomy.

"A second circumstance, however, even more plainly led us on this path. We saw in nearly all cases of contractures in adduction, which we corrected by intra-articular redressment after healing of the tubercular process, the regular recurrence of the adduction contracture —and who of our American friends has not seen adduction recurrences after intra-articular correction of the coxitic contracture."

[As we have pointed out in reviews of Lorenz' work in previous editions of the Year Book, Lorenz and his followers do not seem to know that it is possible to cure many cases of hip disease with a good functional range of motion at the hip joint. Every American orthopedic surgeon has had many such results, and we hope the same may be said of all orthopedic surgeons who do not use the Lorenz method.

If it were true (which it positively is not) that all cases of hip disease ultimately recover without useful motion at the hip joint there would be no reason for more words on the subject. We would all agree that

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by immobilizing these hips in plaster splints and causing the patients to walk on their feet without crutches or supports of any kind would give the quickest results. By plaster splints we do not mean the use of the short Lorenz spica, reaching from the knee to the navel with or without his various attachments, but we mean a long plaster splint, reaching from the ankle to the nipples—a splint that really immobilizes the joint as perfectly as any device can, and controls the tendency to adduction deformity.

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But, as the Editor (Ridlon) pointed out in a paper before the XVII International Medical Congress in London last August, it is as absurd to treat all cases of hip disease, or almost any case throughout its entire course, by one splint or one method, as to treat any other diseased condition by any cut-and-dried routine method.

As to correcting old, apparently healed, contraction deformities by forcible redressment, no American orthopedic surgeon has done such a thing for twenty years. We wait until the hip is well—until it has been well for many years, and then follow the reading of the *x*-ray picture, generally doing a sub-trochanteric osteotomy.

Werndorff, decrying discussions as to priority as a thing too unimportant to be considered in Europe (Vienna?), makes vigorous claims of priority for his chief as the one who first immobilized hips and let patients walk on their feet, quite ignoring my report of sixty-odd cases observed in the practice of Hugh Owen Thomas in 1890.—Ed.]

JOINT SYPHILIS.

Its Diagnosis. O'Reilly[7] reports in detail twenty-six cases observed at the clinic of the Washington University at St. Louis.

Briefly, in all cases of arthritis an *x*-ray picture should be made, and in all cases where the diagnosis is not positively something else, a Wassermann should be made. In all cases where the Wassermann is positive, specific treatment should be given, and when rapid re-

(7) Amer. Jour. Orthop. Surg., January, 1914.

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covery has taken place the case may be diagnosed as one of syphilitic joint disease.

Concluding:

O'Reilly does not feel that he is justified in drawing any definite conclusions after a study of only twenty-six cases. These cases are not selected, except that the patient promised to return for treatment—a promise not always kept—but were taken as they came to the outpatient department. They represent fairly accurately the types which are met with constantly in the clinic. He thinks it is, however, possible to draw some inferences which are accurate, at least for their clinic.

Syphilis of the joints is much more common than has been supposed, and the more general use of the Wassermann reaction and the *x*-ray tends to show that a large number of cases supposed to be tuberculosis, osteoarthritis and infectious arthritis are really syphilitic in origin. A Wassermann test should be made in all cases of arthritis as a routine, and when positive the diagnosis should be confirmed by the therapeutic test. The absolute necessity of this is obvious, as the difference between the treatment of syphilis and the other conditions is so radical that the prognosis depends essentially on the correctness of the diagnosis and the resulting treatment. All cases in which there is a history of indefinite joint tenderness, multiple joint involvement, pain, whether increased at night or not, or when the pain and functional disability are not proportionate with the amount of joint involvement, should be regarded with suspicion. In all cases, in fact, when there is any doubt as to the diagnosis, syphilis should be looked for.

[Really it does seem that excepting the Wassermann react, much progress has been made since the Editor some twenty-seven years ago presented at a clinical evening of the Orthopedic Section of the New York Academy of Medicine a series of cases, including fingers, wrists, elbows, spines, hips, knees and ankles that he believed to be syphilitic. His diagnosis was based on their clinical differences from the usual run of unquestionable tuberculosis, the multiplicity of joints involved and the results following antisyphilitic treatment. At that time practically none of the orthopedic surgeons present were

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willing to admit that the cases were syphilitic and one eminent man said that he had long known that many cases of tuberculosis were rapidly cured by mercury and iodid of potash.

Now after the lapse of many years the Editor is of the opinion that at least some, if not many, of the cases were tuberculosis and osteoarthritis in syphilitic patients, and not truly syphilitic joint diseases; that the invasion of the tuberculosis, etc., was favored by lack of resistance arising from syphilis, and the unusually rapid cures due to the restoration of resistance by the elimination of the syphilis.

There surely is no reason why a syphilitic patient may not develop tuberculous joint disease, and a response to the tests for tuberculosis may be as much depended on for diagnostic purposes as the Wassermann. And this we have found in cases with typical syphilitic joints, which gave the usual response to antisyphilitic medication. One such case admitted syphilis; had one ankle joint rapidly cured by mercury and iodid; a year later developed disease in the other ankle; gave a typical opsonic index for tuberculosis; and then went on to locomotor ataxia.

All this goes to say that in all cases of arthritis the joints demand prolonged orthopedic treatment; in all cases of syphilis the patients require prolonged antisyphilitic treatment; and that we are still in the dark as to positive symptoms upon which to found the certain diagnosis of syphilitic joint disease.—ED.]

CHARCOT JOINTS.

Diagnosis, Complications and Treatment. Taylor[8] says:

The material on which this paper is based consists of twenty-three cases of Charcot joints observed in the last few years in clinic and private practice. Of the twenty-three cases, twenty-one were in men and two in women. The ages of the patients when first seen ranged from 29 to 57. One patient was 29, eight were from 30 to 39,

(8) Jour. Amer. Med. Assoc., Nov. 15, 1913.

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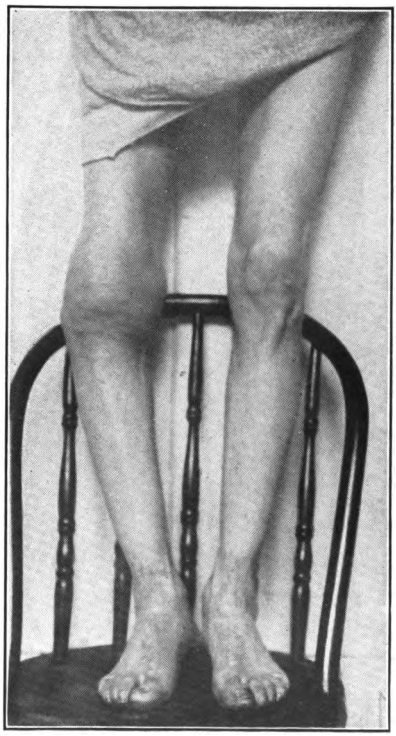
PLATE VI.



Right Charcot knee—Taylor (see page 170).

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ten from 40 to 49 and three 50 or over; in one the age was not ascertained.

Twelve patients definitely admitted luetic infection and an initial sore; four admitted gonorrhea but denied syphilis, and two denied both. In five the history of infection was not gone into. In most of the eleven cases without a syphilitic history, a positive diagnosis was extremely probable on clinical grounds, and it is Taylor's firm conviction that a luetic infection is the underlying cause in every case. It is interesting to note that in the twelve cases in which the date of the initial lesion is known syphilis was acquired in every instance between the ages of 18 and 25. The shortest period noted between infection and a Charcot joint was seven years; more commonly it appeared from fifteen to twenty years or more after infection. The Wassermann reaction is not always positive, especially in those cases in which antisyphilitic treatment has been given. Stein's statement that tabetic patients who have never been treated for syphilis always give a positive reaction, if confirmed, practically proves the syphilitic basis of all tabes.

A number of patients attribute the beginning of their symptoms to a definite trauma, even when there is immediate fracture or joint lesion. Many more say that an injury which proved to be a fracture was soon followed by painless or nearly painless swelling of the involved or neighboring joint. Crush fractures of the outer or inner tibial tuberosity, often spontaneous, painless and unrecognized, are a frequent cause of a Charcot knee. Doubtless the tabetic joint with effusion and bone softening precedes in many instances, resulting later in a spontaneous crush fracture after joint involvement. Seven of the cases here reported suffered practically painless spontaneous fractures before the Charcot joints appeared. These and others have already been reported in detail. In the twenty-three cases here considered there were three spontaneous fractures of the shaft of the left femur high up, one of the right patella, one above the right ankle, one of the neck of the right astragalus, seven of the internal tuberosity of the tibia (four right and three left) and one of the right external tuberosity; all were followed by a Charcot of the implicated

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joint. Nearly all tabetic fractures heal kindly with a large callus after the usual splinting, which should, however, be somewhat longer continued than in ordinary cases.

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Spontaneous fractures and Charcot joints often occur in patients who have noticed no previous disturbance in gait, and have considered themselves in good health. A painless fracture or large persistent joint effusion with joint looseness, but with little pain or local disturbance in adults, should always lead to examination for the symptoms of tabes dorsalis, when Westphal's sign (absent knee-jerks), pupillary symptoms, and swaying with eyes shut (Romberg's sign) will usually be found, even when there is no ataxia.

"Examination of the affected parts by roentgenoscopy has been of great value. In the early stages many tabetic joints show little or no deviation from the normal picture. More advanced cases show roughened and fuzzy outlines and often the production of new bone about the affected parts, and some of the advanced cases, bone absorption at points of pressure, and bone atrophy. In several knee and foot cases roentgenoscopy revealed crushed fractures when there had been no definite history of injury. Roentgenoscopy also revealed an ossification of the rectus muscle following a spontaneous fracture of the patella, and in several cases detached bits of bone, some of which could be palpated. In one patient with a right Charcot knee and foot, the left foot showed hypertrophy of the calcanear tubercle and apparently an os trigonum. In one of the knee cases roentgenoscopy revealed a large bone-plaque behind the knee not complained of."

"As nearly as could be ascertained the Charcot joint appeared before any ataxic gait in ten, and after ataxia was noticed in eight; in five the precedence is uncertain. Most of the preataxic patients considered themselves in good health, and noticed nothing wrong until the appearance of the Charcot joint, with or without injury. Several, however, had had spontaneous fractures long before the Charcot joint. There is usually little or no pain connected with either a spontaneous tabetic fracture or a Charcot joint."

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The Charcot joint is usually a large, loose joint filled with fluid, with the increased play, deformities and displacements due to stretched capsule and eroded articulation. In some cases the swelling goes beyond the joint up and down the leg. In the three hip cases there was total disappearance of the head, and corresponding upward displacement with elevation of the trochanter, and a flail joint with marked instability. At the knee, if the lesion is of many months' duration, there is usually abnormal lateral motion and hyperextension. (See Plate VI.)

If there was a crush fracture of the internal tuberosity or bone absorption on the inner side of the knee there is an out-knee; if these changes have taken place on the outer side there will be an in-knee. Out-knee was noted five times, in-knee five times, and hyperextension seven times in the seventeen knees. In several cases the tibia was also displaced outward. At the ankle and tarsus there was usually enlargement with a tendency to valgus with or without fluctuation. In one case there was extreme tarsal valgus with great enlargement and involvement of the scaphoid, cuneiforms and base of first metatarsal. The enlargement was hard and without fluctuation (*pied tabétique* of Charcot).

In the spinal case there was a rounded lumbar kyphosis; the third and fourth lumbar vertebræ were involved. In several cases loose pieces of bone could be felt about the knee and seen in the roentgenogram. In one there was ossification of the rectus and a practically stiff knee, and in another motion was limited, owing to previous joint infection.

Mixed treatment is ineffectual in tabes. Salvarsan several times repeated sometimes gives great relief, especially to the shooting pains and sometimes to other symptoms. One patient in the series had had the knee excised three years before. There was no union, and the patient could not walk without a brace. When the joint changes have not progressed too far, great improvement results from immobilization with a caliper brace (Thomas knee-brace articulating with tube in heel of shoe). The swelling gradually recedes, the joint becomes much firmer, deformity is diminished or cor-

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rected, and in a number of instances the patient has gone back to work. In very early cases, before bone destruction, a jointed knee-brace will produce the same result. A jointed brace must also be used when the patient is not able to rise from a chair or balance himself in a stiff brace. In one instance a jointed brace applied elsewhere gave no relief, but when a stiff brace was substituted improvement quickly followed. In early or medium cases, proper orthopedic treatment gives good results.

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INFANTILE PARALYSIS.

Tendon Fixation. Gallie[9] recommends a new operation--tendon fixation for the permanent correction of paralytic deformities. It is briefly as follows: The deformity having been corrected, grooves are cut in the bone beneath the tendons of the paralyzed muscles, the tendons are drawn taut to hold the deformity in full corrections and then buried in the grooves in the bone and sewed fast. He has operated thus far on ten cases and reports satisfactory results.

Fastening of Flail Joints With Screws. Magruder[1] recommends fastening the flail ankle due to infantile paralysis by screws in place of making an arthrodesis in young children. (See Plate VII.)

Of course the report of one case does not determine the treatment for all time, particularly when the case is reported early. But the putting in of screws, which can readily be taken out if they cause trouble, can not be so justly condemned as the doing of mutilating operations, such as arthrodeses and tendon transplantations. In growing children one ought not to scramble the tissues of paralyzed legs. It is so very difficult to unscramble them.

Ryerson's Operation. Ryerson,[3] who has operated rather extensively on all kinds of deformities of the lower limbs due to infantile paralysis during the past five years, gives his experience in too extended detail to be quoted here. He has confirmed the observation of

(9) Amer. Jour. Orthop. Surg., July, 1913.
(1) N. Y. Med. Jour., Nov. 8, 1913.
(3) Jour. Amer. Med. Assoc., Nov. 1, 1913.

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Same (antero-posterior view).

Showing fixation at ankle joint, and scaphoid and cuboid bones (lateral view).—Magruder (see page 174).

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many others that Vulpius' operation of fastening one tendon to another does not give good results when any considerable strain is put on the part, as between the foot and the leg. The silk tendon-extension of Lange he has found to be generally of use. But the new thing that Ryerson tells us, is that attaching silk tendon extensions and silk ligaments to periosteum does not give permanent results. In one instance he found that the silk attachments to the periosteum had moved away as far as 1½ inches from the place on the bone where it had been attached to the periosteum, forming a sort of periosteal tendon connection between the end of the silk and the bone. So he now attaches tendons and silk extensions, and silk ligaments, *only through holes bored through the bones.* Whether these remain permanent (*i. e.*, do not become too long by cutting out, or too short because of the growth of the limb) still remains to be seen. For in the history of tendon surgery of infantile paralysis, no matter how promising the operation at the time it was done, it has generally been found of no great worth some years later, and a new method has been adopted.

Ryerson is such a skillful operator that his technique in placing silk ligaments may be quoted:

"A curved incision with its convexity downward is made from just below the scaphoid to the middle of the inner metatarsal bone. The flap is retracted, and the soft tissues are dissected away from the proximal end of the metatarsal bone. A drill-hole is bored in the base of the metatarsal, and through it is passed a braided silk cord size 12 to 16, previously boiled in a 1:1000 solution of mecuric chlorid. The cord should be twenty inches long, for easy handling. It is pulled through to its middle, and a loose single overhand knot is tied just above the bone to keep the two strands close together. The ends are then threaded into a long eye in the end of a Bessemer steel wire probe about 3/32 inch in diameter. This probe is stiff enough to stand considerable strain, but can be bent as desired. The tendon of the tibialis anticus is now exposed at its insertion into the cuneiform and metatarsal and a small slit is cut in the sheath. The probe, slightly curved toward the end, and

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carrying the silk, is passed into the tendon-sheath, and is forced gently upward under the annular ligament until it reaches a point on the tibia two or three inches above the ankle-joint. A curved incision is made over the tibia at this point, and the end of the probe is pushed out through it. This is easily done with the steel probe, but is much more difficult with the ordinary silver or copper probe. The silk is now pulled out of the eye of the probe and clamped with a hemostat for purposes of identification."

A similar operation is now performed on the outer side of the foot, the fifth metatarsal being drilled and threaded with a similar silk cord, which is then passed up the sheath of the peroneus tertius tendon and made to emerge from the tibial incision. A drill-hole is now bored through the crest of the tibia, and one cord of each of the pairs of cords is passed through it by means of a large needle. The pair of cords from the inner side of the foot is now pulled tightly enough to bring the foot to a right angle, and tied with a triple square knot. The outer cords are now tightened enough to bring up the external border of the foot to the same level, and likewise tied. This now holds the foot firmly, and the incisions are closed. It is well to sew the subcutaneous soft tissues over the silk cords as a separate layer, and to suture the skin very carefully. A plaster-of-Paris cast is applied, and removed in about two months, after which there is usually no further need of external support. In cases of marked varus, the silk cords from the outer metatarsal are fastened into the fibula instead of the tibia.

Urging Operative Aid. G. G. Davis,[4] in his usual modest and conservative manner, after explaining the long and difficult treatment by braces, says that of recent years operative surgery has opened a new field of aid for these paralytics; and it is because a good example of what can be done for them by operative means came to Davis' notice that it was considered worth while to present the patient to the college as an illustration of what can be done for this class of cases. As a rule,

(4) N. Y. Med. Jour., Jan. 3, 1914.

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at present, operative measures are reserved as a late procedure and resorted to only when further improvement or restoration of muscular power is not to be expected. For the first two or three years after the onset of the paralysis the improvement in function of the paralyzed parts is progressive, but it finally comes so nearly or quite to a standstill that radical measures of treatment are justifiable. Davis strongly suspects, as we become more experienced and better informed as to what can be done and what results can be achieved by operative procedures, that they will be resorted to earlier than is now considered advisable. Apparatus is used during what may be called the period of reconstruction, only as a temporary measure. In some of the paralyses recovery ensues while the apparatus is worn. In such cases operations are not needed, but, eventually, in many cases one is confronted with the necessity of either the patient wearing an apparatus indefinitely or of so arranging the limb anatomically that it can fulfill its purpose without apparatus.

He then reports one case, a boy of thirteen, who had been under treatment for twelve years and had been allowed to develop an equino-valgus deformity at the foot, knock-knee and a flexion deformity at the knee, and outward rotation of the whole limb at the hip. By an osteotomy at the lower end of the femur he first corrected the knee deformity. Later by an arthrodesis at the ankle he corrected the deformity there. By a still later operation at the hip he corrected the outward rotation of the whole limb, and gave the boy a limb that he could walk on better than before and without a brace.

[Doubtless Dr. Davis did the right thing for this patient, but the reader ought not to assume that all similar cases should be treated in this way, and that there is no other efficient way to treat such cases.

Most cases in the hands of some men can be treated by braces, braces that are not continually breaking, so as to prevent the development of equino-varus at the foot, and knock-knee and flexed-knee. Arthrodesis at the ankle shortens an already short limb, and in a growing child further arrests the growth. Simple tenotomies of the tendons of shortened muscles makes it pos-

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sible to correct the equino-valgus, and buried silk ligaments maintains and stabilizes the corrected deformity, provided a plaster splint is worn long enough. The knee deformities, knock-knee and flexed-knee, can be corrected by force, and a plaster splint worn long enough renders the correction permanent. It is true that the muscles of transferred tendons may be seen to act, but it has not yet been shown that their contraction in any way adds strength or usefulness to the limbs. The advisability of correcting the outward rotation of the limb at the hip is also a debatable question. Such a correction assuredly adds to the comeliness of the limb in standing and walking, but turning the foot to the front diminishes the stability of the limb, which must always remain an unstable limb, no matter what is done.—ED.]

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Early Management. Lovett[5] presents so valuable a paper, and so condensed, that the Editor would like to print it entire. Since this is not possible we urge our readers to look it up and read it thoughtfully.

During the acute attack he suggests hexamethylenamin as the only medicine that *may* have some slight beneficial effect on the disease. He advises rest, catharsis, light feeding, and quiet. Rest and quiet are of most importance and must be continued for four or six weeks, or until all sensitiveness has passed, no matter how slight the attack, and all contraction deformities must be watched for and prevented. After this time massage and muscle-training are begun, and the muscle training is far the more valuable of the two. Electricity has not been demonstrated to be of any use. Treatment of the lower extremities usually gives better results than of the upper extremities. Patients should be gotten on their feet and encouraged to walk as soon as possible. Appliances and braces are used to prevent the development of deformities and to enable the patient to walk better and to walk more.

When deformities have developed they are to be corrected with as little and as simple surgery as possible. No reparative surgery should be attempted until after

(5) Jour. Amer. Med. Assoc., Jan. 24, 1914.

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the deformities have been corrected. He believes that the transferrence of the tendons of active muscles is advisable in a few cases, but this should *not* be done in children under twelve years. Silk ligaments are more useful than transferred tendons, but these should be delayed till twelve years. Arthrodesis at the ankle he has not done for several years, believing that the silk ligaments give better results. Arthrodesis at the knee and hip he does not recommend.

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Management of Little's Disease. Little[6] reports on that most troublesome condition named after his father (W. J. Little), Little's disease.

After considering the pathology he says:

The lesion being, then, a radical one, incapable of true cure, the most that science and art can hope to achieve is improvement, by attempting to restore the lost balance by intervention at some point or points in the neuro-muscular combination.

He then gives an historical review, and an account of recent advances, and goes on to say that the immediate objects of surgical treatment may be stated to be:

Correction of deformity, and—

Abolition or diminution of spasm, with the ultimate end in view of enabling the patient to place the limbs in such a position that he may use them properly, but before undertaking any treatment the surgeon must form an estimate of the mental capacity of the patient. If this seems to be normal or even approaching to normal, it is worth while to undertake thorough and long-continued treatment, in the belief that the patient's will power and intelligence will enable him to take advantage of every improvement. If, however, the patient is idiotic, there is little hope of his learning to use his muscles, and disappointment is nearly sure to follow treatment. In a case of doubtful intelligence it is desirable to give the patient the benefit of the doubt, and to undertake the treatment, always remembering on the one hand that parents generally overestimate the intelligence of these children, and on the other that improvement in the physical condition is nearly always

(6) Brit. Med. Jour., Nov. 1, 1913.

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accompanied by improvement in the mental condition, sometimes to a surprising extent. Almost all observers are agreed upon this point, and also in the opinion that treatment must be patient, prolonged, and persevering.

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The question as to the appropriate age for beginning treatment is answered differently by different surgeons. Some—for example, Froelich—would begin at 3 years old, while others—for example, Kirmisson—prefer to wait until the age of 7. It appears to Little that the sooner correction and training can be begun the better; and he is disposed to agree with Froelich rather than with Kirmisson, for the somewhat complex acts of maintaining the erect position and of progression in it, require the development of certain automatic paths and centres in the central nervous system, which paths are normally developed before the age of 3 years. Given fair intelligence, it is surprising how quickly a child will develop powers of walking erect, as soon as the surgeon has rendered the physical condition of the limbs suitable to the purpose. In a case of severe bilateral congenital varus, the patient, aged 5 years, had never walked, but although he was of poor intelligence, he was able to walk well less than a month after the deformity was corrected.

It will be seen from the following list that the means of treatment fall into two categories, which, however, are not mutually exclusive, because the employment of some of both categories may be advisable in any individual case. For instance, no one will deny the advisability of tenotomy of a structurally shortened muscle for the relief of deformity, although spasm in such a case may have been abolished by one of the operations on the nervous system. Nor will it be doubted that after muscle and tendon operations have failed to produce a good result, more radical operations on the nervous system may be necessary and beneficial.

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Manipulations Splints, etc. Walking instruments Tenotomy Tenoplasty Tenectomy Tendon lengthening Myorrhexis Myotomy Arthrodesis Osteotomy	Proceedings intended to counteract effects of disordered nervous influence.
Neurotomy (complete) Neurotomy (partial) Alcohol injection of nerves Nerve transplantation Rhizotomy	Proceedings intended to prevent disordered nervous influence.
Re-education	Intended to develop and improve latent powers.

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On the whole Little seems to favor simple tenotomies and myotomies, retention in plaster-of-Paris in the over-corrected position for a considerable time, and prolonged muscle reeducation in the management of these cases.

Decompression in Spastic Paralysis. The purpose of an article by Sharpe and Farrell[7] is to offer a new operative treatment in selected cases of spastic paralysis. They have now a series of only twelve cases to report, but the results have been so gratifying and even startling, that they feel justified in making a report of the work that has been done up to the present time. They do not assert that the improvement in all of their cases will be a permanent one (sufficient time has not yet elapsed since the operations), and yet they do not see why the improvement should not continue to be more and more marked as the children grow older.

The authors condemn all other operations in the following sweeping statement:

Tenotomies, besides being unsurgical, are unsatisfactory. Tendon lengthenings (Hibbs' operation) alone are

(7) Jour. Amer. Med. Assoc., Nov. 29, 1913.

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satisfactory in only very mild cases. Foerster's operation for sectioning of the posterior nerve roots of the spinal cord is advocated merely to lessen the irritability and the instability of the cortex of the brain by decreasing the number of afferent stimuli reaching the brain through the posterior nerve roots of the spinal cord and also to affect the reflex mechanism of the spinal cord. Besides being a rather formidable and long operation for a child, the lessening of the spasticity is only temporary, few cases being reported improved longer than one year. Sharpe's and Farrell's experience with seven cases has been the same. The injection of alcohol into the peripheral nerves (the Allison and Schwab operation) produces immediate paralysis and a temporary relief from spasticity; in their experience of thirty-one cases, however, the spasticity has returned within one year. With nerve resections (Stöffell's operation), they have had no experience. These operations, however, do not in any way "get at" the primary cause of the spastic paralysis, namely, the lesion of the brain, but are merely peripheral operations to relieve the spasticity temporarily, in the hope that, before the recurrence of the spasticity, sufficient power will have returned to the opposing muscular groups to reestablish the muscle balance. Little, if anything, has been done to improve permanently the condition of spastic paralysis, and Sharpe and Farrell offer their observations in the hope that they may lead to a more satisfactory solution of the treatment of these pitiful cases. Their attention was first centered on the importance of relieving the increased intracranial pressure as a means of lessening the spasticity and improving the mentality of these children, by a decompression operation performed by one of them.

Their method of procedure is as follows:

In those cases of spastic paralysis of the hemiplegic, paraplegic or diplegic type, with a definite history of difficult labor with or without the use of instruments, in which, on ophthalmoscopic examination, signs of intracranial pressure are shown in the dilated retinal veins and a blurring and haziness of the optic disks, especially of their nasal halves, a large right subtemporal decompression is performed to relieve the intracranial pressure.

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If the intracranial pressure is extremely high and remains high after operation, a left subtemporal decompression is performed the following month, the operative recovery requiring only a week to ten days.

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The method of dealing with the various pathologic lesions found at operation will be discussed in detail in the more complete report to be published later. The usual findings are definite cystic formations resulting from a cortical hemorrhage occurring at birth. The decompression operation is performed merely to offset the effects of the pressure of this hemorrhage with cystic formation, and the resulting spasticity and mental impairment.

The after-treatment consists in the correction of deformities by tendon lengthenings or stretchings of the contracted muscles, the maintenance of corrected positions through the employment of especially adapted and properly fitting braces, and skilled massage in conjunction with short applications of galvanism and faradism, particular attention being given to the weakened and overstretched muscle groups. A careful, systematic course in muscle training is carried on daily.

Whitman's Operation. J. P. Lord,[8] who is enthusiastic over the Whitman operation for calcaneus, uses it also for other unstable conditions of the foot. He describes the operation as follows:

A long, curved, external incision is made passing from a point behind and above the external malleolus below its extremity and terminating at the outer aspect of the head of the astragalus. The peronei tendons are then divided just in front of the malleolus, completely separated from their sheaths and drawn backward. The lateral ligaments are next divided and the joint is opened. The interosseous ligament is cut through and the foot is twisted inward. When the attachments to the navicular have been freed the astragalus may be removed. A thin section of bone is then cut from the outer surface of the adjoining os calcis and cuboid, and on the inner side the calcaneonavicular ligament is partially separated from its navicular attachment. The lat-

(8) Jour. Amer. Med. Assoc., Oct. 11, 1913.

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eral ligaments are freed from the two malleoli and the cartilage is removed from their inner surfaces. The foot is then displaced backward as far as possible so that the external malleolus may cover the calcaneocuboid junction, while the inner is forced into the depression behind the navicular, the malleolus being changed in shape if necessary to secure accurate adjustment. Finally, the peronei tendons are drawn through an opening in the tendo Achillis, or they are sewed to it and then reunited to their respective tendons with strong silk sutures. The wound is closed without drainage, and the foot is then held in an attitude of equinovalgus by a plaster bandage fixing the leg at a right angle to the thigh. The object of the removal of the astragalus is to assure stability and to prevent lateral deformity by placing the leg bones directly on the foot. Incidentally it restores the symmetry of the foot. The object of the backward displacement of the foot is to direct the weight on its center and thus to remove the adverse leverage and to prevent dorsal flexion by direct contact of the tarsal bones with the anterior margin of the tibia. The tendon transplantation is an additional safeguard against deformity and of service in restoring function. In about three weeks the long plaster is removed and a short one is substituted, the foot being fixed in moderate equinus by a cork wedge beneath the heel. On this the patient is encouraged to walk. The plaster support may be used with advantage for six months or a light brace may be substituted for it. Eventually the brace is discarded and a shoe is substituted with a cork inner sole adjusted to the attitude of plantar flexion.

General Measures First. Fairbanks[9] has had the unique experience of observing forty cases of birth palsy at the shoulder. He speaks of a cutting operation in four of the cases, but we do not clearly make out what the ultimate results were.

Under the heading of treatment he says that for some time past he has been using this splint (Fig. 4) for cases of birth paralysis and infantile paralysis of the upper limb. The arm is held abducted to something approach-

(9) Lancet, May 3, 1913.

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ing the right-angle at the shoulder, the elbow is at a right angle, the forearm is supinated, and if desired, and the splint is made long enough, the hand and fingers can be fixed in extension. The splint which Fairbanks uses, is made of tin, and consists of one long straight arm-piece riveted to an oblong, slightly thinner, body piece, in the form of the letter T. It is padded and then bent so that the oblong piece lies around the chest on the affected side and the arm-piece makes two abrupt curves

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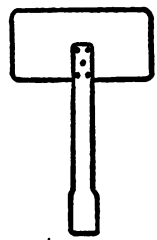
Special splint applied to a case of birth paralysis.

Fig. 4. Apparatus for birth palsy (Fairbanks).



Special splint for birth paralysis and some cases of infantile paralysis of the upper limb.

Fig. 5. Same.

at a right-angle (Fig. 5). Webbing straps and buckles are attached to keep the splint in place. It will be noticed that one long strap passes from the upper posterior angle of the body-piece, across the back and round the front of the opposite shoulder, over a layer of cotton-wool, to return to the point on the splint from which it started. This prevents the whole splint from slipping round to the front and allowing the elbow to come forward. If posterior displacement of the head of the humerus is to be avoided the elbow must be kept back in line with the shoulders.

This splint is taken off at least twice daily for massage of the whole arm and shoulder and passive movements of all the joints. The movements that must be particularly performed are those which we know are likely to become limited—*i. e.*, external rotation of the humerus, full flexion of the elbow, and supination of the forearm. It

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is also useful to carry the elbow back with the arm abducted and externally rotated—*i. e.*, an accentuation of the position in which it is held in the splint, so as to force the head of the humerus forwards and prevent contraction of the anterior part of the capsule and the subscapularis. Electricity is inadvisable in young children and also entirely unnecessary. After a few weeks, if the muscles have shown signs of rapid recovery, the splint may be removed for a portion of the day and the child encouraged to move the arm. In older children the opposite limb may be put inside the clothes with this object in view. Later the splint need only be worn at night. In a favorable case, efficiently treated from birth, about three months should see the paralysis cured, but even then it is as well to manipulate the joints to be sure of avoiding contracture. If after three months' careful treatment there is no sign of recovery, the muscles should be tested electrically under an anesthetic, and if they do not respond to faradism operation upon the plexus is advisable. This depends, of course, upon the condition that the case has been carefully treated, and not only upon the fact that the child is three months old and is still paralyzed. Some surgeons would recommend much longer delay before an operation is undertaken.

Fairbanks agrees with Whitman that true congenital dislocation at the shoulder is rare; that traumatic dislocation from injury at birth is more common; but that paralysis with subluxation is much more common than both the former. He does not describe just what he means by "subluxation," but the word is usually used to mean that the head of the humerus is out of its socket. If this is what is meant the Editor does not agree with Fairbanks and Whitman.

[The Editor's experience and views are as follows:

In the early days all disabilities at the shoulder of an infant found at birth or soon after and characterized by some malposition and disability were regarded as birth palsies. Later on it was found that in some cases it could be made out that the head of the humerus was dislocated backwards. Operations on a few cases led to the belief that these were traumatic dislocations because

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pieces of the rim of the glenoid cavity were found attached to the displaced head. For awhile it was thought that all cases were of this kind, and consequently that a cutting operation was necessary to a successful result. Finally we learned that there were some cases that apparently were true congenital dislocations, and so far as we know the Editor (Ridlon) was the first to replace one of these dislocated shoulder joints by manipulation alone, retain it in place and obtain a perfect result. The operation was based on previous abundant experience in congenital dislocation at the hip, both as to manipulation and to after-treatment. The head of the humerus, like the head of the femur, is replaced by leverage, using the uninjured and shortened anterior ligament as the fixed point. The head is held in the same manner, by keeping these parts taut, and the cure finally results in keeping the replaced bone in place undisturbed for many months, usually eight months, and then leaving the matter to the patient to recover the usual position of the arm and the normal movements. The position in which the extremity is placed when the plaster splint is applied is with the palm of the hand at the back of the head, and the elbow as far back as the uninjured arm will easily go.

As to the treatment of simple birth palsy, the Editor has been for years accustomed to put the arm up in the above mentioned position and leave it there for many months, four months at least, without once changing the position, until the deformities of inward rotation and abduction have permanently disappeared and enough structural shortening in the opposing groups of muscles has taken place to maintain the arm in the normal position. The Editor does not mean to claim that this will cure all cases. If the findings of some operators are true findings it can not cure all cases. But so far we have had the good fortune to meet no such cases. But we have not had forty cases.]

CONGENITAL SCOLIOSIS.

Its Etiology. Böhm,[1] of Berlin, furnishes one of the most interesting and instructive papers relating to the

(1) Berlin. klin. Woch., Oct. 20, 1913.

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etiology of scoliosis that it has ever been our privilege to enjoy. One is tempted to translate the whole article, as there is so much of value in it. Böhm's studies of developmental skeletal defects in this country and abroad qualify him to speak with convincing authority upon this subject. He groups in five classes the various defects with which we are acquainted.

In the first group he includes those cases suggested by Hoffa in which a probably normal fetus suffered developmental hindrance or malformation by pathologic intrauterine conditions, as diminished amniotic fluid, the pressure of one twin against another, etc. This group he considers of little practical importance.

The second group, on the contrary, is of great practical clinical importance, and includes the large variety of true skeletal malformations, which he further divides into those due to defects, and those due to fusion. This would include the more extensive defects as the spina bifida, anterior and posterior and even more rarely definite loss of large portions of the spinal column. These types, however, are not the more common types and receive but passing mention. The localized defects are the more important orthopedic ones. They arise from defective development or union of the three primary elements of which each half of the symmetrical bilateral trunk is constituted. These primary elements are the two centers for the bodies, the two centers for the neural arches and the two centers for the costal processes in each vertebral segment. Thus one center only of a body may develop, producing a wedge-shaped or hemi-vertebra, frequently with a rib on its convex side and none on its narrow edge. Again the spinous processes may be separate from each other and the neural arch separate from the body as not rarely occurs in the 5th lumbar vertebra, even this separate neural process may also be separated into two halves at the spinous processes that have failed to unite. Great defects with absence and deformities of several ribs are not rare in these days of *x*-rays.

Fusion of several vertebræ, particularly the half vertebræ or otherwise deformed elements are not uncommon. [Fusion of the atlas with the occiput has now been

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observed by many writers, two instances proved by skeletal examination, having been observed by one of the Editors—Parker.] Deformities may result in the anteroposterior plane, with kyphoses and lordoses, as well as in the lateral or combined with the lateral. Böhm states as a general rule that the earlier the defect shows the more serious is its deforming character; that the minor defects are frequently first observed during the child's school period when the school is blamed for their production.

As a third group of malformations he describes "variations" in which he includes the cervical ribs at one end of the spine and the various forms of fusion or defective development of the last lumbar vertebra and the sacrum at the other. Thus the ribs on one side may all be set one vertebra higher than on the other or the irregular lumbosacral development may start a lumbar deformity with regional compensation. The frequency of these variations runs up to 20% of all skeletons, though only a small proportion of them are responsible for asymmetries.

The fourth group includes those rare but interesting cases of bilateral asymmetry of congenital origin. [Dr. Bassoe recently reported a case of this type in an Italian boy in this city.]

In the fifth, and last group, he includes those defects resulting from improper secondary development, as, for instance, the fetal chest with its high sternum, and ribs perpendicular to the spinal column with very little backward tendency at their vertebral angles may remain of the fetal type with high scapula or a prominent sternum —chicken breast, or a retracted sternum and "funnel chest."

With all of this as a foundation he believes, as previously stated, that the reason many scolioses first appear in the second decennium is that at this time minor defects become more effective and apparent with broadening of the pelvis and other parts of the body and the natural magnification by growth.

He concludes without reserve: "That the host of fixed trunk deformities, the true or fixed scolioses and anteroposterior deformities excluding the symptomatic, from affections of the lower extremities, empyema, poliomy-

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elitis, tuberculosis, etc., and exclusive of rachitic deformities, is in the main due to developmental defects of the trunk skeleton."

[The Editor is quite in accord with this belief, particularly as related to scoliosis.]

Mechanics of Its Causation. Abbott[2] still believes that he can take a person with a normal spine and having caused the person to assume a physiologic scoliosis put on a plaster jacket and obtain a true pathologic scoliosis. He illustrates his idea by many drawings and concludes:

"From observations made on a large number of models it appears that the muscles controlling the rotation movement of the dorsal spine have their fixation point above on the convex side of the lateral bend, and pull the ribs upward and backward, causing the bodies of the vertebræ to turn toward this side. At the same time the muscles on the opposite side have their point of fixation below and pull the ribs downward and forward, aiding this twisting of the spine.

"The same observation leads one to believe that the lumbar spine is controlled in the same manner by the pelvis.

"This position which at first is active, *i. e.*, due to muscular effort, soon becomes passive and habitual assumption of it seems to develop a typical scoliosis."

The Abbott Method as Viewed in Europe. During the last year articles have appeared in the German and French journals by several different writers in these countries. (1) Vulpius,[3] of Heidelberg, (2) Böhm[4] and (3) Joachimsthal,[5] of Berlin, and (4) Schanz,[6] of Dresden, gave quite complete expositions of Abbott's theory with such added experience and comments as they were individually led to report.

In France, (5) Lance[7] and (6) Ombrédanne,[8] of Bretonneau, and (7) Redard[9] and (8) Bilhaut,[1] of Paris,

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(2) Amer. Jour. Orthop. Surg., July, 1913.
(3) Deutsch. med. Wochenschr., Apr. 10, 1913, and Berlin. med. Wochenschr., Sept. 22, 1913.
(4) Deutsch. med. Wochenschr., No. 19, 1913.
(5) Berlin. klin. Wochenschr., Apr. 14, 1913.
(6) Ibid., June 2, 1913.
(7) Gaz. des Hôp., July 22, 1913.
(8) Presse Méd., Jan. 3, 1914.
(9) Annales d. chir. et d'orthop., January, 1914.
(1) Ibid., November, 1913.

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gave their own opinions if not reflecting those of their country.

Vulpius came to America in the fall of 1912 and went directly to Portland, Me., to see Dr. Abbott's work. He gives his understanding of the theory and practice of Abbott's method before and after his trip, with good illustrations of the frame and its method of use. His article published in April, 1913, he claims is the first exposition of the subject exemplified by cases in Germany. It deals with the theory and technic such as we are familiar with from Abbott's articles published in this country. In his second article, in September, 1913, his experience has been considerably increased, as his comments show. He is unable to reconcile with his own experience the statement of Abbott that strong pressure on the convex side is not harmful, as he believes it sharpens the angles of the ribs (an experience with which the authors quite agree), and he places only light pressure upon them. He is not so impressed with the *x*-ray evidence, as he believes the region as a whole may often be displaced past the mid-line by increasing the compensatory curves with no permanent gain to the patient. He also learned that 6 or 8 months rather than 2 or 3 was nearer the proper length of treatment with jackets, massage and exercises after that. Long single curves yielded best to treatment; those with sharp-angled deformities he excludes entirely from this form of treatment. He does not advise treating children under 6 years of age and excludes adults, anemic and weak patients, and those with heart and lung affections. He is not ready to give definite conclusions until he has observed at least fifty cases long enough to study them well. He did not see a single case in America that he considered cured, although he saw *x*-ray pictures that appeared to show a cure. He concludes that it has some permanent value and thinks that in Germany the best results will be obtained in institutions devoted to the treatment of scoliosis, in which the Abbott method may increase their efficiency "more than we at present dare to promise."

Joachimsthal goes over the ground much as Vulpius does and concludes that it is well adapted to the treat-

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ment of total scoliosis or where it is mostly confined to the dorsal region, but is of little value where there are marked compensatory curves.

Böhm presented to his German readers at the suggestion of Dr. Abbott, on the occasion of his appearance before the meeting of the German Orthopedic Society, in 1913, a technical explanation of the latter's theory and method much as is given in Abbott's papers here. He does not commit himself on the value of the method, although he remarks the good results Abbott claims to have achieved.

Schanz studied the theory and practice critically during the occasion of Abbott's visit to the afore-mentioned congress, and he classes it with the Swedish gymnastics, the Sayre corset, and the Klapp creeping cures, all occupying the whole stage during their brief careers, but all failing to come up to their promises in the treatment of scoliosis. He quotes the well-known story and illustration of the normal medical student whose spine was first bent to one side, producing apparently a typical scoliosis, and at the end of six weeks bent exactly the opposite way, producing as extreme a scoliosis in that direction. He very properly calls attention to the fact that, in spite of the temporary rib deformities produced, no deformity of the spine characteristics of scoliosis—the wedge-shaped or the oblique vertebræ—was in either case produced, and the condition rapidly returns to normal when left to itself. Children's ribs are easily molded in this way. He believes the deformity of the thorax recurs after treatment is left off, as he could observe in the photographs of Abbott's cases 7 months after treatment, although the patient had worn a stiff corset all of the time. He concludes that as long as we possess no means of stopping the scoliosis-producing process we have no definite or certain means of cure, that some cases may get well and remain well, and others are little, if at all, controlled.

[With our rapidly increasing knowledge of the large part played by congenital defects in the development of scoliosis, as shown to us daily by the *x*-rays, the prospect for complete correction, and preservation of the symmetry of the spine becomes less and less brilliant. This,

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however, does not mean a hopeless cessation of effort, as much can be done to make the best of the condition presented, by the judicious use of any or all methods best adapted to the individual case, but it should make us study and classify our scoliosis cases with quite as much care as the internist bestows upon the differentiation between different forms of "heart disease." Parker.]

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Lance discusses Dr. Abbott's visit and demonstration of his method in Paris, in 1912, and then goes into details in regard to the principles and technic. The article is well illustrated and the results obtained are considered better than those given by any other method. He concludes: "The Abbott method gives results incomparably superior to all previous methods in the treatment of severe scoliosis. A large number of suitable cases even in adults, are susceptible of complete and lasting correction. The severest cases improve rapidly by the method, but we are not able to assert that the results are lasting."

Ombrédanne is associated with Lance, and like most others he gets his best results in the total scoliosis or in the single dorsal type—compensatory curves he considers unfavorable. He does not consider the method adapted to the functional or static type of trouble. Active breathing exercises exert a favorable influence upon the correction.

While uncertain as to the real value of the Abbott method, Redard asserts one practical result of the exposition has been to call attention to the value of favorable correction with retention in severe scoliosis. While rallying to the defense of such methods in general, he presents his plan of treatment adopted since 1895, which he designates as "straightening by force, followed by fixation in a position of hypercorrection." He precedes his fixation treatment by a period of massage, exercises, etc., to render the spine as flexible as possible. He places his patients in a frame on the side or abdomen, and with the shoulders and pelvis raised, just the opposite from Abbott's procedure, at the same time exerting some traction upon the head and the feet. The plaster jacket is then applied, fenestra are cut, and padding inserted. By this means he claims good results in favorable cases, but believes no one can cure those with ankylosis or

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vicious bone changes by the Abbott or any other known method.

Bilhaut thinks Abbott should be given no special credit for what had been known to other orthopedic men on the continent for many years. He says Hoffa had long previously called the attention of the profession to the fact that flexion of the spine induced detorsion, and for this purpose he constructed a table to produce this effect. He believes the scoliosis should be treated early before they need severe measures like Abbott's. (How he can control this in France, he does not state.)

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Treating the slight cases probably accounts in some measure for his assertion: "I have treated the most impossible cases; I have combatted the most enormous deviations; I have always benefited my patients by an important amelioration and to the satisfaction of all, parents, patients, and doctors. The good results have always been the recompense for the pains I have taken."

Badolle and Rendu[2] report their experience with the Abbott treatment in a single case where a right dorsal scoliosis apparently became a left scoliosis but the *x*-ray picture showed the spinal deformity unchanged. Nové-Josserand, commenting on the case and his own experiences, expressed the opinion that the cases were ameliorated by this method, but he was not yet ready to acknowledge that the relief was permanent or that complete recovery occurred.

Desfosses[3] gives an interesting summary with personal comments upon the scoliosis question as he observes it in the present interesting state of investigation and controversy, with Abbott twisting the column one way and reporting brilliant results and MacKenzie Forbes twisting it the opposite way with figures and results to support his contentions. He concludes that the complete solution of the problem will not come entirely through mechanical treatment, but will only be possible when we understand better the physiology of growth and especially that of puberty.

Lewy[4] reports with illustrations two cases of congenital

(2) Soc. des sciences méd., Jan. 25, 1914.
(3) Presse Méd., Feb. 4, 1914.
(4) Deutsch. med. Wochenschr., Mar. 20, 1913.

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scoliosis, one in a child not quite two years, and one in a girl 16 years old, in both of whom the *x*-ray shows a wedge-shaped vertebra carrying a rib upon its broader side, but none upon its narrower, and reducing the total number of ribs on the shorter side to eleven. He comments upon the increasing frequency with which the congenital type of scoliosis is being disclosed by the *x*-ray He mentions these etiologic factors, improper position of the fetus in utero, the presence and influence of cervical ribs in some cases, and the definite defects within the spine itself which appear to be much the more frequent cause. He offers no radical treatment applied directly to the deformed vertebræ, but the usual corrective measures.

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Treating by Reverse Scoliosis. Forbes,[5] of Montreal, seems to have gone a step beyond Abbott in the treatment of scoliosis. While Abbott flexes the spine and then by bandages bends the spine sideways to correct the lateral curvature, Forbes flexes the spine and then corrects the torsion by twisting the shoulder girdle above a fixed pelvis, producing a reverse scoliosis. In this position a plaster jacket is applied, from which windows are cut over the flattened chest areas and pressure made over the bulging areas.

[The Editor has not made a trial of this treatment, but he knows Forbes, and what Forbes says goes.]

Lumbar Spine's Rôle. Cook[6] says: "The key to the whole situation is the lumbar spine. The lumbar spine is the natural center of gravity, center of motion and center of stress of the whole human body. Torticollis, flat-foot, club-foot, ingrowing toe-nail, unilateral knock-knee, bow-leg, diseases of, injuries to or abnormalities of, the ankle, knee, hip and sacroiliac joints, pendulous abdomen and curved scapulæ, in fact anything and everything that affects the balance of the body, affects the curve of the lumbar spine."

He believes that "it is easier to pull than to push," and accordingly uses a plaster corset with a large fenestrum on each lateral side. By means of a strip of surcingle passed in at the opening on the concave side,

(5) Brit. Med. Jour., Aug. 30, 1913.
(6) Amer. Jour. Orthop. Surg., July, 1913.

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around the convexity and out again, and then back again around outside of the corset the body is pulled towards the straight, or possibly in some cases over-corrected.

As to Prognosis. Porter[7] frankly admits that on examining a case before treatment that he can neither tell whether the case will grow worse without treatment; nor can he say whether it will remain stationary; nor can he tell whether by treatment the deformity will be corrected or not.

Experience With Abbott's Method Not Final. Frieberg,[8] discussing Abbott's method, says: "My own experience with Abbott's method extends over a period of six months only and I am therefore not in a position to speak of final results. The number of cases is, moreover, small, since I have used the method in private practice only and upon such cases as I considered favorable and to which I could devote the utmost attention to details. I have without exception used great care in getting accurate record of the deformity before and after correction was made. This record was made by carefully marking each spinous process with a skin pencil and making a photograph of the back in both standing and forward bending positions. After this a graphic record of the deviation of the spine from the perpendicular was made according to the method which I demonstrated to this society on a former occasion. This record embraced the spine from the first dorsal vertebra to the gluteal fold and was drawn to a scale of 50 cm. with the aid of a slide rule. Record of the torsion deformity was made, in degrees, by means of a theodolite and this instrument was also used to measure the inclination of the line joining the acromion processes and the anterior iliac spines respectively. As the result of the painstaking use of these two methods simultaneously, I am brought again to the opinion which I have long held, that while the photograph is much more convincing to the lay eye and while it gives, undeniably, the better general impression of the figure, the graphic record is more accurate and distinctly more useful to the surgeon. It has furnished me with a more definite guide in the

(7) Ibid., July, 1913.
(8) Ibid.

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correction of the lateral deviation of the spine, especially since it shows this clearly in its relation to the displacement of the trunk upon the pelvis. If it has been encouraging in showing that a true reversal of the deformity has been accomplished in some cases, it has also demonstrated again that correction or even overcorrection of the figure may be apparent in the photograph, whereas the bony deformity has been influenced to a much less degree. This means simply that the apparent correction has been produced by yielding of the spine above the apex of the curve, or in both of these places. To my mind the demonstration of this fact is exceedingly important in its bearing upon the ultimate outcome of our cases.

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"Since the process of cure, according to Abbott's reasoning, is to be a functional transformation of the bone structure, it would not seem reasonable to expect it to occur as the result of maintaining the corrected position for a few weeks only. Consequently, in all of the cases considered in this paper, the jacket has been allowed to remain not less than four months after maximum correction has been secured. It appears very significant to me that in two of my cases it was possible to secure an unusually great overcorrection of the figure in the jacket and maintain this for five months without influencing the abnormal deviation of the spine to a marked degree. This could be observed by palpating the spine through the window in the jacket and we were, therefore, not surprised by what we found when the jacket was removed. With the spine flexed we had succeeded in bending the trunk far over toward the formerly concave side by the yielding of the spine above and below the deformity proper. In doing this, however, we displaced the curvature proper without greatly modifying it and the accommodative effect of this new position was not enough to produce the obliteration of the curve in several months' time."

Exercises in Its Treatment. Smith[9] has written a paper advocating exercises—exercises alone—for the treatment of lateral curvature. He closes with the following:

(9) Brit. Med. Jour., Sept. 27, 1913.

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The ideal method is to place the patient at a school where such cases are understood. The atmosphere of discipline is good, school work and rest can be duly proportioned, and the presence of other pupils undergoing treatment stimulates interest and avoids monotony. A nurse trained in one's own procedure pays daily visits and superintends each period of exercise. But the surgeon directs the whole conduct of the case; he initiates every new movement, and sees that it is carried out properly. Efficient exercises are powerful measures which have to be suited to each individual case, and it is only by strict supervision that one can realize their full value—namely, curative in the great majority of selected early cases, and an invaluable adjunct to those requiring mechanical support or other measures.

[The Editor does not at all agree with Smith's article printed six weeks after Lovett had read in London the wonderful paper abstracted below, and the subject had been discussed by American and German surgeons!]

Pathology and Classification. Lovett[1] gives a very complete and unprejudiced summary of our present views of the treatment of scoliosis, and aids materially in clearing up differences of opinion by dividing the subject into true and false scoliosis, or into postural and structural scoliosis.

In false, or postural scoliosis, there is no deformity of the individual bones of the spine. Such cases may readily be cured. In true, or structural scoliosis, there is deformity of the individual bones of the spine and of the ribs, and the cure in such cases is difficult or impossible. In false, postural, functional scoliosis the diagnostic characteristics are as follows:

(1) The spine forms a single lateral curve, in 90% of the cases convex to the left, for which predominance no satisfactory explanation has been given.

(2) In the ordinary standing position the left shoulder is carried higher than the right in left curves, and vice versa. This is because the bend to the left separates the ribs on the left, which carries the left side of the shoulder girdle higher than the right.

(1) Boston Med. and Surg. Jour., Oct. 30, 1913.

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(3) In the standing position the right side of the shoulder girdle is twisted back in relation to the pelvis, and the left twisted forward in left curves, and vice versa. This is because there is no such spinal movement as a pure lateral bend, and every lateral bend is accompanied by a twist. This twisting of the shoulder girdle in a horizontal plane is an expression of this fact. Any bend of the spine convex to the left in the upright position is and always must be accompanied by a twist of the shoulder girdle backward on the right.

(4) If the patient stands and bends forward from the hips until the trunk is horizontal the right side of the back will be slightly higher than the left in left curves, and vice versa. That is, the twist backward as seen in this position, in this type of scoliosis, occurs on the concave side of the lateral curve instead of on the convex, which is the case in the structural type. This is because the backward twist of the right side of the shoulder girdle, spoken of in the preceding section, is carried over into the forward bend position as a prominence upward of the right side of the back.

"Treatment. Cases of false scoliosis in the matter of treatment being a muscle problem, yield to muscle treatment—that is, they are amenable to gymnastics, and the prognosis for complete recovery under efficient treatment is favorable. The treatment consists in substituting a correct for a faulty attitude, which is accomplished by a set of exercises much like the 'setting up drill' of the army recruit. If stiffness to one side exists it is easily remedied by unilateral bendings."

As distinguished from the functional variety which has just been described, the structural variety is characterized by a change in the structures of the spine and thorax, manifested by a lateral curve of the spine associated with a turning of the vertebral bodies of each curved region toward the convexity of the lateral curve. This latter is the "rotation" of scoliosis. We are dealing no longer with the persistent malposition of a structurally normal spine, but with a spine deformed by structural alterations in bone and soft parts.

This turning of the vertebral bodies to the convex side of the lateral curve is made evident by a backward

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prominence of one side of the thorax or lumbar region in the standing position, and still more evident as an upward prominence of that side in the forward bent position, and is to be accepted in even slight degree as evidence of the existence of true or structural scoliosis. The pathologic changes associated with this grade of scoliosis, with which you are perfectly familiar—the wedge-shaped and twisted vertebræ, the compressed intervertebral disks, the deformed and displaced ribs, and the contracted soft parts—constitute factors that we must take into serious account in formulating our treatment.

Structural or True Scoliosis in the matter of etiology is very differently regarded in the last few years from what it was formerly, and the idea that practically all cases are due to static causes, to school positions and the like, has been extensively questioned. Insomuch as this matter bears directly on treatment, it must receive consideration.

Structural or true scoliosis may be roughly classed as being either mild, moderate, or severe. In the mild cases the deformity, although perfectly characteristic, may be so slight that we can easily concede that the changes present are no more than we might expect to find in a spine of normal resistance which had been held laterally curved during a part of the period of growth. These cases are most often the outcome of functional scoliosis, and are often spoken of as static.

In the remaining cases, however, the cases of moderate and severe degree, the changes are so marked or severe that we cannot regard them as the result of growth of a normal spine column held asymmetrically, but must look for an additional cause. Such causes are to be found most often in (*a*) congenital anomalies of the spine or its appendages, (*b*) empyema, (*c*) infantile paralysis, and (*d*) rickets. In addition to these, there is a class of cases where the deformity is so severe that one must assume a diminished individual resistance of bone to deforming causes, and yet evidences of rickets are not to be found. Some writers would assume in all such cases the existence of rickets to explain such cases, but in the absence of the accepted diagnostic signs of

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that affection it seems fairer to admit the fact, and assume an undefined weakness of bone for which we have as yet no name.

The practical outcome of the foregoing statement is that in the opinion of the writer one may assume that a short leg, *e.g.* will cause asymmetry in standing and postural or false scoliosis, and in some cases will cause mild degrees of true scoliosis, but that it is not a competent cause of moderate or severe scoliosis in an individual *with normal bones.* If the bones, however, on account of rickets or because of some similar condition not at present recognized, do not possess normal resistance, a short leg or any similar condition may be in such cases a competent cause of scoliosis of high degree.

In the treatment of true scoliosis it appears unreasonable to expect any real correction of the structural deformity from gymnastics alone, and no real results have been demonstrated by any one in moderate and severe cases. The same may be said of the use of braces and retentive corsets. The good results reported from the use of such treatment has been based on the treatment of false and not of true scoliosis.

Lovett then reviews the work of the older Sayre, Calot, Schanz, Wullstein, Rich, Z. B. Adams, R. T. Taylor, Abbott, and his own work, and considers the advantages and disadvantages of vertical position and the horizontal (prone, side and supine) for the patient while jackets are put on with considerable corrective force.

Lovett believes that it has been demonstrated that positive gain has been shown by the methods of Schanz, Wullstein and himself, but he still regards the methods of Rich, Forbes and Abbott as *sub judice,* although he admits that the flexed spine (Abbott and Forbes) permits lateral bending of the spine more readily than any other position.

[It appears to the Editor that the whole matter can be summed up in a few words:

Many cases of false scoliosis (having no structural deformity) can be cured by various mechanical means and corrective exercises.

No cases of moderate or well marked true scoliosis

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have as yet been shown to have been completely corrected by any method.

The treatment of scoliosis has made marked advances during recent years; but it has not arrived at a cure.

The next advance is likely to be greater accuracy of records by means of *x*-ray pictures, and the recognition of true scoliosis as a congenital deformity.]

TORTICOLLIS.

A Case of Osseous Origin. George Miller[2] adds another instance to the rapidly accumulating literature of vertebral defects in their relation to external phenomena. The child was a boy of 11 years with some facial asymmetry and the whole head shifted somewhat to the left and the chin over the left mammary line.

Of special importance was the *x*-ray picture showing a possible soldering of the atlas onto the occiput, a union of the 2nd, 3rd and 4th cervical vertebræ along their right lateral margins and a split in the 2nd, 3rd and 4th vertebræ resembling a spina bifida occulta.

Three pairs of short cervical ribs were observed in the three lower cervical vertebræ.

A myotomy of the right sternomastoid had previously been done, but the uselessness of the procedure was very evident from the *x*-ray findings. Some support of the head during development was suggested to obtain as good a position as possible.

STIFF AND PAINFUL SHOULDERS.

Etiology. There is perhaps no condition about which so little is generally known in the way of diagnosis and treatment as the stiff and painful shoulders following such injuries as do not have positive evidences of dislocations and fractures. To differentiate these traumatic shoulder joints from commencing tuberculosis and commencing osteoarthritis has been well nigh impossible for most of us. And the treatment has been equally unsatisfactory, at least when one asked one's self whether

(2) Berlin. klin. Wochenschr., Jan. 26, 1914.

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the treatment had cured the patient, or if the patient just got well while being treated.

In 1906 and 1908 Codman seemed to explain the whole thing satisfactorily by accusing the subacromial bursa. But operations on this bursa were refused by many, and those operated upon were not by any means quickly and perfectly cured.

Now after much discussion Thomas[3] presents a second paper (his first was in 1911) that may be the final word. It is his opinion that these cases suffer a more or less complete rupture of the capsule in the anterior inferior part; that this is often accompanied by injury to the bursa; and that sometimes the tendons of the short rotators are pulled loose, carrying away smaller or larger fragments of bone.

The arm is usually allowed to hang in adduction and inward rotation, and healing thus the limitation of the joint movement becomes chronic.

He advises putting the arm in the abducted position and holding it there with a splint covered with a light plaster dressing with the patient in bed until the pain has ceased and much of the soreness gone, and then early exercises in abduction and outward rotation. He concludes as follows: "The discussion which has arisen concerning these so-called stiff and painful shoulders is tending toward an agreement on the essential features. The statements of F. Lange to the effect that we are dealing with two separate conditions, easily differentiated from each other, are not supported by the facts. Codman's view is probably the correct one—*i. e.*, that the cases ascribed to subacromial bursitis are in most instances, at least, the same in type as those ascribed to a laceration of the anterior portion of the capsule of the shoulder-joint. The difference of opinion is the result of interpretation of the cause of the symptoms. The operative and post-mortem observations of Codman laid the foundation for the solution of the problem, since they first located a definite and positive lesion, which has since been found by others.

My contention is that the cause of the trouble in the bursa is an extension of the capsule tear from the axilla

(3) Therap. Gaz., Apr. 15, 1913.

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to the outer side of the joint, the overlying tendons in the region of the greater tuberosity giving way also and frequently taking with them a portion of the tuberosity. The chief cause of the stiffness and pain, however, is the contraction on the axillary side of the joint. This accounts for the tear of the supraspinatus tendon, to which Codman ascribes the bursitis. Brickner's report of a case of spontaneous reduction of a dislocation of the shoulder, unsuspected by the patient, is a valuable contribution. The difficulty which he experienced in making the diagnosis between fractures of the greater tuberosity and "calcifications" of the subacromial bursa is a valuable aid in showing that the "calcifications" are fractures of the greater tuberosity.

Taylor's view that the essential lesion is a palsy from overstretching of the brachial plexus, according to my knowledge, is the first recorded suggestion that these stiff and painful shoulders belong in the group frequently ascribed to injuries to the brachial plexus or its roots. I have seen very severe brachial paralysis, traumatic in origin and of weeks' and months' duration, melt away from the use of the arms after the restoration of the normal motion in the shoulder-joint. This proves that the cause of the paralysis was an injury to the joint and not an injury to the nerves.

Since I offered my capsule theory in a paper published nearly fifteen months before Lange's papers appeared, and since he does not show that any one else had previously suggested it, I must claim priority for it. It is particularly gratifying that he should extend its application to the explanation of the obstetrical palsies of the upper extremity. The fact that it has led him to say that the day for the 'let-alone treatment' for these obstetrical palsies has passed by should encourage others to test its efficiency."

[The Editor would suggest that inasmuch as the position into which these arms drop and in which they remain troublesome to both patient and surgeon is the same as in birth palsies, it is indicated to put these arms up at once in plaster splints with the palm at the back of the head and the elbow well back towards the transverse plane of its body.]

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PAINFUL BACKS.

Treatment. Marshall[4] describes a new brace for those painful backs where the lumbo-sacral region is the part complained of. It is a rectangular frame made of strips of steel reaching from well down on the buttocks up each side of the lumbar spine to the ribs, and held in place by an abdominal belt of webbing. It looks exactly like a diminutive and poorly made Thomas spine brace, and is applied in the same way and for the same purpose as the back support presented some years ago by Cook of Hartford. Only Cook's brace had less steel and more leather padding and in place of the cheap webbing belt it had "a pink silk belly-band." Marshall has greatly diminished the psychologic value of his brace in omitting the "pink silk belly-band." The first case on whom Cook used his brace was a professional dancer—a high kicker. He put on his "little brace with the pink silk belly-band" and assured the American Orthopedic Association in the most solemn manner: "She has been kicking ever since."

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But seriously, what are we to do for these patients, and there are not a few of them, complaining of pain in their sacro-lumbar regions? They are not suffering from the "slipped" or "strained" sacro-iliac joints of Goldthwait, for it is doubtful if any such anatomic anomaly exists. They have not impingement of the transverse processes of the fifth lumbar vertebra against the ilium, no matter if an *x*-ray picture seems to show it. They have not slipping of the fifth lumbar vertebra on the sacrum, although the *x*-ray picture may show an abnormal fifth lumbar. They just have backache. If the bowels are cleared out and kept clear; and if the general health of the patient is attended to and a normal routine of living is established, and *if the patient be kept under treatment long enough* he is sure to stop complaining of his back. When he complains of something else, send him to another doctor.

(4) Boston Med. and Surg. Jour., Aug. 21, 1913.

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PAINFUL LUMBO-SACRO-ILIAC REGION.

Is Operation Indicated? At last there are two men who have the courage of their convictions, and have operated on these cases—and their names are Thompson and Fassett,[5] of Seattle—despite all that has been said and written about displaced, slipped and strained sacro-iliac joints. No one, in so far as we know, has cut down and demonstrated the condition claimed and done an arthrodesis or made any direct effort to stabilize the joint. Motion at the sacro-iliac joint is not necessary. Parker found 12 joints with bony ankylosis in 250 dissecting room subjects and no loose joints. I have always suspected that those who claimed that they found great numbers of slipped and strained sacro-iliac joints did not really believe it.

Then came the change of base from the sacro-iliac to the sacro-lumbar joint. Here in patients with painful backs we can really see abnormality in many *x*-ray pictures—not only in those having painful backs, but also in a goodly number who made no complaints of their backs. For the fifth lumbar vertebra is misshapen more often than all of the other bones of the skeleton. Among these abnormalities are transverse processes that in *x*-ray pictures *appear* to impinge upon or overlap the iliac bones. If this congenital abnormality can cause a painful back for the first time at the age of twenty or twenty-four years, or at any other age, why not cut off these offending transverse processes? This is just what Thompson and Fassett did.

"Case 1 (Thompson's case). Male, aged 20, single, American, shingle weaver, came to the office July 6, 1911. He gave a history of trouble with the back for the last two or three years, disability increasing much more rapidly for the last four months, totally incapacitating him from work. Radiographs showed sacralization of the left lateral transverse process of the fifth lumbar with a distinct joint much like where is impinged on the ilium. Patient walked with a marked dorsal scoliosis toward the affected side. (Lumbar scoliosis was toward

(5) Northwest Med., June, 1913.

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the unaffected side.) It was impossible for him even to approximate an upright position on account of pain. There was distinct tenderness over the left sacroiliac joint."

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"Operation advised. Performed July 15th by Willis and Thompson. Radiograph August 19th showed a small spur left at the lower margin of the transverse process which we attempted to remove.

"Result of first operation. Patient walked in erect posture; pain much relieved. Returned to work but was not able to work full time on account of pain in back. Advised waiting at least six months and, when he appeared again one year following, the symptoms had not been improving and another operation was therefore advised and performed by Willis and Thompson, Oct. 1, 1912. Following this operation there was considerable pain for several weeks referred down the leg, probably from injury to the nerves at the time of operation, because the leg jerked violently several times. A radiograph taken immediately after this operation, which, however, was not very satisfactory on account of the presence of adhesive plaster dressing, apparently showed entire removal of the spur. A radiograph taken in April, 1913, when he appeared for final examination, shows partial reconstruction of the transverse process. By careful examination of the original plate, however, Thompson is satisfied that this reconstructed process does not extend so as to be in direct contact with the ilium, although the shadow extends past that caused by the margin of the ilium.

"It will be noticed in these pictures that the crest of the ilium extends very high in a vertical direction from the level of the lumbosacral joint. The shadow of a short, lateral process would, therefore, extend past the line of the crest but as it is situated in back of the ilium it does not necessarily touch it. At the present time he says that his back is entirely well and never causes him any trouble whatever. There has been some paralysis of the flexors of the foot with corresponding atrophy of the muscles on the anterior part of the leg. This is not sufficient, however, to cause him any inconvenience in walking. He has returned to his former

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occupation, but upon my advice is standing upon an inch and a half board on the affected side. This will tend to relieve any tendency to pressure on the affected side."

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Case 2 (Fassett's case). Referred by Fassett for *x*-ray and then treated by him. Male, aged 24, single, department head in a store, using a desk a great deal, complained of pain in the sacral region so severe as to cause him to walk the streets for hours at a time during the night, as the pain was less in a standing position than when lying down. Radiograph April, 1910, shows a wide transverse process of the fifth lumbar vertebra on the right side, impinging principally on the sacrum but also on the ilium. He was treated first with a belt, plaster cast, etc., with no results.

Operation, June, 1910. Pain at night was considerably relieved. A radiograph taken after this operation shows, however, that the transverse process itself was not removed but simply thinned. In October of the same year he complained that the symptoms had been increasing for the past month and a second operation was done. Subsequent to this there was some partial anesthesia on the outer side of the right ankle and some spasm of the toes and cramps in the legs. These symptoms gradually subsided. At the present time there is a little hyperesthesia in the previously anesthetic area at the outer side of the right ankle. He also developed symptoms attributable to flattened arch of the right foot which were relieved by a special shoe. He is now employed traveling and says that his back is entirely well except that it hurts a little if he leans forward for a long time. This is relieved immediately, however, by straightening up. He also has occasional cramps in the lower limbs on both sides, but they are not sufficient to disable him in any way.

The peculiar feature in this case is that the original pain was in the left leg while the abnormal transverse process was on the right side. The process, however, articulated with both the sacrum and the ilium and probably caused a sprain or partial dislocation of the left sacroiliac joint, which accounts for the symptoms being on that side.

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CONGENITAL DISLOCATION OF THE HIP.

Lorenz vs. Ridlon Method. Bankart[6] condenses more good sense into his paper than we have heretofore seen in print on this subject. He says:

"It is proved beyond question that in congenital dislocation of the hip, if the head of the femur is placed and retained 'in,' 'on,' or 'against' the acetabulum, the bone grows out around the head, the acetabulum becomes deeper and the head better developed, so that a joint is formed which is anatomically and functionally sound.

"The majority of surgeons who deal with these cases have adhered more or less closely to the technique described by Lorenz; indeed, many still follow his original teaching in every detail. But it must not be supposed that the surgery of congenital hip has stood still for eighteen years. Many modifications have been introduced during that time—some good, and some bad—and, while the general principle of Lorenz's pioneer work remains the same, there is no doubt that just as good results—and in many cases Bankart is convinced, much better results—can be obtained by a technique which differs in many ways from the original.

"As every one knows, the first step in Lorenz's 'bloodless' operation is to stretch or tear the soft parts around the joint; the adductor muscles are ruptured by forcible abduction and hacking with the hand; the parts behind and in front are stretched by forced flexion and hyperextension, and those above by traction on the limb. It is taken as an axiom that the hip cannot be properly reduced until all the soft parts are so stretched as to offer no resistance. This is not true; for in the majority of cases the hip can be reduced without any of these violent preliminaries, which are responsible for most of the shock and for nearly all the accidents of the Lorenz operation, and which, in addition, greatly weaken the muscles of the thigh.

"The constant pull of the muscles upon the femur is the most important factor in bringing about the development of the joint, and, provided the head of the bone is in

(6) Brit. Med. Jour., May 17, 1913.

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place, the more powerful the muscular retraction the better. The muscles should therefore be damaged as little as possible.

"In the earlier attempts to treat congenital hip, the great difficulty was the tendency to redislocation of the head of the femur backwards. To overcome this, Lorenz introduced his 'frog' position, in which the thigh is fixed in right-angled abduction and external rotation, the knee being actually behind the plane of the hips, and this position is still used in the majority of cases immediately after the hip has been reduced.

"But the fear of reluxation has been exaggerated. In the Lorenz position the head of the femur is thrust forwards and tends to project in front; often it passes in front of the acetabulum, and an anterior transposition is the result. Anterior transpositions are so common after the Lorenz technique that some surgeons have even counted them among their 'successful' results! It is true that, compared to an untreated dislocation, the functional result of anterior transposition is often very good, but it cannot for a moment be compared with that of true reposition. The head should be placed *in* the acetabulum, and nothing short of that can be called a success.

"When the Lorenz position is maintained too long, the retraction of the soft parts behind is so great that the thigh cannot be rotated inwards. Consequently after this treatment one sees many cases of persistent external rotation (often associated with anterior transposition), which gives rise to great disability, and is most difficult to treat. The Lorenz position should be employed until the tendency to backward displacement is overcome—that is, a comparatively short time—after which the thigh should be placed in a position of *internal rotation*, which gives a much more perfect apposition of the head of the femur and acetabulum, and which also allows retraction to take place more equally all round the joint.

"When the hip is successfully reduced, there is considerable tension on the muscles of the thigh, especially on the hamstrings, which keep the knee tightly flexed. Great stress is laid by Lorenz and his followers upon the stretching of these muscles by daily extension of the knee

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soon after reduction. Bankart believes this to be absolutely wrong. The surest way to induce redislocation of the hip is to stretch the hamstrings early by extension of the knee. The force of such stretching acts obliquely upwards on the femur, and if there is any possibility of the head slipping sideways from the acetabulum, it will be made to do so. The fear of permanent flexion of the knee is unfounded. Personally Bankart makes a point of including the knees, flexed, in the first plasters, so as to ensure that they are left alone. He has had them fixed in this position for upwards of eight months, and he has never had any trouble in getting them straight afterwards. In the second position of the hip it is necessary to include the knee in order to secure internal rotation."

He considers grinding the head into the acetabulum, and says:

"The head of the femur and the acetabulum are both covered by cartilage, and all the elements of a joint are present. The aim of treatment is to secure *stability*. The changes in the bones are brought about, not by friction, but by constant unchanging *pressure*. The source of this pressure is the pull of the thigh muscles upon the femur, and this pull is constantly acting when the head of the bone is in place. Under the influence of this force, if the limb is left absolutely undisturbed, the acetabulum can be seen (by *x*-ray) to become deeper, the head of the femur is better developed, and a buttress of new bone grows up from the margin of the acetabulum around the head until a secure joint is formed. Then, and not till then, should the child be allowed to use the limb. Activity before this stage can only make for instability. By movement the pressure is distributed over a wider area, instead of being concentrated on the center of the joint; the acetabulum becomes wide and shelving instead of steep and abrupt; the capsule is looser all round than if the joint had been kept still, and, lastly, movement is a potent cause of redislocation."

"By far the best method with which Bankart is acquainted is that of reduction over the *inferior* border of the acetabulum, advocated by Ridlon. It is performed in the following way: In the case of a left hip the knee is grasped with the right hand, and the limb is fully

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flexed both at the hip and the knee; the head of the femur is thus directed downwards. Pressure—and, if necessary, great pressure—is now made straight downwards upon the knee, so that the head of the femur is driven down below the acetabulum; counter-pressure is made by the other hand upon the tuberosity of the ischium, and the position of the femoral head is made out by the fingers of that hand feeling in the buttock. The descent of the head is increased by internal rotation of the thigh, but, as Ridlon has pointed out, it may even descend too low for easy reduction. When the head has thus been brought below the acetabulum, the thigh is slowly abducted; the head then passes upwards over the lowest part of the rim into the acetabulum.

The simplicity, rapidity, and ease of this reduction, as compared with the Lorenz method, is often surprising. In the latter the hip is reduced over the *posterior* margin of the acetabulum, with the thigh abducted to a right angle. To do this successfully, the head of the femur must first be brought down to that level by tearing and stretching the soft parts. But in reduction over the inferior border no preliminary violence is employed; the limb is not previously pulled about in any way; descent of the head is secured by the position of the limb and by direct pressure downwards on the femur; when the thigh is abducted the muscles aid rather than oppose reduction.

The elimination of unnecessary violence is a great advance in the treatment of congenital hip. Shock is infinitely less; the risk of accident—fracture, paralysis, etc.—is reduced to a minimum; permanent weakness of the muscles is avoided, and their important action during after-treatment is better preserved.

One other advantage must be specially mentioned. In the treatment of congenital hip it is generally agreed that there is an age limit beyond which it is inadvisable to attempt reduction—usually about eight years in bilateral, and about ten years in unilateral cases. This restriction is imposed on the Lorenz operation on account of the great violence required to stretch the soft parts in older patients, whereby the severity of the operation is proportionately increased, and the risks of serious accidents are very much greater. But, as Bankart has

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already said, in reduction over the inferior border, these preliminary forcible manipulations are avoided, so that the same objections do not apply to this method. Accordingly, the scope of the operation has been considerably extended in recent years, and many older patients are treated now than formerly. It is not to be denied that the difficulties increase with age, but provided that they can be overcome, there is *no age limit*, as such, to reduction of congenital dislocation of the hip. The limit is reached, in an individual case, when the operator ultimately fails to get the hip in. Bankart emphasized this point because many surgeons maintain that it is unjustifiable to attempt reduction over a certain age. Many patients are, therefore, passed over who at the present day certainly ought to be given a chance. The ideal of treatment is to benefit the greatest possible number of patients, and if there is any possibility of getting a hip in without serious injury to the patient, it should be attempted. It may be said in passing that the age of a patient is not always a sure guide to the difficulty of reduction; a case of 14 or 15 may prove to be easier than one of 4 years old; often in bilateral cases one side is much more difficult than the other; some of the most difficult cases are in quite young children.

Operative Treatment by an Anterior Medial Incision. Ludloff[7] gives the following method of dealing with congenital dislocations of the hip when for any reason the bloodless methods are unsuccessful or incomplete. With the child lying upon its back, the affected limb is held in right-angled abduction, or the Lorenz position of fixation, the whole region likely to be touched during the operation covered with iodin, the rima ani and vulva sewed together over an iodoform gauze strip, to prevent possible soiling of the field of operation during the procedure, and the final covering of parts with sterile sheets preparatory to the initial incision. This he makes in the direction of the axis of the abducted limb from Poupart's ligament along the lateral margin of the tendon of the abductor longus for a distance of about six inches. After cutting through the deep fascia blunt dissection

(7) Berlin. klin. Wochenschr., Jan. 16, 1914.

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is employed to separate the pectineus from the psoas when the capsule is readily reached. The large vessels are safely held outward by a retractor and but few small vessels are encountered during the operation. For purposes of better retention the psoas tendon is severed and the capsule opened for inspection. He strongly advises this incision and approach as giving a direct view of the acetabulum with the minimum amount of vascular and nervous disturbance and their unpleasant effects. The psoas muscle by the dislocation and the abducted position during operation is displaced more lateralwards than usually, greatly facilitating the entrance to and into the capsule. Its continued presence favors reluxation, so its section is advised. The capsule must be freed to a considerable extent from the margin of the acetabulum to allow of good inspection and must also be cut down to and along the linea intertrochanterica to prevent its folding into the acetabular cavity, else dislocation occurs too easily. The limbus and the ligamentum teres are removed and the cavity deepened when necessary. After reposition the anterior part of the weakened capsule is strengthened by a fascial transplant insuring its stability.

He reports twelve cases operated in this manner, four of which are still in the first dressings. They are put up in adduction and inward rotation. In one case there was a reluxation owing to the failure in his early work to provide a strong anterior part to the capsule. One child died from shock from a prolonged operation. In the other cases one of two years' duration had free movements of the joint in all directions while the others were still developing it.

COXA VARA ADOLESCENTIUM.

Etiology. Broca[8] gives an exhaustive study of the symptoms and their mechanism in this interesting malady, illustrating the various attitudes assumed in standing, sitting and kneeling, with accompanying radiograms to verify the lesions.

As to the causes he emphasizes the influence of heavy

(8) Presse Méd., Nov. 22, 1913.

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burdens carried by young persons. These burdens are such as are borne by porters, etc., while he completely ignores, as do many other foreign writers, the excessive overweight of the patient himself, the usual accompaniment of cases seen in this country. In fact the authors very rarely see this type of coxa vara in any other class of individuals. He does not favor operative procedures unless for the correction of deformities remaining after the disease has completed its course. Rest in bed for pain and as little use of the limbs as possible during the active stage are the essential features of his treatment.

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FLAT FOOT.

The Use of Foot Plates. Whitman[9] would have us believe that he has said the last word in the treatment of weak and flat feet. In 1890 there were treated at the Hospital for Ruptured and Crippled in New York 97 cases, or 2.6 per cent. In 1912 there were treated 2,109 cases, or 29.2 per cent. An increase of 26.6 per cent of all cases at the institution. But he suggests no explanation for this enormous increase in this one malady. Every orthopedic surgeon practicing anywhere in the United States has come to an appreciation of the fact that since about 1890 the number of people who come complaining of their feet has enormously increased as compared with other deformities, disabilities and weaknesses. It may then be well to inquire what, if anything, happened at about 1890.

At that time a very material thing happened. The orthopedists, lead by Lovett and other Boston men, urged unremittingly for the use of the "crooked" shoe, a shoe curved inwards in its anterior part so that Meyer's line (a line drawn through the great toe, the great toe joint and the heel) was possible in a shod foot. In 1892 the Editor had to send from Chicago to Boston for shoes of this type, it being impossible to find such shoes on sale or a shoemaker who would make them in Chicago. Now it is almost impossible to buy or have made a shoe of any other shape. In the opinion of the Editor this curved-inward shoe has been to a very great

(9) Amer. Jour. Orthop. Surg., October, 1913.

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extent the cause of this enormous increase of weak and painful feet. For the shoe curved inwards in its forward part—curved inwards to prevent abducting the great toe and the front of the foot—actually forces the foot into pronation, throws the weight on the inner side, that is on the arch, and unless the sole be built up on the inner side or a brace like Whitman's be used does all that a shoe can do to cause flat foot.

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Then when numbers of customers come complaining of these feet and shoe dealers come to know that foot-braces were being used by orthopedic surgeons they did the obvious thing, they began the sale of factory-made foot plates, and many pushed the sale by extra commissions to salesmen until now one expects to be offered foot plates by the shoe salesman more often than a shampoo by the barber. Soon every person wearing foot plates became orthopedic adviser to all his friends as to painful conditions of the feet, and the whole line of complainers of their feet—those having rheumatic, gouty, osteoarthritic, syphilitic, gonorrheal and every other painful condition of the feet bought foot plates, and seldom getting relief ultimately went to their doctors, surgeons and orthopedists and announced that they had flat-foot. Many lazy doctors accepted the diagnosis and put on other plates, and then the patient went elsewhere.

That Whitman has had a very great experience during the past twenty-five years no one knowing him can for a moment doubt. Nevertheless he has been using the same foot plate all that time. He never uses any other. One might as well treat all cases of hip disease with the same type of splint, or all cases of Pott's disease with the same brace, or all cases of scoliosis in the same way. Some of the rest of us old fellows have also had some experience during the past twenty-five years. The Editor, for example, has been nearly as busy as Whitman. At one time he used the Whitman plate in all of his cases; he presented Whitman's reprints to his students—but he has not used ten Whitman foot plates in the past ten years. Why? Because most of the patients coming complaining of their feet have no flat foot at all. Very many are wearing bad shoes and need only good

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shoes and exercises for muscles made weak by non-use. Very many are constipated and are cured by senna tea. Many are amazed to be cured by removal of diseased tonsils or teeth. And among women not a few only require higher heels to their shoes to compensate for shortened calf muscles.

Whitman says: The essential disability of the so-called flat foot is caused by lateral distortion.

The lowered arch is the secondary and not the primary deformity.

Pain is induced by strain upon sensitive tissues and has no proportionate relation to the deformity.

The more remote symptoms in the limbs and trunk are the consequences of the ungearing of the locomotive apparatus and the strain to which the mechanism as a whole is subjected by it.

The characteristic of all grades of weak foot is the persistence of the passive attitude of abduction.

In advanced cases this has become a fixed deformity. In the earliest stage it is a voluntary attitude that is abnormal because it persists when the foot is in active use.

[All this is undoubtedly true, but it is not the whole truth by any means. Even if it were it ought not to be a question of using Whitman's foot plate, or nothing. It should be for the orthopedist to do the necessary thing for the case in hand with the best means available. Whitman's foot plate is a very good device, but it is not easy to order properly or have properly made. Even he admits that it is uncomfortable—so intentionally so that the patient will walk on the outer border of his feet to escape the pain caused by the plate.—ED.]

Some Common Peculiarities. Marshall[1] presents the most interesting paper on flat-foot that we have recently seen. It is particularly interesting to observe that light is beginning to break in Boston on this little understood subject. It has become almost the fashion to suffer from "flat-foot." At least most lay persons and many doctors who experience any pain or discomfort in the feet say they have flat-foot. Whereas as a matter of fact very few of them have any flat-foot at all.

(1) Boston Med. and Surg. Jour., Jan. 1, 1914.

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Marshall recognizes the fact that the wearing of shoes has been responsible for the majority of such cases, but fortunately he also has noticed that patients complain of their feet when the shoes that they have worn are in no way responsible for the pain. He has also learned that "orthopedic shoes" often add to the suffering and are sometimes intolerable, and that malformed shoes often give the greatest comfort to malformed feet; that some are more comfortable in thick soles and stiff shanks and others more comfortable in thin soles and no shanks. But he still condemns the use of high heels [whereas, the Editor more often prescribes higher than lower heels].

Marshall has found that some feet are made more comfortable by arch supports; while others are made more uncomfortable. [Hail the day when no arch-support is worn except upon the prescription of an orthopedic surgeon *who has not invented one.*]

The lesson taught in Marshall's paper is that not only must the feet be examined and treated accordingly to the findings, but that the *patient* must be examined and treated for his needs.

PES CAVUS.

Pathology and Treatment of Non-Paralytic Forms. Davis[2] says: "The pathology of these non-paralytic cases is obscure. They are absolutely different from the paralytic type and require different treatment. In non-paralytic cases the foot is, as a rule, short, thick, muscular, contracted and possessing apparently a surplus of energy. Strength is its characteristic. A careful examination and trial of the individual muscles will show that while some may be weaker than others, there is no paralysis of any of them. The presence of the deformity is evidence that there is lack of muscular balance and if there is no paralysis, then distortion is probably the result of over-action on the part of the muscles producing the deformity. These feet and legs do not show the trophic changes seen in paralytic cases. When the history is investigated we find there is an absence of any attack of poliomyelitis and that instead of the disease being

(2) Amer. Jour Orthop. Surg., October, 1913.

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of long duration and dating from infancy that it is an affection comparatively recently acquired and is perhaps most frequent in adolescents and young adults. Instead, also, of the deformity being more or less suddenly acquired as in the paralytic form it is of gradual formation and has progressively gotten worse."

The treatment of Spasmodic, Irritative or Non-paralytic Pes Cavus. The foot should have the deformities eliminated, the muscular spasm stopped and finally should be protected against future discomfort and insult. To lower the elevated arch tenotomy of the plantar fascia and perhaps the tendon of the flexor longus hallucis should be done and then the foot should be forcibly stretched either manually or over Koenig's wedge block or, if it is extremely resistant, by using instrumental means, such as the Thomas wrench or some of the many forms of club-foot stretchers. Tenotomy of the contracted muscles is advisable. If the heel is raised the tendo-achillis should be divided; if marked spasm of the peroneal or anterior or posterior tibial muscles is present their tendons should be divided. If the toes are drawn back, causing them to arch dorsally and if when traction is made on them the extensor tendons are made tense then these also should be divided. The only digital flexor tendon that it is usually advisable to divide is the flexor longus hallucis. The necessity of its division is evinced by its being made very tense by its tension on the big toe. Recovery from these procedures only takes a few days and then shoes should be applied. These should be made with the idea of affording comfort and preventing recurrence. To do this the shoe should be at least three sizes over all longer than the foot; should be a straight and not a spring last; should be sufficiently wide, with room for the toes; possess a shank stiffened with a strip of steel and in some cases having a strap passing across the instep twice—over the back—to press the foot firmly down on the sole of the shoe. It is not desirable at this time to discuss other individual phases of treatment used, often early in the course of the affection, such as the use of anterior pads and supports like Cook's "anterior heel," and the operation of Forbes of Montreal to raise the head of the first metatarsal bone

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by transplanting the tendon of the extensor longus hallucis muscle into the first metatarsal bone, and other means which are of value in rendering uncomfortable feet comfortable.

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OSTEOCHRONDRITIS DISSECANS.

Pathology. Ridlon[3] reports three cases of this rare condition—a condition so rare that only one other case has been reported in this country.

The condition consists of an aseptic necrosis of a piece of bone the size of a date stone, or smaller, beneath the cartilage on the inner condyle of the femur. At least it lies beneath the cartilage for a time, but may break through into the joint and become a loose body. The patient presents no clinical symptoms sufficiently characteristic to warrant a diagnosis. All one knows is that there is something the matter with the knee joint. A good *x*-ray picture shows the separated piece and is the only way that the diagnosis can be made.

Ridlon did not treat any of his cases, but it has been recommended to open the joint, incise the cartilage and remove the loose piece of bone.

OSTEOCHONDRITIS DEFORMANS JUVENILIS.

Pathology and Diagnosis. Wilkie[4] reports one case with *x*-ray picture. We learn of this condition for the first time. If this condition is a real one, which, however, the history of the case does not make positively certain—the time of observation appearing to be altogether too short—orthopedists, and many others, have been overlooking many of these cases and treating them for hip disease.

The diagnostic points which Wilkie gives are:

"(1) A very pronounced limp, suggestive of congenital dislocation of the hip; (2) a very slight atrophy of the affected limb, confined mainly to the gluteal muscles; (3) abnormal prominence of the great trochanter; (4) the limb is held in position of abduction; (5) flexion

(3) Jour. Amer. Med. Assoc., Nov. 15, 1913.
(4) Edinburgh Med. Jour., Jan. 19, 1914.

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and extension of the hip are perfectly free; (6) rotation is slightly and abduction markedly restricted, and (7) jarring of the hip causes no pain."

The *x*-ray picture appears to show:

"There is (1) flattening of the head of the femur in its upper part; (2) rarefaction in the upper epiphysis and in the upper and outer part of the neck of the femur, and (3) irregularity of the epiphyseal line."

The fact that the von Pirquet tuberculin test was negative is in no way conclusive that the hip is not a tuberculous hip.

The fact that the hip movements in flexion and extension were normal or nearly so, is the most interesting symptom detailed, for we have been accustomed to believe that in hip tuberculosis movement in every direction is restricted to some considerable degree.

There is, however, a class of cases of hip trouble where for a long time, sometimes for several years, the hip motions are not sufficiently restricted to warrant a diagnosis. These cases to which we refer show so small a change in an *x*-ray picture that the joint may be considered as normal unless compared with a picture of the other hip when it will be found that the head and neck are beginning to be smaller in all dimensions. Later on they become still smaller and the acetabulum larger. This state of affairs progresses slowly but steadily, usually without pain and with little or no sensitiveness, until after three or four years the diameter of the acetabulum will have been increased by half and the head and neck of the femur, transversely as well as longitudinally, will have been diminished by two-thirds. This condition, whether the case has been treated or not. Finally, when the head and neck have sunken completely into the enlarged acetabulum about up to the inter-trochanteric line the joint loses most of its motion. In none of these peculiar cases that we have seen have there been tuberculous abscesses, and we do not know positively what the pathology is.

FRACTURES.

Their Treatment. It has long been a debated question whether the treatment of fractures pertains

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more to the work of the orthopedist—the "mechanical surgeon"—or to the general surgeon—the operator. But as this book will be read mainly by the general practitioner who must be an operator on occasion and also more or less of a mechanician, we will venture to give the subject some notice here.

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Jones[5] says: "The object of treatment is the restoration of complete function with least risk and inconvenience to the patient and with least anxiety to the surgeon."

He condemns the use of the flat board splint in all cases, using instead sheet iron gutters. He never uses weight-and-pulley traction on either the upper or lower limbs. Apparently he rarely uses plaster-of-Paris, although he does not condemn its use. He very rarely puts on bone-plates. He never uses passive movements so long as any tenderness remains at the seat of fracture.

"When this tendernes has entirely disappeared the joint may be moved through a small range of 5 to 10 degrees. If this can be done without pain a good prognosis may confidently be given. The patient may then be allowed to use the joint through a small range of movement, and if in two or three days the range of movement is increasing, then greater freedom may be permitted. If, however, the joint becomes stiffer and a little painful, then the time for movement has not yet come. A little later comes the time for passive movement. The indication for this is the belief that further movement is prevented by fibrous adhesions and shortening of ligaments. Passive movement should be done once in each direction in which movement is limited. It should not be followed by a reactionary swelling and stiffness which lasts for more than twenty-four hours. If the joint is stiffer twenty-four hours after a single movement it means that it is still not ready for movement, or the movement used has been too violent. To-and-fro passive movements are very likely to stir up a reaction of an inflammatory nature which leads to more effusion and more adhesions. In all such cases more time is lost by being in a hurry than by waiting a little

(5) American Jour. Orthop. Surg., October, 1913.

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longer than necessary before trying to restore motion."

"So far we have said nothing of massage. At all stages of treatment we believe that massage is beneficial, provided it is of the lightest possible character and applied with skill without disturbing the fragments, or stimulating the young callus to fresh overgrowth. When in doubt on this point it is certainly safer not to massage but to rely on absolute rest."

He regards "non-union" as in a great extent due to the "personal equation," and pleads for more time. Cases of "malunion" he refractures and resets, and starts the treatment all over again, making a point of allowing abundant time for recovery.

"The time that has elapsed since the accident is no indication of the solidity of the union. If the seat of fracture is tender the callus is soft. Usually the patient complains also that the deformity is growing worse, that is to say, the callus is yielding. If it can yield in the direction of deformity, it will yield with equal readiness in the direction of correction if proper forces are applied to it."

Considering individual fractures, he treats fractures of the clavicle "by keeping the shoulder back and out." Fractures of the upper part of the humerus by sheet iron gutter splints; one from just above the outer condyle up to the anterior fold of the axilla, and a similar one at the back.

All fractures about the elbow joint, except fractures of the olecranon, are treated with the forearm fully flexed on the arm.

Fractures of the neck of the femur by a double Thomas hip splint, with the injured leg abducted, in some cases with fixed traction added. That is with a crutch for a fixed point from the splint against the perineum on the opposite side and traction by sticking plasters fastened to an extension at the bottom of the splint, except when hypostatic pneumonia comes on; then he uses a Thomas knee splint and has the patient sit up in bed.

For fractures of the shaft of the femur he uses a Thomas knee splint, eight or ten inches longer than the leg and makes fixed traction by sticking plasters made fast to the bottom of the splint. At the back of the

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thigh and leg he puts a sheet iron gutter, and in front another from the top of the patella to the groin.

Fractures at the ankle he does not like. To these he usually applies bone plates.

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