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PRACTICAL PEDIATRICS

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PRACTICAL PEDIATRICS

GRAETZER AND SHEFFIELD

PRACTICAL PEDIATRICS

A MANUAL OF THE MEDICAL AND SURGICAL DISEASES OF INFANCY AND CHILDHOOD

BY

DR. E. GRAETZER

EDITOR OF THE "CENTRALBLATT FÜR KINDERHEILKUNDE" AND THE "EXCERPTA MEDICA"

AUTHORIZED TRANSLATION, WITH NUMEROUS ADDITIONS AND NOTES,

BY

HERMAN B. SHEFFIELD, M.D.

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1905

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1914-16 Cherry Street.

TO

LEONTINE OLIVE

IN MEMORY OF HIS BELOVED

LITTLE DAUGHTER

THE AMERICAN EDITION OF THIS WORK

IS

AFFECTIONATELY DEDICATED

BY

THE TRANSLATOR

AUTHOR'S PREFACE.

A REFERENCE book such as I hereby dedicate to the profession does not as yet exist. This is rather remarkable, for the practice of pediatrics is an unusually delicate and difficult art, to the study of which, as a rule, but little time is allotted during the college terms, while at a later period it plays a very important rôle in practice—contributing largely, so to speak, to the daily bread of the practitioner. The practitioner needs, therefore, a reference book which will enable him *cito tuto et jucunde* to familiarize himself with all subjects pertaining to diseases of childhood which he previously did not know or had forgotten. Such a book must necessarily be arranged alphabetically,[1] must be brief and to the point, and contain as many parenthetical hints as possible, so as to permit at a glance of the selection of the more important from the less important material. With this object in view the author has endeavored briefly, but clearly, to present everything worthy of attention from a modern standpoint. As a pupil of Henoch, he has naturally leaned toward the teachings of his master and taken special notice of his excellent text-book. In doing so he has not, however, suppressed any of his personal opinions, nor has he neglected to make liberal use of the collective recent literature. Furthermore, he has added the observations made by him during many years of extensive practice, especially in the field of pediatrics. The sections on therapeutics particularly are, to a great extent, based upon actual experience.

The author trusts that his book will prove valuable especially to the general practitioner, who, in his early career, is not always prepared to cope with the difficulties encountered in the management of diseases of infancy and childhood. It may also serve as a repertory for the candidate of medicine before his examinations.

DR. E. GRAETZER.

[1] [In the present edition for obvious reasons this scheme was not adhered to in Part I.]

TRANSLATOR'S PREFACE.

THE *raison d'être* for this miniature encyclopedia of the medical and surgical diseases of infancy and childhood is amply explained in the author's preface.

There is, to my knowledge, no book on pediatrics which presents in so small a space such an abundance of practical and clinical material, pathological and bacteriological data, and details of etiology and diagnosis as the volume in question. The author has rightfully avoided the introduction of superfluous material, such as elaborate descriptions or illustrations of baby nursing-bottles, family scales, silver baby-spoons, classical weight curves, theoretical diet lists, ultrapedantic cooking recipes, etc. Furthermore, instead of rehearsing threadbare descriptions of the *typical* course of diseases, he has laid especial emphasis upon the numerous *deviations* from the type which so often baffle the skill of the general practitioner.

The more adequately to meet the demands of the American practitioner, the translator has inserted quite a number of notes and additions which he trusts will enhance the practical value of the book. Among the translator's additions are sections on intubation, Lorenz's operation for congenital dislocation of the hip, broncho-pneumonia, achondroplasia, home modification of milk, gonorrheal ophthalmia, tinea tonsurans, hydrotherapy, massage and electricity, climatology, palatable prescribing, antitoxin, several newer standard remedies, etc. All these additions are indicated by brackets []. In preparing these notes the translator frequently consulted numerous text-books as well as medical periodicals.

In closing, I desire to express my sincere gratitude to Prof. Henry T. Brooks, M.D., for his unselfish and untiring aid in correcting the manuscript.

H. B. S.

NEW YORK.

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PART I.

I.

Care of the Newly Born.

Care of the Umbilicus.—The care of the umbilicus is extremely important, as otherwise diseases (sometimes fatal) of the umbilicus may set in. Normally the ligated proximal portion of the navel dries up during the first few days, shrinks, and falls off about the fifth to the sixth day after the formation of an inflammatory line of demarcation and leaves a slightly moist wound, which cicatrizes. This should not be disturbed; on the contrary, desiccation should be promoted in order to eliminate as rapidly as possible the dead tissue, which is such a favorable soil for bacteria. In thick umbilical cords or in weak children separation may not occur until the twentieth day. Strictest cleanliness must be enforced, and no tearing, pressure, or pulling allowed until after cicatrization. Clean scissors, sterile linen cloths, clean hands (nurse! lochial secretion of the mother) are to be used during ligation of the cord and also later. In former times five to six centimeters of the umbilical cord were left; at present only one centimeter is left, so that there is as little as possible of dead or putrescible tissue. The daily bath has also been discarded. After the first bath bathing is interrupted until the umbilical cord has fallen off, because moisture favors the growth of germs which accumulate on the navel, and delays desiccation. Therefore no ointments or oiled cloths should be employed. The rest of the umbilical cord is tied with a sterile linen cloth turned over the left side of the abdomen, and covered with a pledget of dry, sterile gauze or absorbent cotton. Sometimes a dusting powder, consisting of 1 part of salicylic acid to 4 parts of starch, is applied; recently, also, xeroform

or alumina. The entire abdomen is covered by an umbilical bandage. This is to be examined after a few hours, especially if a thick bandage is used, to detect possible loosening of the string—or hemorrhage. The compress is changed for the first time after three days, and then every second day until the umbilical stump has fallen off. Then a daily bath and the use of boric acid ointment until cicatrization. Schliep always obtained very rapid mummification by painting the umbilical stump twice daily with a 2-per-cent. solution of silver nitrate. To prevent hernia the use of an umbilical band for some time after complete healing of the umbilicus is to be recommended.

Care of the Eyes.—*Credé's Method* is aimed at the prevention of ophthalmoblennorrhea *(q.v.)*. It consists of instillation into each eye of a drop of a 2-per-cent. solution of silver nitrate by means of smooth glass rods, three millimeters thick and rounded at the extremities, after the eyes have previously been cleansed with a linen cloth dipped in clean water, or a 3-per-cent. solution of boric acid.

Premature Infants are usually lighter in weight and smaller in size than full-term children. Their body-temperature—specific warmth—is very low, the face is generally sunken and senile, the skin wrinkled, the heart-beat and pulse are barely perceptible, respiration is superficial, and the voice whining. All these manifestations are sometimes observed in babies born at full term, but only in those who are debilitated from constitutional diseases, especially syphilis of the mother. Such children must also be treated like premature infants. Children prematurely born are especially liable to various diseased conditions: *e.g.*, disturbances in healing of the umbilical cord, thrush, icterus, retention of urine, etc. Babies born at seven or even six months who are free from the disturbances just mentioned and weigh from 1200 to 1400 grams ($2\,^1/_2$ to $2\,^3/_4$ pounds) not rarely thrive, provided very careful attention is given to them, especially in regard to supply of necessary heat and to rational feeding. As to the supply of heat, it often suffices in milder cases to roll the entire body in cotton batting, to surround it with several hot-water bottles, or to place the child in a "Winkel bath-tub" with double walls, and with warm water between the walls. In severe cases (very low temperature, etc.) the air to be inhaled

must be made very warm by heating the room or by placing the infant [the earlier, the better] in an incubator. As baths radiate much heat, prematurely born infants should not be bathed until the navel has healed. The first bath should last for from two to three minutes, and the child immediately be wrapped in cotton batting, etc. Prematurely born babies should be fed on woman's milk, and if, as is usually the case, they cannot suckle, the milk must be administered with a teaspoon [or dropper] every hour or two during the day and every three to four hours during the night, from 30 to 40 grams [℥viij to ℥x] for each feeding, or gavage *(q.v.)* should be employed. If woman's milk cannot be procured, well diluted cows' milk (1 to 3 or 4 parts of cocoa, tea, or 5-per-cent. milk-sugar solution) must be resorted to. The continuation of these procedures depends upon the condition, development, body-temperature, etc., of the child. The transition to the ordinary methods of treatment must be very gradual. Very often even the greatest care is futile. As a rule, the smaller the baby and the lower the body-temperature, the less and slower the improvement. If the premature infants are able to take the breast the prognosis is far better. Premature babies generally die, and, if they survive, they remain feeble for many years, and manifest increased tendency toward diseases, which usually end fatally. Sometimes, however, a sudden change for the better takes place, the children grow rapidly, and are healthy and flourish.

[See "Incubator" and "Atelectasis."]

Incubator (couveuse) is an apparatus in which prematurely born *(q.v.)* or otherwise very weak infants are placed in order suitably and permanently to supply them with a uniform temperature requisite for the maintenance of life. Various apparatus are in the market, and consist principally of a chamber provided with glass walls, an arrangement for ventilation, etc. The internal temperature of the incubator is maintained at about 91° to 98° F. by heating it from the outside. In this manner many children may be reared who would otherwise perish. [The infant lies upon a bed of cotton or a soft pillow. It should be lightly clothed, a shirt and napkin being generally sufficient. It should be disturbed as little as possible, and removed only for feeding, weighing, and cleaning the incubator.

In many instances feeding can be done by simply sliding the glass cover. The cotton bed should be renewed every two days at least, and the skin may be kept clean with cotton and oil. It is not only necessary to watch the temperature of the incubator, as registered by a thermometer, but the baby's rectal temperature should be taken every few hours; fluctuations between 97.5° and 100.5° F. are unimportant. If the variations are much greater, the temperature of the apparatus should be modified accordingly.

Every incubator-reared baby requires close and constant attention. Results depend upon nothing so much as the intelligence and watchfulness of the nurse. Unless skilled attendance is possible, the result without the incubator may be better than with it. Since no system of ventilation can be absolutely depended upon, whenever possible a cylinder of oxygen should be at hand for use in the attacks of asphyxia or cyanosis which so often occur.

Feeding of the premature infant is no less important than the heat and ventilation. Few infants under eight and a half months will take the breast. Most of those over seven months will suck from a bottle if the nipple is small and soft. The feeder suggested by Rotch, which is in principle only a large medicine dropper, works very well for many cases. A few must be fed by gavage. Feeding should always be done slowly; if rapidly taken, some of the food is likely to be regurgitated, and this regurgitation may produce attacks of asphyxia or even aspiration pneumonia. The quantity of food and the frequency of feeding will depend upon the size, age, and vigor of the child. At first only 1 or 2 drachms should be given, and repeated every hour; later, as much as an ounce every hour; and, finally, when the child has reached development equal to full term, from 1 to 2 ounces may be given every two hours. Artificial feeding is usually not very satisfactory with premature infants. In some of the larger and more vigorous, modified milk gives good results; for weaker and smaller children, however, good breast-milk is essential. For the first twenty-four hours, ordinarily nothing is given except warm water or a 4-per-cent. solution of milk-sugar, 1 or 2 drachms every four hours. When two days old, breast-milk may be given diluted with an equal

quantity of sugar solution,—in all, 2 or 3 drachms every hour. The proportion of the breast-milk may be gradually increased until at the end of two or three weeks it is given undiluted, the guide to increasing it being the condition of the infant's digestion. The breast-milk selected should be that of a woman whose own child is at least 10 days old. The premature baby may take its mother's breast wholly or in part as soon as it is sufficiently strong to nurse. For two or three weeks, however, it is almost always necessary to have the breast of another woman to draw upon.

The results with premature babies will depend very much upon how soon after birth they receive proper care. Where one is expected an incubator should be in readiness, so that the child can be put into it at once or as soon as it breathes properly. If the incubator is not employed until the child is several days old and is failing rapidly, the chances are slight. Another factor of importance already mentioned as greatly affecting results is the constant attention of a nurse who has had experience in cases of this kind. The age and vigor of the infant are of the greatest importance in estimating the chances of survival. The following table[1] gives Tarnier's statistics, showing the percentage of premature infants saved during a period of five years without the incubator, and during the succeeding five years with the incubator; also the percentage saved at the Sloane Hospital (New York), as published by Voorhees:—

Age.	Tarnier Saved Without Incubators.	Tarnier Saved With Incubators.	Voorhees Saved Without Incubators.	Voorhees Saved, With Incubators, Excluding Cases Dying a Few Hours After Birth.
Born at 6 months	0.0	16.0		
" " 6½ "	21.0	36.0	22.0	66.0
" " 7 "	39.0	49.8	41.0	71.0
" " 7½ "	54.0	77.0	75.0	89.0
" " 8 "	78.0	88 8	70.0	91.0
" " 8½ "	88.0	96.0		

SHEFFIELD.]

[1] [From Holt's "Diseases of Infancy and Childhood."]

Gavage is the artificial introduction of food directly into the stomach. It is indicated in premature infants *(q.v.)* or feeble, newly born infants who are not able to suckle. A thin Nélaton catheter is introduced into the stomach through the mouth or nose, and the milk is poured in by means of a funnel and thin rubber tube; the catheter is rapidly withdrawn immediately thereafter.

Sleep of the Child.—A healthy, newly born child should sleep day and night except when it drinks or is being dressed, etc. Children of one month should be awake only from three to four hours in twenty-four, and fall asleep right after drinking. From the sixth month on the child needs only fifteen hours' sleep; from the first to the fourth year about ten hours; from the fifth to the twelfth year eight to nine hours. Disturbed sleep is often due solely to bad habits; pampering; putting the child to bed at irregular hours; taking it into the bed of the adult, etc.; or to unsuitable treatment before going to bed, telling of ghost stories, terrorizing, etc.; often to hunger or also to overfeeding at bedtime, particularly with heavy foods and those producing flatulency; stimulation of mental impressions in the bedroom (odors, bright light, or noises); overheating of the room; unsuitable night-clothes or bed, and to bedbugs. If the underlying causes cannot be determined, and if overexertion, pain, or acute diseases are not responsible for the restless sleep, it is then simply a question of general nervousness, usually associated with anemia. Occasionally, however, it is due to severe brain disease, such as tubercular meningitis or tumors, which often begin with insomnia, or to an hereditary disposition, overexertion, psychical disturbance, masturbation, etc. [hip-joint disease, "starting pain"]. Furthermore, attention must also be paid to the habitual use of alcohol, coffee, and tea.

The *treatment,* therefore, must be directed toward removal of all the injurious influences enumerated, when good sleep is usually promptly obtained. If not successful, recourse must be had to hypnotics. It is advisable, however, first to begin with warm baths of from fifteen to twenty minutes' duration (or cool baths may be tried) before retiring. A Priessnitz compress over the abdomen sometimes acts admirably. Medicinally aqua aurantii floris is about the mildest hypnotic, and, according to

Comby, often acts well in doses of from 20 to 60 grams [½ to 2 ounces]. Bromids or chloral *(q.v.)* may also be used. Recently the new remedies, such as sulphonal [hedonal] and trional, have been administered with success. In sleeplessness due to pain or cough an opiate or antipyrin may be administered.

Hardening.—C. Seitz says: "The question when infants or the newborn should be taken outdoors can best be answered as follows: Healthy children under 1 year of age may be taken out for several hours if the weather is good and warm. Such children may also be taken out at noon for about an hour in the winter, on sunny, clear, and not windy or too cold days (not lower than 26° F.). On cold days the head should be covered with a woolen cap, the face protected by a thick veil, and especially the body kept warm with woolen blankets. More care must be exercised with premature and weak children. Children born later in the fall or in the winter must not [?] be carried outdoors until the warm season sets in. It is not advisable to harden infants in the first year of life. The marked susceptibility of their respiratory organs to low temperature and marked atmospheric changes must not be lost sight of. Healthy children over 1 year of age may be gradually and systematically allowed to become accustomed to such changes, but only in the warm season of the year. Local ablutions of the face, arms, and hands are begun with first, and later successively also of the breast, abdomen, and back. Usually water of room temperature is used for the ablutions, but in weakly and anemic children warm water should be used. Washing of the whole body with cool water must not be done in children under the fourth year of age. These ablutions (for the purpose of hardening) once begun must regularly be persisted in. They are to be followed by quick drying (in the winter with warmed cloths). Children 5 years old may be bathed in the river or sea, if the temperature of the water is not below 68° F. Children 10 years old may take cold baths at a temperature of 63° F. On the other hand, girls of that age should not bathe in water under 66° F. and older girls not at all during or a few days after menstruation. The temperature of the air must always be higher than that of the water. The duration of the bath should not exceed 10 or 15 minutes, and should be limited to 4 or 8 minutes if the temperature of the water is low."

II.

Infant-feeding.

Colostrum is the milk which begins to discharge almost immediately after birth of the child and a few days later is followed by real milk. Colostrum is richer in serum-albumin, fat, and salts than breast-milk of a later period. Formerly colostrum was considered harmful, and the baby was fed during the first few days on sugar-water, fennel-tea, etc. Nowadays, however, the child is put to the mother's breast a few hours after birth, as it was learned that colostrum is quite nourishing and to some extent counteracts the physiological loss of weight of the infant which takes place in the first few days of life. It acts as a mild laxative, and thus aids in the complete discharge of the meconium.

Woman's Milk is the best food for a child up to the ninth month. As a wet-nurse *(q.v.)* is an expensive substitute and a source of much annoyance and inconvenience, every mother, even of the higher classes, should endeavor to nurse her child as long as possible. Even if she is able to nurse only a few months, it is a great gain for the child, for it thrives better from the start; it can later more easily overcome diseases, etc.

As obstacles to nursing only the following are worth considering: Deficiency of milk. This should not always be accepted as a reason, if, on the first or second application of the baby to the breast, insufficient milk is present, for after repeated applications, especially with copious consumption of fluids, milk-gruel, etc., a rich milk-secretion is soon established. Certain anomalies of the breasts, such as defective development, mastitis (see "Wet-nurse"), diseases in the mother which might become aggravated by nursing and prove dangerous to the mother as well as harmful to the child (transmission!), namely:

psychoses, epilepsy, hysteria, and other nervous diseases; valvular heart disease; and acute and chronic infectious diseases, especially tuberculosis. The mildest affections of the lung-apex —nay, even a strong hereditary diathesis—contra-indicate nursing. In syphilis of the mother the latter should nurse her own child, whether or not it has any distinct manifestations of the disease. Pregnancy also contra-indicates nursing. Menstruation, however,—except, perhaps, if the child is greatly affected by it, which is very rarely the case,—is no contra-indication.

The first application of the child to the breast should take place after eight hours at the earliest and twelve at the latest after labor, although at this time only colostrum *(q.v.)* is present. If there is no milk, hope of the possibility of nursing must not be given up. The child should temporarily be fed on diluted cows' milk *(q.v.)*. From beginning to end the breast should be given with strictest regularity; during the day every three hours (only to very weak babies every two hours); in the night only once during the first two to three weeks and later not at all, except, perhaps, when there is an excessive secretion of milk. The child should nurse for from twenty to thirty minutes at a time, and, if the breasts are not very rich in milk, alternately from the right to the left breast. If there is insufficient milk in one breast the child should be allowed to drink from both breasts at one meal. During the first few weeks the full and healthy child should fall asleep at the breast. A little regurgitation immediately after suckling in very young infants is of very little moment, as the stomach is small, perpendicular, and tubular; later, however, it means overfeeding or disease of the stomach. According to Feer, the quantity of breast-milk obtained by the infant with each feeding averages as follows:—

Weeks . .	1	2	3	5–8	9–12	13–16	17–20	21–24
Grams . .	40–50	80–90	85–110	120–134	140	150	155	160

As to the diet of the mother, see "Wet-nurse" and "Weaning."

Selection of a Wet-nurse.—If a mother is unable to nurse her child, a wet-nurse is the best substitute. In her selection three conditions must be fulfilled; and others only if the material to be chosen from is large. The wet-nurse must have sufficient milk; must be free from severe, acute, and all constitutional diseases; and not gravid. The composition of the milk is not of very great importance; indeed, the child may be nursed even by several wet-nurses at the same time and still thrive. It is unusual for the quality of the milk not to agree with the child, as long as the quantity is sufficient.

In selecting a wet-nurse the latter must be tested by carefully examining her breasts. Both breasts should be exposed; one breast after the other is grasped by the thumb on the upper and the four fingers on the lower periphery, and by moving the whole hand somewhat forward, uniform and gentle pressure should be exerted upon the whole breast. It is not expedient to confine the pressure to the immediate vicinity of the areolæ, as this is apt to prove misleading, for even a poorly secreting breast contains a good quantity of milk at the dilated ends of the mammary ducts, especially if let alone for some time.

An examination of the breast reveals: 1. The volume of the glandular parenchyma; if it is large it is rarely without sufficient secretion. 2. The quantity of milk which is present in the breast; it is supposed to escape in several even jets for from twenty to thirty seconds. In this respect the physician must be on his guard, as the breast might not have been emptied for hours previous to the examination. Such a condition may, however, be recognized by the presence of several compressible, injected, tensely distended, thick, quill-like, spiral mammary ducts, and by the pain produced on pressure. It is therefore best to surprise the wet-nurse with the examination. On the other hand, in order to avoid being chosen, some wet-nurses manage to have the breasts empty by secretly (at toilet) withdrawing the milk. If this is suspected, the wet-nurse must be kept under constant surveillance for from two to three hours.

It is very important to test the glandular parenchyma. If milk flows for some time from a moderately developed breast in uniform jets, the physician need then have no anxiety as to

the quantity of the milk secreted. On the other hand, no matter how freely the milk flows, the physician should always be on his guard as long as the breast is poorly developed in glandular parenchyma, for in such an event he is confronted either with a breast that has been kept filled for a long interval or with one that only transiently secretes more, but is generally not capable of secreting plentifully for the long period of nursing. He should be equally careful when he finds a breast that is richly developed in glandular parenchyma, but secretes very little milk. This usually occurs in wet-nurses whose food-supply had been greatly diminished for some time previous to the examination and who, in the majority of instances, furnish plenty of milk after having been supplied with a corresponding quantity of food, especially fluids.

The form of the breast also offers certain guarantees. Breasts containing an abundance of milk are either cylindrical or conical in shape. Pendulous breasts are unfortunately rare. Breasts that are poorly supplied with milk are tense, hemispherical, and distinctly marked by the radiating lines which develop during pregnancy (primiparæ). It is frequently important to determine whether the breast "goes easily" (this is usually the case in cylindrical and conical breasts) or "goes hard": *i.e.*, if it empties easily or with difficulty. A delicate child—*e.g.*, a premature birth—must have breasts that empty easily, as it is too weak to suck hard, while to a strong child such breasts are apt to prove dangerous by drinking too much and possibly contracting dyspepsia. It is very good if the wet-nurse's own child is found well nourished. The physician should be alert for deception. When, however, the mammary parenchyma, milk-secretion, etc., are good, the delicate appearance of her own child, which may be due to other causes, ought not to be discouraging.

The milk thus having proved sufficient, the health of the wet-nurse must then be inquired into. Make a most painstaking complete physical examination. The hair is to be examined first for lice (remedied by washing with petroleum or 5-per-cent. creolin solution); the forehead for corona veneræ and bony swellings; the nose for ozena (this renders the wet-nurse useless, but not the mother); the eyelids for trachoma (which ren-

ders wet-nurse absolutely useless [?]). Examine the cornea for scars (which render wet-nurse useless if associated with other signs of scrofula; not the mother); face, lips, and gums for anemia (this does not render her useless if no essential grave leukemia is present); teeth must be sufficient to chew; caries does not render her useless, provided there are no suppurative processes of the bones, etc.; oral cavity and pharynx for *plaques muqueuses*, ulcers, and deposits; the neck for struma (if moderate, not harmful); for scars in the neighborhood of the angle of the lower jaw (which usually originate from scrofula, and render wet-nurse useless); for cervical glands, swellings from carious teeth, or chronic pharyngeal inflammations (which do not harm). Caution is recommended when the cubital, axillary, or inguinal glands are enlarged. The lungs must be very carefully examined and be entirely free from disease. Any form of chronic bronchitis renders the nurse useless. Compensated heart disease does not interfere. The thorax must be examined for swellings of the paramammary glands. These are pathognomonic of syphilis. Ill-smelling sweat in the axillæ and intertrigo under the breasts render the wet-nurse useless. Also the form of the nipples must be looked into. Delicate, prematurely born children require long, hard, prominent nipples. The form is otherwise immaterial, but the nipples must not be immovable and imbedded in the conical areolæ. Erosions of the nipple, even fissures, do not exclude the wet-nurse, as they can be remedied by a nipple-shield made of red rubber. Incipient or fully developed mastitis renders the wet-nurse useless, but not necessarily the mother. The upper extremities must be examined for cubital glands and psoriasis. The latter, as well as psoriasis palmaris and plantaris, renders the wet-nurse useless. The abdomen and legs are to be examined for dropsy; the genitalia for syphilitic manifestations. The slightest suspicion renders the wet-nurse useless, while pointed condylomata and fluor albus do not necessarily. The lower extremities should be examined for multiple large varicosities. The latter render the wet-nurse useless.

It is advantageous if the wet-nurse has passed delivery not less than six weeks and not more than five months; is not younger than 20 years and not older than 30; has given

birth to one or two children and nursed them successfully, and has come from the country. Working-women in manufacturing establishments are less favorable, owing to the suspicion of excesses or intoxication by poisonous articles. With a large selection all this must be considered. As a rule, menstruation has no influence upon the quantity and quality of the milk. The slight indisposition of the child during the short period is unimportant.

Once a nurse has been selected, it is imperative that she retain the milk as long as possible. The milk should escape in from five to six jets, with light pressure, even when the child is full; the latter should nurse for about twenty minutes and fall asleep at the breast. She should not in any manner impair her health and consequently that of the infant.

The diet should not vary much from the ordinary; thus: Country wet-nurses should slowly become accustomed to meat. Wet-nurses should avoid delicacies; too fat articles, such as fried food and gravies; foods difficult of digestion and those producing flatulency; also spices and alcohols; only light beer in small quantities should be allowed. It is best to give them from six to seven meals a day, consisting chiefly of milk and gruel. Overloading of the stomach—*e.g.*, at the christening—should be avoided. Furthermore, the wet-nurse must keep herself very clean, especially her hands and breasts. The latter should be washed with a 4-per-cent. solution of boric acid; and she should always have some exercise, such as light housework and outdoor walks.

Weaning of the Nursling from the woman's breast should take place between the ninth and twelfth months, after eruption of the first teeth, best after appearance of the first six incisors. Owing to the frequency of gastro-intestinal diseases during the hot months (June, July, August [and September]) weaning should, if possible, not be attempted during these months. If the time for weaning should fall within this period, it is advisable to wean the baby either sooner or later. Weaning should be undertaken gradually rather than abruptly, within about from four to six weeks, by replacing first one meal of breast-milk by one of cows' milk, then by two feedings, etc. Soon after weaning, milk soups should be given by adding oat-

meal or wheatmeal, grit, barley, or zwieback to the milk. Also beef-bouillon and veal-bouillon may be gradually added. By degrees, cocoa, yelk of an egg, etc., are to be given, but in such a manner that milk should always form the chief food until the child is 2 years old.

Cows' Milk Feeding.—If a mother is unable to nurse her child and a wet-nurse for some reason or other cannot be procured, cows' milk is the most rational infant-food (see "Asses' Milk"), and should always be tried before resorting to other substitutes. Even admitting that cows' milk can never substitute natural feeding with mothers' milk, good results are nevertheless obtained with it, if proper care is exercised. Cows' milk is a fluid essentially different from woman's milk, but it approaches most closely the demands of the infantile organism. Woman's milk contains not only less proteids and more fat, milk-sugar, and salts, but the essential ingredients of woman's and cows' milk differ. In the first place, human milk contains by far more albumin, thus: Human milk, 61.5 per cent. casein, 38.5 per cent. albumin; cows' milk, 85.7 per cent. casein, 14.3 per cent. albumin. The richer the milk in albumin, the more easily digestible, because albumin is a primarily soluble body. Casein renders digestion more difficult. Moreover, the casein of cows' milk differs from that of woman's milk inasmuch as the former coagulates in the stomach in large, firm lumps, the latter in fine, small flakes. It is as yet undetermined whether the milk-sugar possesses the same chemical constituents in both kinds of milk. The fat, which is present in large quantities in woman's milk and renders it more digestible, is in finer emulsion than in cows' milk, and therefore more easily absorbed. It is thus quite evident why cows' milk agrees less with the infant's stomach than the food destined for it by Nature. Furthermore, woman's milk leaves the breast almost sterile and is immediately taken up by the baby's stomach, while cows' milk, by coming in contact with the air, etc., has ample opportunity to take up various bacteria before reaching its destination. Finally, according to recent investigations woman's milk contains several ingredients—*e.g.*, according to Moro, a sugar-converting enzyme—which are absent from cows' milk. Although these substances are not as yet distinctly characterized, they never-

theless contribute their share to stamp woman's milk as the most rational infant-food. Fortunately, some deficiencies of cows' milk can be remedied artificially: *e.g.*, the quantitative differences of the chief constituents.

AVERAGE COMPOSITION.

	FAT.	PROTEIDS.	SUGAR.
Cows' milk	2 to 4	3.55	4.88
Woman's milk	3.2	1.50	6.12

In order to render cows' milk acceptable to the child's stomach it is necessary to diminish the quantity of proteids and increase the amount of sugar. The former is accomplished by diluting the milk with water. The following formulæ are generally recommended:—

To a child 3 months old, 1/4 milk, 3/4 water.
" " " 6 " " 1/2 " 1/2 "
" " " 9 " " 3/4 " 1/4 "
" " " 12 " " pure milk.

The increase in the quantity of milk is, of course, accomplished gradually between each quarter of the year. Indeed, the scheme just outlined must often be deviated from, depending upon the condition of the individual infant. Some children, for example, do not tolerate pure milk even at the age of 12 months, while others tolerate it at the age of 6 months. Others, again, in order to thrive, must receive more milk in the first three months. Water is the best diluent. From the third month on, in order to supply the deficiency in salts, it is frequently preferable to dilute the milk with barley-water or oatmeal-water (2 tablespoonfuls of unhusked barley- or oatmeal- grain are boiled with 1 liter of water for one-half hour in a covered pot, then strained through a finely woven net and water added to make 1 liter). Also by mixing the milk with different infant-foods [*e.g.*, Reed & Carnrick's soluble food]. Indeed, with some children such mixtures agree better. The addition of cream (from 1 to 2 teaspoonfuls to 1 tablespoonful for a meal), to make good the deficient quantity of fat in cows' milk, is also often recommended and contributes to the welfare

of some children. This addition of fat and salts, however, is usually superfluous. It is absolutely necessary to add sugar to the milk, best in the form of milk-sugar (about 15 grams—5 heaping teaspoonfuls—to $^1/_2$ liter of food). It is, of course, impossible to equalize the difference in the nature of the proteids; on the other hand, the milk can always be freed from bacterial contamination by sterilization *(q.v.)*. The milk must be of good quality and be obtained clean, and kept clean until used if the child is to remain healthy. The hygiene of the stable is an exceedingly important factor, and, if possible, the physician should convince himself that all requirements are complied with. Good milk should be a white, opaque fluid of aromatic odor, not bitter in taste, clear of threads and mucus, and have no visible sediment even after several hours' standing (to be observed in a conical glass). The reaction should be amphoteric or faintly alkaline; the specific gravity, 1.029 to 1.034. Mixed milk is best,—*i.e.*, milk of several cows,—because the differences as to race, age, and time after weaning the calf are equalized, and mild disturbances of health in one cow are not so easily manifested. Dry feeding is productive of the best milk, although other kinds of feedings are not detrimental. It is the sudden transition from one form of fodder to the other that often causes a change in the milk which gives rise to digestive disturbances in the child. Finally, the quantity of cows' milk the infant is to receive with each meal should be:—

In the 1st month, 50 to 75 grams [℥xii-xviij].
In the 2d month, up to 120 grams [℥iv].
End of the 6th month, 150 to 200 grams [℥v-vj].
From the 9th to 12th month 200 to 250 grams [℥vi-viij].

[As the percentage of fat requisite for the maintenance and development of the child is greatly reduced by diluting "whole" cows' milk, there has largely come into vogue the plan of using the upper portion of the milk, which is commonly spoken of as "top-milk."

Top-milk, as obtained in New York City, contains, according to J. Winters, the following percentage of fat and proteid:—

PORTION TAKEN.	FAT.	PROTEID.
Upper ½ ounce	24.8	3.1
Upper 1 ounce	23.1	3.2
Upper 2 ounces	21.4	3.3
Upper 4 ounces	20.1	3.4
Upper 6 ounces	18.6	3.5
Upper 8 ounces	16.7	3.6
Upper 12 ounces	12.1	3.7
Upper 16 ounces	9.4	3.8

In accordance with this table the following scheme of feeding is appended with the object in view of assisting the physician in prescribing proper milk mixtures without being compelled to enter into minute complicated calculations. It should be borne in mind, however, that no schedule can be followed with absolute regularity, and that individualization is the keynote to successful infant-feeding.

FEEDING SCHEME.

AGE.	NUMBER OF FEEDINGS IN 24 HOURS.	INGREDIENTS FOR TOTAL NUMBER OF FEEDINGS.			
		TOP-MILK OF ONE BOTTLE (OUNCES).	LIME-WATER OR (LATER) GRUEL (OUNCES).	MILK-SUGAR (TEASPOONFULS).	BOILED WATER (OUNCES).
1 day to 2 weeks	9	1 to 2	1	3	10
2 weeks " 4 "	9	4 " 6	2	6	20
4 " " 8 "	8	8 " 10	3	8	22
8 " " 12 "	7	12 " 14	3	8	18
12 " " 24 "	6	16 " 18	3	7	16
24 " " 36 "	6	20 " 22	3	6	12
36 " " 48 "	6	24 " 26	3	3	8
48 " " 60 "	5	28 " 32 whole milk	3	3	4

Occasionally cases are encountered which fare badly on fresh cows' milk, no matter how carefully and scientifically prepared. In such cases peptonized milk, condensed milk, or the well-known proprietary infant-foods should receive unbiased consideration.

Partially Peptonized Milk.—"One pint of fresh cows' milk and 4 ounces of water are put into a bottle and a powder added containing 5 grains of extractum pancreatis and 15 grains of sodium bicarbonate. This is kept at a temperature of from 105° to 115° F., or about as warm as the hand can bear comfortably, which is best maintained by placing the bottle in water. It should be shaken from time to time. The process is continued for from six to twenty minutes." The mixture is then placed on ice if the milk is not to be fed at once.

Completely Peptonized Milk.—"The process is exactly the same as the above except that the peptonizing process is continued for two hours.

"Peptonized milk is to be diluted according to the age of the child. In acute attacks of indigestion completely peptonized milk is usually preferable to that which has been partially peptonized. At most peptonization should be used only for a month or two at a time; as the case improves the amount of the powder used is gradually diminished and the time of peptonizing shortened."

Condensed Milk is composed, approximately, of 7.0 per cent. of fat, 8.5 per cent. of proteids, 51.0 per cent. of sugar, 1.5 per cent. of salts, and 31.0 per cent. of water. By diluting it with from 12 to 6 parts of barley-water, a milk mixture is obtained which is quite nourishing and readily digestible. Some authorities suggest the addition of an equal quantity of cream to supply the deficiency of fat arising from the dilution with water. As a temporary food, especially among the poor who have no means of obtaining good fresh cows' milk and of keeping it free from contamination, condensed milk serves as an excellent substitute. Its continued use, however, is apt to lead to digestive disorders and to rickets.

Infant-foods.—The remarks just made in reference to condensed milk to a great extent hold good also to the proprietary foods. The latter are generally classified into milk-modifiers and milk-foods. To the milk-modifiers belong, among others, Mellin's, Wyeth's, Wampole's, and Eskay's foods, and "imperial granum," while "malted milk," Nestlé's, Allenbury's, and Reed & Carnick's "lacto-preparata" and "soluble food" are the chief representatives of the milk-foods. According to J. Lewis

Smith, "Carnrick's 'food' contains a large percentage of the solid constituents of milk, the casein of which has been partially digested, so as to resemble the casein of human milk in its behavior under the digestive ferments. Used alone it is sufficiently nutritious for the infant."—SHEFFIELD.]

Asses' Milk resembles human milk more closely than cows' milk and offers the best substitute for woman's milk, at least up to the fourth month; less so beyond this age, owing to its deficiency in fat. It contains almost the same quantity of proteids as woman's milk; the quantitative relation between casein and albumin is also the same. Finally, asses' milk contains almost the same amount of salts (0.42 per cent.) and sugar (6.2 per cent.). As asses are always immune against tuberculosis and almost free from other diseases, the consumption of raw asses' milk might be worth considering, as it is certainly more readily digested than boiled milk. Unfortunately, however, owing to the scarcity of these animals, asses' milk is too expensive for infant-feeding. Its use as a food for sick children for at least a few weeks should, however, be taken into consideration.

Sterilization of Milk.—Cows' milk which is to be used for feeding of infants must be sterilized as early as possible after milking in order to destroy the bacteria contained in the milk, which may multiply before the milk is given to the baby. Furthermore, there is danger that the milk is obtained from a diseased cow. According to Flügge, sterilization is insufficient to destroy all germs, and very virulent peptonizing bacteria, which peptonize the casein with formation of rennet ferment, are uninfluenced. The further development of these bacteria is, however, prevented by keeping the milk in a cold place immediately after sterilization. If the milk is preserved in an air-tight, closed vessel, after the important pathogenic bacteria are destroyed those remaining do no damage. The milk is best sterilized in steamers as constructed by Soltmann and others. The Soxhlet apparatus [or the Arnold sterilizer], however, is the best, as with it several feedings can at once be sterilized. The quantity of milk necessary for twenty-four hours is correctly diluted (see "Cows' Milk"), divided in several bottles and sterilized together by exposure to the steam at boiling heat for from ten to fifteen minutes. Formerly the milk was steamed

for forty-five minutes, but recent observations have proved that milk is changed by too long sterilizing, so that anemia, Barlow's disease, etc., result from its use. The bottles, which are provided with rubber stoppers, close automatically and remain air-tight. The milk-containing bottles should be warmed to body-temperature before feeding.

[**Pasteurization,** or sterilizing at lower temperatures, has largely come into vogue in this country. It consists of heating the milk to a temperature of from 150° to 160° F. for a period of from thirty to forty-five minutes. It is readily accomplished by means of the Arnold or any other, similar, sterilizer by entirely dispensing with the "hood" of the sterilizer, thus permitting the steam to pass freely out of the holes in the lid. After pasteurizing the bottles are cooled by allowing a moderate stream of cold water from the faucet to run into the sterilizing chamber, care being taken that the cold water does not splash upon the hot bottles and thus crack them.

The medical profession seems to be almost evenly divided on the question of *raw milk for infant-feeding.* One-half claims all advantages for raw milk; the other, in the same emphatic manner, for sterilized milk. Both, however, lose sight of the middle way, which is generally the safest—*i.e.,* pasteurization. Sterilization at a high temperature is certainly the ideal method from a bacteriological point of view. It destroys almost all pathogenic bacteria, particularly those producing typhoid, cholera, acute gastro-enteritis, etc. It has the disadvantages, however, of changing the taste of the milk, some children refusing to drink it; it is more difficult of digestion; the nourishing qualities are somewhat diminished; and, finally, sterilized milk tends to produce constipation. Raw milk, while, if properly prepared, is entirely free from the disadvantages just enumerated, as obtainable in large cities, in the summer, is unfit for infants' food, owing to the virulent bacteria it very often contains, and the great difficulty of keeping the milk from turning sour, even for a few hours. On the other hand, pasteurization preserves the taste and quality of the milk and destroys most of the pathogenic micro-organisms. If kept cool after having been pasteurized it usually does not turn sour for at least twelve hours.—SHEFFIELD.]

III.

Remarks on Physical Diagnosis.

Pulse.—The normal pulse-rate in children is much more frequent than in adults. In the newly born it is from 120 to 150, and remains as high during the first few months. In the second year it is 100 and over; it then gradually diminishes, but it is still 90 per minute in children from 3 to 6 years of age. It does not reach the pulse-rate of the adult until the second decade. The pulse-rate varies with the change of the attitude of the child. It is increased by suckling and eating food. It is more markedly influenced by crying and excitement: *e.g.*, when the physician approaches. If the latter does not bear this in mind he is very apt to be misled, inasmuch as retardation of the pulse (icterus) may escape his observation, and high frequency alarm him.

It must be emphasized that very pronounced acceleration of the pulse is not of such prognostic importance in children as in adults. Biedert counted 218 beats per minute in a child 1 year old who continued to live eight days longer. [In a boy 3 years old suffering from pneumonia I counted 220 beats per minute. The child recovered fully within a week.—SHEFFIELD.] Such a pulse in an adult would indicate approaching dissolution. Examination of the pulse of children is reliable only during sleep. The tip of the index finger is gently placed upon the radial artery; if the child wakes the movements of its arm must be followed without resistance; if it becomes still more active the arm should be at once released and further examination postponed until the child is again sound asleep. Only then can the physician draw correct conclusions as to the condition of the pulse. It must also be remembered that even in healthy children the pulse is sometimes somewhat irregular during sleep, and that during convalescence from acute febrile diseases, such as pneumonia, typhoid, measles, etc., the pulse may be irreg-

ular or retarded for weeks without cause for alarm. Retardation of the pulse is observed, for example, in sclerema, uremia, debility, and at the onset of tubercular meningitis. In the latter disease it is often unequal and irregular, and becomes considerably more rapid in the last stages. The same is often also the case with scarlet fever. To conclude from the pulse alone that there is fever is mere conjecture. In threatening collapse the pulse-wave usually grows smaller; in heart and brain disease arhythmical and interrupted, while in typhoid, etc., dicrotic. Also the relation of the pulse to respiration (normally from 3 or 4 to 1) may be a valuable sign.

Respiration.—Respiration in children has some peculiarities. It is quicker than in adults, and, the younger the child, the quicker the respiration. In the newborn the number of respirations is from 30 to 40 per minute and quite superficial; in the first weeks of life, from 25 to 35; in children from 2 to 5 years old, from 22 to 26; in those 6 to 14 years old, 21 to 24; they then become slower until they reach the number of the adult (16 [to 18]). It is more frequent in sitting and standing than in the recumbent posture. Respiration is best observed when the child is asleep, as it is then usually more rhythmical.

Every little emotional impression changes the respiration; it even may be interrupted by pauses without signifying anything. Even Cheyne-Stokes respiration is of no significance. Increased frequency of the respiration does not always indicate the presence of respiratory disease unless it be labored, moaning, whistling, and sighing in character. Snoring respiration is suggestive [of adenoids] of tonsillar hypertrophy, angina, retropharyngeal abscess, etc., while a harsh, deep, stenotic sound suggests croup. The normal ratio of respiration to pulse is 3 or 4 to 1; disturbance of this proportion is abnormal. Persistent disturbance (*e.g.*, 40 to 60 respirations to 120 or 140 pulse), as a rule, indicates disease of the respiratory tract, unless rachitis (rachitic children with deformed thorax breathe more quickly) or nerve trouble exists. Thus, during first dentition in otherwise healthy infants Henoch often saw a frequency of from 60 to 90 respirations for months, which returned to normal with appearance of the teeth (reflex excitement of respiratory center). In-

creased respiratory frequency is similarly observed in the course of pertussis and in tuberculosis of the bronchial glands. Diminution of frequency is found particularly in cerebral diseases, laryngo-tracheal stenosis, and sclerema.

The type of respiration is abdominal in the first few weeks and months of life, owing to the predominance of the diaphragm over the thorax. It changes slowly, and in the tenth to eleventh year the respiratory type of adults (in girls costal!) gradually sets in. Light inspiratory retractions at the lower edge of the ribs (insertion of diaphragm), which are observed in the first few weeks or months of life and persist even longer in rachitis (relaxed thorax), are physiological. The vital capacity of the infantile lungs is especially large, owing to greater elasticity of the thorax. This explains the power of the child to hold its breath and to cry long. As to the "respiratory sound," see "Auscultation."

Temperature.—The temperature in children up to the sixth or eighth year is best taken per rectum. It drops markedly in the newly born soon after birth, ranging between 95° and 94° F., but begins to rise a few hours after and reaches 99° to 100° F., which is normal in children. A temperature of 101° to 102° F. on the fourth or fifth day is indicative of pathological processes (*e.g.*, omphalitis). Temperature changes are quite frequent in children, owing to the fact that their heat-regulating power is not as yet fully developed. The diagnosis of fever must, therefore, be made with some reserve. Feeding, severe crying, running, fright, etc., cause an elevation, and sleep a lowering of temperature. Also slight indispositions—*e.g.*, constipation—considerably raises the temperature. The temperature may rise high in indigestion, and all other diseases cause high fever; it is therefore not of such bad prognostic importance as in adults. The differences between the morning and evening temperatures in febrile affections are more marked in children than in adults, as is also the critical temperature drop: *e.g.*, in pneumonia (9° F. or more). Antipyretics are sometimes followed by so pronounced a drop of temperature that collapse ensues. Caution is therefore imperative. Considerable lowering of the temperature is caused by sclerema and hydrocephalus. Children with congenital heart disease and

those prematurely born cool off very readily. The deficient heat-regulating power of such children must therefore be assisted by external artificial heat, in order not to permit the temperature to sink so low as to imperil the vital functions.

Auscultation of the Thorax.—*(a)* Of the Lungs.—Auscultation should precede percussion because the latter is less pleasing to children. To avoid frightening the child the ears [if no stethoscope is employed] should be warm. Crying interferes very little with auscultation of the lungs. On the contrary, it aids somewhat in revealing bronchophony over limited and deeply seated infiltrations. Auscultation of the sides of the chest, at the axilla, must not be forgotten. The respiratory sound is quite weak in the first weeks of life, because the short, superficial respiration is not sufficient powerfully to force the air through the bronchi. When the child is 6 months old, however, breathing is distinctly "puerile," and a sharp blowing sound, resembling bronchial breathing of the adult, may be heard which is especially distinct in rachitic deformities. The sounds are louder on the right than on the left side because the right bronchus is of larger diameter. Pure bronchial breathing is physiological between the scapulæ (especially to the right of the spinal column), but pathological in other localities. Furthermore, in small children inspiration only is heard distinctly, while expiration is heard with difficulty or not at all if the child is perfectly quiet. The pathological sounds are almost identical with those in the adult. The practitioner must not be misled by rattles and râles, which may originate in the nose or throat while the child is crying and be transmitted to the chest. During deep respirations or when the child is about to cry, fine, vesicular râles may at times be heard over the borders of the lungs, especially the lingula (fourth left costal epiphysis), in the region of the tenth and eleventh vertebral bodies posteriorly, and in the supraclavicular region. These sounds are due to the entrance of air into the previously undistended alveoli.

(b) Of the Heart.—The auscultatory points of the heart are the same in children as in adults, except that the apex-beat is displaced outward. In auscultating the normal heart of young children, accentuation of the first sound is heard equally well at the arterial and venous orifices, thus deviating from the

condition observed in adults. Accentuation of the second sound is not heard until about puberty. Constant augmentation of the second pulmonary sound over the first ventricular sound is pathological, while temporary accentuation is usually due to excitement. The latter is also the cause of cardiac arhythmia which is often encountered in the beginning of the examination of the patient and disappears quickly; and it is also responsible for sounds, especially of the second pulmonary, due to arhythmical closure of the valves. All this, in addition to the systolic vesicular breathing or sound which is quite frequently heard in children, especially at the left boundary of the heart, renders the diagnosis of heart affections in children quite difficult. On the other hand, the diagnosis is sometimes facilitated by the fact that anemic sounds are almost never heard in children under 4 years of age. The heart-sounds are louder in children than in adults, and are often audible also over the back, abdomen, liver, and stomach, owing to favorable conduction. They are somewhat dull in nurslings, and become gradually clearer up to the period of puberty. The heart-beat in children may be weak or strong, subject to the same influence as in adults.

Percussion.—1. To percuss the *lungs* of little children correctly is quite an art, owing to their restlessness, crying, etc. It is best to percuss with the fingers, although a very small pleximeter made of flexible material may also be used. In every case gentle percussion is absolutely essential, owing to the fact that resonance is greatly favored by the elasticity of the thoracic walls, and harder percussion may give rise to co-vibration of distant parts and lead to error. It is best to percuss while the child is sitting as erect as possible, since artificially produced scoliotic curvatures occasion dullness in these parts. Lateral postures also may be chosen. The child should never lie upon its abdomen, for compression of the abdomen pushes the intestines and diaphragm upward, diminishes the thoracic space, and is apt to intensify the dyspnea up to asphyxia when the child is already suffering from embarrassed respiration. Aside from the posterior portions of the thorax the lateral and anterior aspects must not be forgotten since diseased foci are often detected here. Thus, for instance, pneumonic spots are some-

times found under the clavicle while the posterior portions are perfectly normal. In order to judge rightly it is best to percuss during the height of expiration and inspiration. No reliance should be placed upon results obtained while the child cries, for during crying artificial dullness may readily be obtained even in a healthy child over the lower posterior portions, owing to compression of the lungs and to the ascension of the diaphragm; furthermore, during crying a metallic clink may often be heard even in a healthy child. Finally, it is important very carefully to percuss the portions which correspond with the tracheal bifurcation (glandular swelling).

2. As to percussion of the *heart,* Seitz says: "In percussing the heart of a child the greatest stress must be laid upon relative dullness, which can usually be determined without difficulty by a lighter stroke than in the adult, and especially with the aid of the sense of resistance. In children under 1 year of age the highest point of relative heart-dullness usually lies to the left of the sternal end of the second rib. The left border of cardiac dullness arches from here downward to the fifth rib 2 centimeters outside of the left mammillary line, while the right border of the dullness begins at the highest point of the right sternal end of the second rib, crosses the second right intercostal space, arches downward to the right parasternal line, and runs along the latter down to the fourth intercostal space or to the upper border of the fifth right rib. The fact that in the first year of life the left heart border overlaps the left mammillary line, thus also the extreme end of the left lobe of the liver, makes it clear why at this period of life it is often possible to determine the lower boundary of the heart, which runs bilaterally somewhere near the upper border of the fifth rib or ascends somewhat from left to right. The area of the cardiac dullness measures, along the mammillary line, from 6.5 to 8 centimeters; so that the left border of the area of dullness overlaps the palpable apex-beat. The apex-beat usually does not correspond with the apex of the heart, but with a section of the heart lying either above or to the inner side of the apex-beat. The area of absolute cardiac dullness in children under 1 year of age extends from the lower border to the left third rib downward along the left sternal border and does not always

reach the left mammillary line. At 6 years of age the conditions in regard to the area of relative heart-dullness have changed. The highest point still lies within the sternal end of the second intercostal space, but the left boundary overlaps the left mammillary line by 1 centimeter; the right border no longer reaches the right parasternal line, and the lower border of the heart is situated on a horizontal line extending from the lower border of the right fifth rib to the left fifth intercostal space. The greatest width of dullness amounts to 10.2 centimeters. The absolute heart-dullness begins at the upper border of the fourth rib, and its lateral boundaries are displaced about 1 centimeter to the median line. From the twelfth year onward the highest point of relative dullness is located somewhat lower, at the sternal end of the third rib. The left border overlaps the left mammillary line only slightly or not at all, and meets the lower boundary at the lower border of the sixth rib. The right border of the area of dullness extends to the sternal end of the fourth right rib and runs nearly in the median line between the right sternal and parasternal lines up to the right intercostal space, where transition to the lower boundary takes place. The greatest width of dullness amounts to 11.5 centimeters. From the twelfth year onward the absolute dullness varies very little from that in adults, and the conditions at the age of 14 are entirely analogous with those in the adult. Active and passive motility of the relative heart-dullness cannot be detected in early childhood."

Great care should also be exercised in percussing the child's heart. Hauser says: "The child's heart must be percussed very gently and carefully, for the reason that, owing to elasticity of the thorax, hard percussion is apt to cause co-vibration of the lungs in the vicinity of the heart; and, *vice versa*, owing to the thinness of the anterior borders of the lungs, which overlap the heart in various directions, hard percussion of the lungs may elicit percussion sounds of the heart as well. Furthermore, the determination of the size of the heart by percussion more frequently leads to error in young children than in adults, for the reason that during crying, straining, holding of the breath, and general bodily restlessness the heart is either less covered by the lungs or greatly changes its relation to the chest-wall, and is

also differently influenced in its normal relative position by the variability of the position of the diaphragm.

"The determination of the area of relative heart-dullness in young children is quite possible, but it always becomes more difficult with increase in years; so that it is by far better to be satisfied with percussion of the absolute dullness. Under certain circumstances even this meets with difficulties similar to those encountered in adults: *e.g.*, owing to emphysematous overlapping of the lungs, shrinking of neighboring portions of the lungs, interstitial pneumonia, retraction of pleuritic adhesions, etc." Erroneous impressions of diminution and enlargement of the heart are thus obtained, and actual changes in volume are often overlooked even on most careful examination. Hauser, for example, had an excellent opportunity to convince himself of such an error in a case in which he, together with two other very prominent diagnosticians, failed to recognize an enormous dilatation and hypertrophy of the heart, owing to the fact that during life an acute emphysema of the lungs which developed in the course of a severe attack of pertussis caused the area of absolute heart-dullness to appear within normal boundaries. At the present day such mistakes are generally obviated by a Röntgen-ray examination, and this method also proves most serviceable in the detection of apparent *idiopathic hypertrophy of the heart.* This apparent enlargement of the heart is not rare in older children, and is manifested by general debility, dyspnea, cardiac palpitation (especially on exertion), headache, dizziness, even fainting spells, and unpleasant sensations about the heart. The plausible assumption that these phenomena are due to anemia, rapid growth, puberty, etc., is contradicted by the usual finding of considerable enlargement of the area of heart-dullness. On x-ray examination, however, it is shown that the enlargement is only apparent, and that a high bilateral, also unilateral, position of the diaphragm is the cause of the heart being pushed upward, displaced transversely and pressed against the chest-wall over a wider area than normally. The abnormal position of the diaphragm is usually the result of dilatation of the stomach, distension of the bowels, etc.

The disturbances caused by prolonged displacement of the heart may persist for a long time and not be remedied until a

rational mode of life has been instituted. The latter consists of avoidance of articles of food and drink which cause flatulence, small and frequent meals, regular action of the bowels, and respiratory exercises.

Laryngoscopy is very difficult in older children and hardly possible in smaller ones. It is very much facilitated by means of a new instrument invented by Escat. With this apparatus laryngoscopy can usually be performed in one sitting even in small, stubborn children. On rapidly introducing the instrument over the back of the tongue two hooks attached to the distal forks enter the pyriform sinus on each side of the larynx. Powerful forward traction is now made by exerting downward pressure, and the mirror is then introduced. The lumen of the larynx remains free; the epiglottis clings snugly to the dorsum of the tongue and a clear view of the inner portion of the larynx is thus obtained. This is usually also the case with Kirstein's autoscope *(q.v.)*. The latter instrument is also convenient for operative work (removal of papillomata).

Autoscopy of the Larynx.—Kirstein's method of autoscopic examination of the larynx and trachea without the use of a mirror is very valuable in the treatment of children. It is performed by means of a special instrument,—the autoscope,—which, by pressing the dorsum of the tongue forward, stretches the curved tract leading to the affected organs and simultaneously lifts the epiglottis. Children whose larynx could never before be examined are now readily viewed (also under narcosis) and easily operated upon, *e.g.*, for removal of papilloma of the larynx and bronchi, etc., thus obviating more extensive surgical procedures.

Lumbar Puncture, if performed under aseptic precautions, is a harmless operative procedure. It was advocated by Quincke a few years ago, and consists of puncturing the dural sac and removing cerebro-spinal fluid. The patient is placed upon the side [or sitting near the edge of a table] with the vertebral column curved forward. The puncture is made slowly about 2 centimeters deep, between the third and fourth lumbar vertebræ [exactly on a line drawn between the superior crests of the ilia], in the middle line between the spinous process [a little to one side], by means of a thin, hollow exploratory needle.

Narcosis is usually superfluous. The escaping cerebro-spinal fluid possesses various qualities. In tubercular meningitis it is clear and colorless like water, and only rarely yellowish or greenish. At times it contains very fine coagula and flocculi, and is very rich in albumin [normally a mere trace], in contrast with that in tumors. The quantity of the fluid, which usually runs under high pressure, as a rule, amounts to from 20 to 30 cubic centimeters and sometimes even more. In epidemic cerebro-spinal meningitis a cloudy fluid containing numerous lymphocytes is obtained in fresh cases, and a clear fluid in later stages. The latter is always the case in serous meningitis, while in purulent meningitis it is always cloudy and purulent. These diagnostic points are certainly very valuable, and become much more so on microscopical examination of the cerebro-spinal fluid. In tuberculous meningitis the examination almost always reveals tubercle bacilli. Sometimes, however, tubercle bacilli are found only after repeated examination. Many doubtful cases may be cleared up in this manner. The equally clear fluid in serous meningitis is distinguished from the former by the absence of tubercle bacilli. In epidemic cerebro-spinal meningitis the meningococcus intracellularis (Weichselbaum, Jäger) is detected, and in purulent meningitis the streptococcus, staphylococcus, etc., are found.

Lumbar puncture is of less value from a therapeutic than from a diagnostic standpoint, but several remarkable results were obtained with it, and even recoveries from serous meningitis and chronic and acute hydrocephalus are on record. As a rule, however, the results here are only momentary, as is always the case in tumors, tuberculous meningitis, etc. Sometimes the benefit derived from it is more permanent, inasmuch as the severe symptoms are arrested for some time, the patient is considerably relieved, and the pressure symptoms, which threaten life, are at least temporarily abated. In view of the harmlessness of this procedure under proper aseptic precautions it should be tried as a therapeutic measure in the affections mentioned.

IV.

Diseases of the Newly Born.

Asphyxia Neonatorum. — 1. ASPHYXIA LIVIDA. — In this condition the face is somewhat bloated, slightly cyanotic, the tongue and lips are blue, and the eyes somewhat bulging and congested. The musculature of the body still retains some tonicity. The cutaneous sensibility is unaffected. The heart-beat and umbilical pulse are slowed. The navel vessels are congested. Apnea, and occasionally, especially after stimulation of the skin, gasping inspiratory efforts.

2. ASPHYXIA PALLIDA is characterized by deathlike pallor, loss of reaction in the skin, the mucous membranes, and the eyes. The limbs are limp, the heart-beat, though accelerated, is scarcely perceptible. The umbilical cord is collapsed and pulseless. Complete apnea.

The prognosis in asphyxia livida is favorable under proper treatment.

1. The TREATMENT consists in quickly clearing the mouth and pharynx of mucus with the finger, tying the cord (first allowing the escape of about one tablespoonful of blood), stimulation of breathing by slapping the buttocks, by sprinkling of cold water, or immersing the body in a warm bath alternated by cold showers. The child is kept for one minute in the bath, then friction is applied; then again a one-minute bath and again friction, etc. If this fails, *Schultze's method (q.v.)* should be employed.

The prognosis in asphyxia pallida is not as good as in asphyxia livida.

2. TREATMENT.—Clearing of the mouth, artificial respiration by Schultze's method or by mouth-to-mouth insufflation by means of a middle-sized catheter introduced into the trachea. (Caution: sometimes ruptures the lungs!) Also rhythmical traction [Laborde] of the tongue may be tried. Resuscitating

efforts should not be abandoned so long as the heart beats, be it ever so faintly. Relapses may occur, and careful observation of the patient for hours afterward is therefore necessary. [Suspend the baby by the feet, head down, and clear throat and mouth with the little finger. Dilate the sphincter ani. Immerse the patient in a basin of warm water and pour cold water upon epigastrium. Wrap the lower half of the child's body in warm blankets and perform Sylvester's method of artificial respiration, or place the child in a basin of warm water and raise the upper portion of the body above the (padded) brim of the basin in such a manner that the scapulæ hang outside of it. Secure the lower portion of the body to some fixed point and support the occipital portion of the head with the palm of the hand. With every inspiration allow the upper portion of the child's body to drop downward and backward, and with every expiration bring it forward in a semicircle. Repeat these movements at the rate of about fifteen times a minute. Hypodermic injection of strychnine, nitroglycerin, or whisky is useful.—SHEFFIELD.]

Schultze's Method of Artificial Respiration is probably the best means of resuscitation in asphyxia neonatorum *(q.v.)*. It has recently been recommended also in bronchitis and atelectasis of small children.

"The child is grasped by the shoulder in such a manner that the index fingers rest, from behind, in the axillæ, the thumbs upon the antero-lateral surface of the chest, the remaining fingers diagonally across the back and the child's extended head between the forearms of the operator. The suspended child is now swung slowly upward so that the lower part of the body sinks upon the thorax and produces powerful expiration, with synchronous expulsion of foreign contents from the air-passages. After a few seconds the swinging motion is reversed and a powerful inspiratory act follows. During these procedures care must be taken that the thumbs and posterior fingers do not exert any pressure upon the chest-wall; on the contrary, the child should hang by the axillæ on the index fingers; furthermore, the oral cavity should be free and the tongue pulled forward. The process is repeated from eight to ten times; the child should then be placed for a short time in

a warm bath, and the swinging movements renewed if voluntary respiration has not occurred" (Biedert). These directions must be carefully observed, as otherwise suggillations, internal hemorrhages, and fractures are apt to occur. If cautiously practiced fracture of the clavicle is no contra-indication to Schultze's method of artificial respiration. [Schultze's method of artificial respiration is contra-indicated in premature births. —SHEFFIELD.]

Atelectasis Pulmonum.—This condition is found in children born prematurely or in an asphyxiated condition, especially if the asphyxia *(q.v.)* was inadequately treated, so that respiration was not quite properly established, or foreign bodies (liquor amnii, meconium) entered the air-passages; furthermore, if the respiratory powers are too weak, portions of the lungs remain in a fetal condition, *i.e.*, collapsed.

SYMPTOMS.—Pallor, sometimes cyanosis or icterus, very superficial and rapid breathing, subnormal temperature (no fever!), weak and generally a slow pulse. The patients are unable to suckle properly or to cry aloud and long (feeble whine), and sleep most of the time. The percussion note over the lungs is not quite clear, and weak, vesicular breathing (never bronchial) or occasional crepitus is heard.

TREATMENT.—Stimulation to breathing by frequent handling (not be allowed to sleep long), frequent change of position, warm baths (two or three times daily) or alternating with cold douches, friction, and also Schultze's method of artificial breathing *(q.v.)* several times daily, for a short time. Electrical stimulation of the phrenic nerve. Artificial heat. Room temperature, 62° to 64° F.; good ventilation. Warm bottles or permanent warm bath. Incubator *(q.v.)*. Careful nursing every one and one-half hours, if possible, with mother's milk or feeding with a spoon. If these measures are carried out carefully the prognosis is not unfavorable, otherwise death, or permanent injury, such as defective closure of the foramen ovale and ductus arteriosus Botalli or debility throughout life will result.

Uric Acid Infarct. — Through sudden alteration in the blood-circulation of the newly born infant there is a very strong excretion of nitrogenous metabolic products in the kidneys; and, as the newly born consumes very little water during

the first few days of life, these products are not washed away, but settle in the straight urinary tubules of the kidneys. Post-mortem transverse section reveals here a yellowish-red streak. This uric acid infarct usually disappears after the child has consumed more fluid, and is entirely eliminated after from two to three weeks. At times, however, it is of longer duration; uric acid and ammonium urate crystals are retained in the lumen of the tubules at the papillæ and renal pelvis as small, reddish-yellow granules which, after having produced certain disturbances, become visible in cloudy urine. If the young nursling is restless while urinating, cries aloud, strains hard, and passes but little urine, uric acid infarct must always be thought of. The wet portions of the diapers are generally found to be darker in color than usual; it is sometimes observed that the margins of these spots have a reddish shade and are covered with reddish granules. Not until these are found is the diagnosis certain, as the other symptoms may be caused also by cystitis, for instance. Uric acid infarct may also give rise to redness of the prepuce or of the internal surface of the labia as a result of irritation. In older children these symptoms usually do not indicate the presence of a uric acid infarct, but of the existence of newly formed uric acid concretions, which are undoubtedly favored in their development by residues of the former. Uric acid infarcts also give rise to nephritis. It is therefore advisable to aid the elimination of persistent uric acid infarcts as soon as possible by means of large quantities of fluids.

Umbilical Hemorrhage may arise from defective closure of the blood-vessels as a result either of defective ligature or deficient development of pulmonary respiration. The latter greatly contributes to the closure of the blood-vessels by rapid lowering of the blood-pressure in the umbilical arteries. Putrefaction and insufficient desiccation of the umbilical stump, etc., are contributing causes. The prognosis is generally good. It is doubtful only in premature or asphyxiated children.

The hemorrhage is generally arrested by tampons, ligature, or suture.

The rather rare form of *idiopathic umbilical hemorrhage* resulting from congenital syphilis, sepsis, hemophilia, Buhl's

disease, etc., is more dangerous. Before or usually after separation of the umbilical cord an oozing of blood, as from a wet sponge, and which cannot be arrested, is noticeable. Death from bleeding sometimes takes place within from one to two days, but occasionally not until after three weeks or later.

TREATMENT is usually futile. The mortality is from 80 to 85 per cent. Styptic cotton (of iron chlorid), pressure bandage of adhesive plaster, filling of the navel with plaster of Paris, or ligating after the method of Dubois may be tried. The latter procedure consists of transfixing the navel base by two needles and surrounding it by threads in the form of figure of eight or by circular turns. Analeptics, good nourishment (woman's milk). [Suprarenal extract; hypodermic injection of warm, sterilized gelatin.—SHEFFIELD.]

Umbilical Inflammation (Omphalitis) is to be differentiated from simple "blennorrhea of the umbilicus." It develops as a result of carelessness in the treatment of the navel (see "Care of Umbilicus") and is manifested by slow closure of the wound after the distal portion of the umbilical cord has fallen off, wetness, suppuration, and the presence of crusts. The general health, however, remains undisturbed. There is no inflammatory reaction in the surrounding parts.

Healing generally takes place under suitable treatment: Sponging of the parts with a 4-per-cent. solution of boric acid; application of dusting powders of boric acid, salicylic acid, aa 1.0 gram [gr. xv], to starch, 10.0 grams [℥iiss]; or equal parts of dermatol or nosophen and starch; recently also xeroform and alumina [aristol and europhen] have been recommended.

As the open wound is readily accessible to infection by micro-organisms, true umbilical inflammation often develops which may become phlegmonous, erysipelatoid, diphtheritic, or gangrenous. In the *phlegmonous* variety the navel forms a conical projection which, with its surrounding tissue, presents a firm, glossy infiltration that is painful spontaneously and also to the touch. The children draw up their legs and present costal breathing. There are fever and other constitutional symptoms.

The PROGNOSIS is doubtful. Sometimes there is a gradual distribution of the inflammation, but often rapid extension over

the surface takes place (death from sepsis); or the process extends into the deeper structures and gives rise to peritonitis. It more frequently terminates in suppuration, under which circumstances the phlegmonous portion becomes red and fluctuating.

The TREATMENT of this variety consists of applications of aluminium acetico-tartrate (3 per cent.), salicylic acid (3 per cent.), boric acid (4 per cent.), or corrosive sublimate (1 to 5000). If an abscess forms: warm poultices with the solutions mentioned, and later incision. Careful nursing, attention to the bowels, and stimulation.

In ERYSIPELATOID OMPHALITIS the symptoms and treatment are the same as in erysipelas occurring in later years.

In DIPHTHERITIC (croupous) omphalitis there is a superficial fibrinous exudation or deep necrotic inflammation, with fever, restlessness, and constitutional symptoms. With limited extension, the *prognosis* is not necessarily bad. After the membranes are cast off (aided by poultices) a superficial or deep ulcer, with reddened, slightly thickened and painful edges, remains.

Treatment.—A dusting powder of salicylic acid, 5.0 grams [℥j], to starch, 45.0 grams [℥iss]; also dermatol, etc.; stimulants.

The most unfavorable prognosis is offered by *gangrenous omphalitis,* which begins with a small, discolored, ulcerated spot and soon develops into a large patch covered by a pasty, greenish deposit or black, fetid masses. It is associated with moderate fever, severe prostration, etc.; occasionally there is extension into deeper structures (peritonitis, urinary and fecal fistulæ) and profuse hemorrhage.

Sometimes it is possible to arrest the course by suitable treatment: hastening of the process by means of poultices with the previously mentioned solutions. After removal of the crust, iodoform; also salicylic acid, dermatol, etc.

The *prognosis* is usually grave. (See also "Arteritis.")

Arteritis and Phlebitis Umbilicalis.—A septic infection of the umbilical wound occurring through the air, or by contact with infected articles, followed by secondary infection of the whole body. It usually begins in the early days of life, but may

occur later, depending upon the time of the falling off and cicatrization of the navel. The child becomes restless, refuses to take the breast, collapses, and dies within a few days. The course may, however, be protracted. The patient wastes away under the baleful influence of fever and complications, such as pneumonia, pleurisy, peritonitis, icterus, phlegmons, and suppuration in the joints; becomes gradually somnolent, collapses, and dies. Sometimes the navel appears entirely normal, and at times ulcerated, diphtheritic, etc. (See "Omphalitis.")

The PROGNOSIS is fatal in premature infants, but in any case the mortality is high.

PROPHYLAXIS.—Strictest cleanliness in the treatment of the umbilical cord. Removal of puerperal causes. During the disease, careful nursing on woman's milk, if possible. Wine, cognac, analeptics, and baths. [Treatment of the individual symptoms and complications as they arise.—SHEFFIELD.]

Icterus Neonatorum is an almost physiological (in about 80 per cent. of all newly born) yellowish discoloration of the skin first affecting the face and breast, and, if persistent, also the abdomen and extremities and seldom the scleræ. It appears on the second or third day, and lasts for from four to eight days; in severer cases for from fourteen to twenty days. It usually runs an afebrile course, free from constitutional symptoms except arrest in gain of weight.

The PROGNOSIS is therefore quite favorable, except in children of premature birth, in whom the affection is very frequent and intense and is apt to retard development.

This form of icterus is to be differentiated from *symptomatic* icterus,—*e.g.*, Buhl's or Winckel's disease; syphilis of the liver; congenital obliteration of the bile-ducts, etc., in all of which there are severe general and other symptoms.

The ETIOLOGY of icterus neonatorum is as yet quite obscure. Some authorities attribute it to the fact that in the first few days of life there is a destruction of numerous red blood-cells and change of hemoglobin into a sort of biliary coloring matter *(hematogenic icterus)*. Others claim that it is due to sudden diminution of pressure in the hepatic vessels, resulting from cessation of the flow of blood from the umbilical vein. Others, again, attribute the obstruction to the escape of bile resulting

from edema of Glisson's capsule, produced by venous congestion *(hepatogenic icterus)*. According to Hoffmeier, icterus is neither hematogenic nor hepatogenic, but due to a polycholic activity of the liver and subsequent entrance of bile into the blood resulting from great destruction of red blood-corpuscles. Quincke, on the other hand, lays great stress upon the relatively prolonged patency of the ductus venosus Arantii, which carries a part of the bile of the meconium,[1] that is reabsorbed in the portal system, directly into the blood (vena cava) without passing through the liver. These reabsorbed biliary substances hasten the cholagogic destruction of the red blood-corpuscles. Recently Gessner attributed the condition to the rough hands of the midwives, who in cleaning the babies' skin postpartum produce multiple hemorrhages of the cutis and subcutis by harsh rubbing. Problematic as is the assumption that bilirubin is formed *in loco* from extravasated blood-corpuscles, Fuchs has recently proved experimentally that icterus frequently develops even without cleansing of the skin. Nothing more positive can be ascertained, and it is best to consider icterus neonatorum a physiological expression of the active changes to which all the organs are subjected in the first few days of life.

TREATMENT is unnecessary; at most, in order to do something, small doses of powdered magnesia with rhubarb [and intestinal irrigation].

Melena Neonatorum is quite rare. Its etiology is as yet very obscure, or at least not uniform. Ulcers, trauma, hemorrhagic diathesis, acute fatty degeneration, congenital syphilis, etc., may play a part.

SYMPTOMATOLOGY.—Frequent discharge of bloody, dark-colored masses from the mouth and rectum, usually beginning on the first to seventh day (rarely later) and ending either

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[1] **Meconium** is called the first fecal discharge of the newborn previous to taking food. It consists of dark-green to black, viscid, odorless masses which contain some constituents of swallowed liquor amnii and bile. It contains brown flakes (bile), fat, cholesterin, desquamated cells, especially of the epidermis, lanugo, etc. The first meconium evacuated during and immediately after birth is sterile, but a few hours later it is found to contain micro-organisms, which must have entered the intestinal tract either by the mouth or the rectum.

fatally after from twenty-four to forty-eight hours under rapidly increasing anemia and collapse or in gradual recovery. The mortality varies between 40 and 60 per cent. under suitable treatment.

TREATMENT.—Icebags to the abdomen while the extremities are wrapped in flannels; no baths, no enemas; administration of milk by the spoon; medicinally tinctura ferri chloridi *(q.v.)* or ergot *(q.v.)*.

This form of melena is not to be mistaken for *melena spuria*, which is caused by injuries of the lips, nosebleed, sucking sore nipples, etc., *i.e.*, by swallowing of blood.

Winckel's Disease (Epidemic Hemoglobinuria, with Icterus, in the Newborn) is a very dangerous (90-per-cent. mortality) and rare epidemic affection of obscure etiology. It was first observed by Winckel (1879) and since then by others. It is probably caused by an infection, sometimes wound infection. Several cases have been seen to follow circumcision. Winckel's disease sometimes affects apparently healthy children, usually on the third or fourth day of life. It begins with restlessness and refusal of food. The temperature is normal. The patients present a cyanotic and icteric hue and accelerated respiration. The urine is pale brown, contains hemoglobin (but no blood-corpuscles), epithelium, granular casts, and masses of *detritus*. Soon rapid collapse occurs, rarely preceded by vomiting and diarrhea, but never by hemorrhages. Somnolence and convulsions are followed by death in from twenty-four to forty-eight hours after the onset of the disease. The autopsy reveals fatty degeneration of various organs. The straight urinary tubules of the kidney appear as dark streaks over the pyramids and are filled with a granular content free from blood-corpuscles. The cortical layer is swollen, brownish, and covered by small hemorrhages.

TREATMENT.—At most, stimulants may be tried.

Erysipelas Neonatorum.—Portals of infection: umbilical wound, small fissures, and trauma, especially about the genitals and anus (circumcision, intertrigo). Sometimes conveyance by the physician, nurse, etc. Occasionally it is a symptom of general sepsis. The prognosis is quite serious.

Erysipelas neonatorum is usually manifested by high fever and consecutive rapid exhaustion. It generally extends rapidly over large areas and even over the whole body. Sometimes there is localized gangrene, and even after successful termination there may be abscess-formation and necrosis, especially of the scrotum. Rare complications are: copious diarrhea, pneumonia, and peritonitis. The latter disease is usually a result of internal invasion by way of the umbilicus. Even without such complications death usually occurs in a few days from collapse.

TREATMENT.—It is best to use nothing locally. Caution is especially commended in the use of carbolic acid! Internally: wine, camphor, etc.

PROPHYLAXIS.—It is of primary importance to avoid exposing the newly born infant to erysipelas.

Trismus (Tetanus) Neonatorum, like the corresponding disease in adults, is a result of wound infection. The seat of infection is generally the umbilical cord, but sometimes also other parts, *e.g.,* circumcision wound. As predisposing causes the following may be mentioned: too hot baths, too early exposure to outdoor cold air, and, perhaps, also concussion of the spinal cord. It usually begins in the second week, but also earlier and later, with restlessness, dropping of the nipple of the breast or bottle with a cry, and tension of the masseters. This is rapidly followed by fully developed trismus, viz.: the lower jaw is rigid; the mouth is proboscidiform; the forehead and cheeks are wrinkled; the masseters firmly contracted; and the eyelids half closed. These attacks at first occur only during the act of nursing, but very soon also at other times and gradually more frequently. It is generally accompanied by moderate fever (the temperature is sometimes high or normal), very frequent and small pulse, and a dark-red to dark-blue discoloration of the face. In a few hours or days the whole musculature is involved in the well-known manner. Generally there are also pharyngospasm and attacks of suffocation.

The PROGNOSIS is very bad, particularly if the temperature is high. Almost all patients die from exhaustion within from two to six days.

TREATMENT.—Careful protection against infection of the navel and other wounds. For the trismus itself: first of all,

treatment of the wound; then chloral hydrate, internally or *per clysma;* lukewarm baths; avoidance of irritants (light, etc.). Also potassium bromid (1 to 3 grams [gr. xv-xlv] daily); sulphonal, 0.1 gram [gr. iss] several times a day, by enema; and extract of physostigma *(q.v.)*. Tetanus antitoxin has recently often proved effective. Feeding with a tube, through the nose, or by nutrient enemas.

Buhl's Disease (Acute Fatty Degeneration of the Newborn) is a very rare malignant disease which appears in the first few days of life. The etiology is entirely obscure (infection?). Anatomically it is characterized by fatty degeneration of the internal organs, notably the liver, heart, and kidneys. The diagnosis may sometimes prove important from a forensic point of view, since the clinical course is suggestive of suffocation, or phosphorus or arsenical poisoning. These afebrile cyanotic (later more icteric) patients may suffer from hematemesis, bloody stools, hematuria, bleeding from navel, purpura, and at times edema. The prognosis is very grave. Rapid collapse and death within from one to two weeks.

Treatment.—At most, stimulation, suitable food, especially mother's milk, and artificial heat.

Sclerema Neonatorum is a condition characterized by hardening of the skin [and subcutaneous tissue], which usually appears in the first few days of life, and sometimes also later. It may be due to two different etiological factors, and is therefore distinguishable in two distinct varieties.

1. True Sclerema (Sclerema Adiposum) occurs only in children atrophic from birth or through diseases. It begins in the lower extremities, particularly the calves, where the skin becomes tense (cannot be folded), bluish in color, and marbleized. From here it rapidly spreads upward, usually over the whole body. The skin is very tense, hard, lusterless, and immovable over the underlying structures, and does not pit on pressure with the finger. From day to day the skin becomes more leathery and, consequently, the limbs more immovable. The patient is waxy pale, lies stretched, with rigid, masklike face, and firmly closed mouth. Sucking is very difficult. This form of sclerema is readily mistaken for trismus and tetanus. The feeble respiration shows that there is still some life in the

cadaverlike body. The body-temperature is very much reduced: often 86° F. or lower. This symptom is of importance in explaining the affection. The fat of the newly born infant contains more solid fatty acids and less oleic acid than that of the adult; its coagulability is therefore more pronounced, and, in consequence, it coagulates at that low temperature. Furthermore, there is gradual sinking of all vital functions. Thus, the heart-sounds become weak, the pulse slow and small, the respiration superficial and slow, and the voice feeble and whining. There are also present constipation, scanty micturition, gradual abolition of the cutaneous sensibility, rapid loss of weight, and exhaustion. Lobar pneumonia is a frequent complication. Death usually takes place in a few days, preceded by apathy and somnolence. Only a few patients, with partial sclerema, survive.

2. Edema (Scleredema) usually affects weak, premature children, and is caused by an edematous infiltration of the subcutaneous tissue resulting from cardiac debility, fetal myocarditis, pulmonary atelectasis, and nephritis. This variety of sclerema begins also in the lower extremities and rapidly progresses upward. The skin is at first more doughy, glossy, and pits on pressure, but when the edema increases it gradually resembles true sclerema, although the skin is never as rigid and hard. The other symptoms, such as lowering of the temperature and the vital functions, collapse, etc., are the same. The prognosis is also bad, but somewhat better in partial edema.

Treatment in Both Forms.—Improvement of the hygienic conditions, particularly of nutrition; wet-nurse, or her milk should be given with a spoon. Artificial heat, such as warm baths, warming bottles [especially incubator]. Stimulation by means of small doses of wine, cognac, ether, and musk. [In severe edema: active diuretics in conjunction with digitalis.—Sheffield.]

Ophthalmoblennorrhea Neonatorum is a gonorrheal conjunctivitis affecting the eyes of the newly born, usually within the first week of life. Infection of the eyes takes place either during the passage of the head through the parturient canal or, more rarely, by subsequent transmission of the disease with the fingers or articles in use which have been soiled with the lochiæ of the mother suffering from acute or chronic gonorrhea,

or with gonorrheal discharges from those in attendance. It usually begins on the second day of life with intense tumefaction of the lids (generally of both eyes), and redness, swelling, and thickening of the conjunctivæ. On separating the eyelids a thin, yellow secretion escapes, which within a few days becomes thicker and more purulent, while the swelling of the conjunctivæ becomes softer, more velvetlike, and papillary deposits or longitudinal folds appear upon the conjunctiva bulbi. If energetic treatment is now instituted the prognosis is good, provided the cornea is intact, and the symptoms gradually abate. Complete recovery, however, does not occur until a few weeks later. In premature, ill-fed, and otherwise sickly children the prognosis is always doubtful, and, if the child lives, suppuration of the cornea and blindness usually result. Indeed, with defective treatment there is always danger of opacity, maceration, and a tendency of the destructive process to extend. The earlier the involvement of the cornea, the more unfavorable the prognosis. Aside from this danger, gonorrheal ophthalmia may occasionally give rise to general gonorrheal infection, such as articular affections, etc.

TREATMENT.—Prophylaxis is extremely important. The eyes can be protected almost with certainty by Credé's method *(q.v.)*. Furthermore, in gonorrheal women the latter procedure should be combined with disinfection of the parturient canal and external genitalia before, during, and after delivery. For the ophthalmia itself the method of Eversbusch is to be recommended. So long as the cornea is intact, it is necessary only carefully to cleanse the eyes every one or two hours (while awake), and remove the pus by means of sterile cotton pledgets (to be later destroyed), and to wash the eyes with 3-per-cent. boric acid solution in addition to daily instillations of 1 drop of $^1/_4$-per-cent. solution of physostigmin. Ice compresses should be employed if swelling is very marked. Careful nursing, attention to diarrhea, etc., improvement of the general condition. If the cornea is involved, silver nitrate should be resorted to (only in the stage of suppuration), beginning with a 1-per-cent. solution and gradually increasing to $1\,^1/_2$, 2, or 3 per cent. The application should be made once a day after disappearance of the eschar from the preceding day, and be followed by cleansing

with salt water (1 teaspoonful of salt to a glass of water) and ice compresses for from two to three hours. In corneal ulcer instillations of physostigmin alternating with scopolamin two or three times daily, and immediately after application of silver nitrate.

℞ Physostigmin salicylate ..... 0.05 [gr. ¾].
Sol. corros. sublimate (1 to 5000) ..... 10.00 [3iiss].
Ad vitr. nigr. opt. claus.

℞ Scopolamin hydrobromate ..... 0.01 [gr. ⅙].
Sol. corros. sublimate (1 to 5000) ..... 10.00 [3iiss].
Ad vitr. nigr. opt. claus.

Furthermore, hourly instillation of chlorin-water (1 to 2 or 1 to 3 of distilled water) and compresses with diluted lime-water (at first lukewarm, and later, after abatement of the purulent secretion, warmer). Elze lauds the combination of silver nitrate and ichthyol in the treatment of gonorrheal ophthalmia. The eyes should be washed with corrosive sublimate, 1 to 4000, twice daily, followed by painting with from 1- to 2-per-cent. silver nitrate solution and an application of 5-per-cent. ichthyol ointment three times a day. Dusting powders also are highly recommended, *e.g.*, calomel, itrol (once daily, in conjunction with ice and laving with itrol solution, 1 to 2000). In extensive destructions [better not to wait so long] a specialist should be consulted. If only one eye is involved the other eye must carefully be protected by a cotton-collodion compress, which should be removed once or twice a day as a measure of control, or by an application of boric acid ointment over the bridge of the nose, or by daily instillation of 1 drop of 2-per-cent. silver nitrate solution (Credé). Silver nitrate has recently been superseded by protargol (from 5- to 10-per-cent. solution). Cleansing the eyes with formalin (1 drop to 100 cubic centimeters of water) and the application of xeroform ointment are recommended as adjuvants in the treatment of this condition.

[E. S. Peck says: "If one eye only be affected the fellow-eye should be covered securely in every part, save at the lower outer region, over the temporo-malar portion of the orbit. This little opening is left for ventilation. The least harsh covering

for a newly born infant's eye is lintine. This is cut round, slightly larger than the orbit; it is covered with a soft fluff of sterilized cotton, and this latter with gauze. Collodion is smeared around the whole edge of the pad save at the point already noted. This protected eye may be inspected every second day. The affected eye must be handled by the nurse, from behind the patient's head. The nurse should never carry the infant in her arms. Small, round layers of lintine are transferred from a large square of ice, every minute or two, to the affected eye—and these minute changes are made for one hour without intermission, when an interval of one hour, or two or three, is given, according to the character of the affection. The rule is, however, to begin with continued applications of ice-cold pledgets by day and night, the patient being under the care of two nurses. No interval of application should be ordered until there is positive evidence of abatement of secretion. This may not occur under two or three weeks, and it may result in a few days. The eyeball, lid, interspaces, and conjunctival sacs should at first be thoroughly irrigated with warm saturated solution of boric acid, the saturation point of boric acid being about 4 per cent. As the secretion diminishes and grows shreddy, the nurse should wipe out the discharge with cotton dipped in the same boric acid solution. Every effort should be made to keep the eyes free from secretion. A protargol solution, at first from 5 to 10 per cent. in strength, should be carried rather forcibly over the eyeball and into the folds of the conjunctival sacs by means of a large pipette. It should at first be used from four to six times a day. As soon as the secretion lessens in amount, or becomes shreddy, while its fluid part becomes thinner, the protargol solution may be brought down to 2 per cent. and used less frequently. A successful result of such treatment would be a limitation of the disease to three, possibly two weeks.

"Examinations for gonococci should be made every second day. An eye should not be regarded as safe until a full week has elapsed, during which time absolutely no gonococci should be found under the microscope. It must not be forgotten that, even with an apparently uninflamed eye, the sclera being white, the cornea glistening, and the lids scarcely swollen, gonococci

may be present. The physicians should not be too conservative as to the length of quarantine in a convalescing ophthalmia."—SHEFFIELD.]

Erythema Neonatorum is a harmless affection which usually occurs two to three days postpartum. It appears as a diffuse and rapidly spreading redness over the whole integument of the body, which is sometimes also tense. There is usually no, or very slight, rise of temperature. Restlessness and anorexia are sometimes present. The erythema usually disappears in a few days, at times with some desquamation.

TREATMENT.—Liberal application of zinc oxid.

Dermatitis occurs in children in the same manner as in adults, and is caused by pressure, friction, local application of medicines, etc. There is, however, one other form of dermatitis which is specific of childhood and known as *dermatitis exfoliativa.* This is an acute noncontagious inflammation of the whole cutaneous surface, which usually affects the newly born in the second, rarely after the fifth week of life. It is often mistaken for syphilis, but has nothing in common with it.

The etiology (hot baths, sepsis?) is as yet obscure. The atrophic condition of the epidermis—the patients are usually, but not always, delicate and ill fed—plays an important rôle in the affection. Exfoliative dermatitis is classed by some observers among pemphigus foliaceus. It usually begins upon the face and at the angles of the mouth with diffuse redness of the skin, and spreads rapidly over the whole body. The mucous membrane of the mouth and lips usually, though not always, appears covered by red, desquamated epithelium; rhagades, and at the same time Bednar's aphthæ *(q.v.),* are not infrequently seen upon the palate. The second stage, which quickly follows the former, manifests itself by desquamation of the skin in large lamellæ. At times there is slight desquamation even in the first stage. It is sometimes preceded by detachment of the skin and bursting of vesicles filled with a light fluid. Denuded, moist spots, covered by thin scabs resembling burns, which gradually become covered with skin under proper treatment, are visible everywhere.

The TREATMENT consists of applications of fats, such as codliver-oil, 1 per cent. salicylic acid oil, also salicylic acid paste,

or powders of dermatol, etc., in strong children in conjunction with baths of decoctions of oak-bark. The disease usually lasts a few weeks. In delicate children it may be followed by furunculosis or even gangrene. In some cases even very careful and strengthening treatment is often powerless to prevent a fatal issue.

Pemphigus Neonatorum is usually infectious and contagious and not infrequently communicated by the wet-nurse. According to Staub, it often occurs also with simultaneous appearance of puerperal maternal septicemia, occasionally also complicated by pemphigus. Different cocci—*e.g.*, streptococcus pyogenes aureus and staphylococcus pyogenes albus—have been found in the contents of the bladder, in the blood of the child, and in the milk of the mother. Pemphigus is probably produced by pathogenic micro-organisms which circulate in the blood and reach the skin through metastases. Sometimes, especially in symmetrical pemphigus, the effect of cold seems to play an important etiological rôle *(trophoneurosis)*. Pemphigus usually occurs on the fifth to the twentieth day of life, but also earlier. It is rarely congenital. It consists of numerous tense blebs from a lentil to a quarter of a dollar in size situated upon a reddened base filled with serous fluid. The blebs occur also in crops. Forensically it may be mistaken for scalding—*e.g.*, on the part of the wet-nurse—and require consideration. The blebs burst rapidly and leave behind moist, red spots, which very soon become covered by skin. Localization: chiefly upon the abdomen, in inguinal region, and other parts. It is very rarely found upon the palms of the hands and soles of the feet. In these locations Henoch saw large blisters. The buccal mucous membrane is sometimes involved. The prognosis is favorable except in cachectic children. The disease usually runs an afebrile course, without impairment of the general health, except itching and restlessness. It is sometimes accompanied by high fever, 104° F. Recovery usually takes place after from ten to fourteen days and is sometimes followed by persistent moisture and ulceration of the skin.

Treatment.—Application of boric acid ointment (1 to 10). If large surfaces are involved, baths at 90° F. two or three times a day, with the addition of oak-bark (500 grams [1 pound]

of quercus corticis to 4 liters of water, to be boiled one-half hour); also bran or clay baths should be given, followed, without drying, by powdering with zinc, salicylic acid, or dermatol and enveloping in cotton. In ulcerations: compresses of salicylic or boric acid solution.

Pemphigus neonatorum is to be differentiated from *pemphigus syphiliticus*, which is usually congenital or develops soon after birth. It is manifested by a small number of small, flabby vesicles, usually not larger than a pea, upon a livid base, filled with bloody-purulent contents. Points of predilection: soles of the feet and palms of the hands; also the neck, axillary, and lumbar regions. It usually runs a slow course, and is often associated with other symptoms of syphilis (coryza).

Umbilical Excrescence (Umbilical Fungus, Sarcomphalos, Granuloma) is a pale- to dark- red, granular, strawberrylike tumor pea to cherry in size or larger. It is attached to a broad base or by a pedicle, is sometimes covered by thin pus, bleeds easily to the touch, and projects from the umbilical ring. It is occasionally so small as to require separation of the umbilical folds in order to be seen. It is caused by an excess of granulation in the umbilicus, which failed to cicatrize after separation of the distal end of the cord. It is therefore frequently associated with umbilical blennorrhea. As cicatrization is otherwise impossible, removal of the tumor is the only remedy. It is accomplished by the caustic stick in umbilical fungus with a broad base and by ligation in umbilical fungus with a pedicle. Excision must never be resorted to, as severe bleeding is apt to follow. The tumor is not always a granuloma, but sometimes a sarcoma, teratoma, or an intestinal diverticulum which became constricted during fetal life. In such cases removal of the tumor is followed by umbilical fistula.

Mammary Glands. — The mammary glands of the newly born are usually somewhat swollen and discharge a milklike secretion ("witch's milk"). This condition may sometimes be pathological in nature (see "Mastitis"). At puberty male individuals also may at times show a congested condition of the breasts, with sensitiveness to pressure.

Mastitis Neonatorum is physiological in the newly born of both sexes from the third to the ninth day after birth and

sometimes much later. It consists of a slight swelling of the breasts, which on pressure secrete a milklike fluid. This condition may terminate in inflammation as a result of slight traumatism, either intrapartum or as a result of expressing the so-called "witch's milk." In the event of inflammation the breasts are red, swollen, and sensitive, and there is also fever. If the organs are not subjected to further meddlesome interference and wrapped in oiled cloths or absorbent cotton, or, according to Coesfeld, covered with emplastrum belladonnæ smeared upon soft, thin leather [or painted with tincture of iodine], there is usually improvement within a few days and gradual *restitutio ad integrum*. In some cases, however, the inflammatory process goes on to suppuration at one or more points, requiring, if not relieved by spontaneous evacuation of the pus, a radiate incision and an antiseptic dressing. The operation should be done soon after the appearance of fluctuation, perhaps, preceded by warm bran or boric acid application or Priessnitz's compresses to promote suppuration. With the escape of pus uninterrupted recovery is the rule. The suppurative process more rarely—especially in atrophic children—extends and produces phlegmonous inflammation and gangrene, often with fatal termination as a result of exhaustion or sepsis. Sometimes there is shrinking of the breast and more or less complete loss of function, which is quite serious in girls. To remove remaining induration Jacobi recommends a 10-per-cent. iodoform ointment or 5- to 10-per-cent. iodoform collodion.

V.

Congenital Malformations.

Microcephalus is a congenital smallness of the brain, at present generally accepted to be an arrest of development due to premature synostosis of the bone-sutures or to premature encephalitic processes. In microcephalic children the skull is large in comparison with the face. The top of the skull is low, the forehead flat, and the head pointed. At times the intellect is little affected; in the majority of cases, however, it is considerably impaired up to total idiocy.

Caput Succedaneum (Simple Contusion of the Head) is an edema produced during labor. It is a diffuse, doughy swelling of the scalp, which pits on pressure with the finger, and is evenly distributed over the sutures and fontanelles. It is often limited to the os occiput. The integument is usually bruised. The swelling, which usually disappears within three or four days, is often mistaken for cephalhematoma *(q.v.)*, but can easily be differentiated from it.

Cranial Injuries are frequently observed in children, and present symptoms, sequelæ, etc., identical with those observed in adults. Cranial injuries in the newly born are usually referable to difficult labor or anomalies in the maternal pelvis. If the children survive the injuries (crushing, hemorrhages, or inflammations), fissures are found which may give rise to meningocele and encephalocele, inasmuch as the fissure (corresponding with the growth of the skull) has a tendency to expand. The fissures are to be differentiated from nontraumatic congenital clefts, which are sometimes observed in the skull of the newly born. Cranial injuries may be manifested also by simple indentations, which, if extensive and deep, may cause convulsions, paralyses, etc.

They often adjust themselves in the first few weeks or months of life; sometimes, however, they persist and produce

epilepsy, psychoses, etc. In such cases operative interference is to be recommended. Elevation of such depressions by means of an air-pump (funnel in connection with a Potain pot) has also been successfully attempted.

Pressure Marks, in the form of hyperemias, suggillations, or necroses, sometimes occur on the skull of the newly born infant, usually when the narrow pelvis of the mother (especially at the promontory, less so at the horizontal ramus of the os pubis or the projecting symphyseal cartilage) has for some time exerted abnormal pressure. It is aggravated by early escape of the liquor amnii, tonic contractions of the uterus, and a pendulous abdomen. It is important from a legal point of view that similar marks may occur also on other parts of the body even with normal pelvis of the mother. This is proved by the two cases, in only one of which there was narrowness of the pelvis, reported by Nordman in 1897. In one case a black, dry leathery spot, an eschar, which became circumscribed and ulcerated, was found over one trochanter major and in the other over one heel, somewhat above the edge of the sole corresponding with the tuber calcanei. In both cases the injuries were in places where the skin comes in contact with the bone, and it must be assumed that these poorly padded portions had undergone a sort of gangrenous decubitus as a result of excessive and persistent pressure. Certain congenital skin defects resulting from tearing of amniotic cords (Ahlfeld), which at first are often also covered with scabs that do not fall off until later, may have to be differentiated from pressure marks. The differentiation in such cases is difficult, the localization of the marks being the only reliable guide.

Cephalhematoma is not a very rare affection in the newly born infant. It develops during birth, especially in difficult and artificially completed deliveries, but also otherwise from pressure during passage of the head through the pelvic outlet and in breech presentation. The pressure exerted by the uterus produces passive congestion in and rupture of the subperiosteal blood-vessels, and extravasation of blood between the pericranium and a cranial bone. The right parietal bone is usually affected, more rarely the left or both, and still more rarely the occipital or frontal bone. The extravasated blood gradually

elevates the pericranium, so that on the second or third day there at first appears over the bone, especially over the right parietal, a small, flat (later gradually larger and more prominent, up to the size of an apple), circumscribed, elastic, distinctly fluctuating, painless tumor which is covered with normal or at most somewhat bluish-colored skin. It never extends beyond the sutures or over the fontanelle. The tumor remains stationary for a few days, and it begins to diminish as a result of absorption of the blood. All around the tumor a hard, bony undulation is soon detected, which, with diminution of the size of the tumor, becomes gradually narrower, but may be felt as long as the tumor lasts—often twelve to fifteen weeks, sometimes longer. [On palpation the prominent ridge, with the depressed center, gives a sensation somewhat like that of a depressed fracture.—SHEFFIELD.] The bony ridge is formed by the process of ossification, which occurs upon the inner surface of the periosteum, and which at first is strongest at the edge, but soon becomes manifest also in the center. There is here a scaffold of bone-lamellæ, which crack like parchment on palpation of the tumor.

The general health is not disturbed by the cephalhematoma. Complications, such as convulsions, paralyses, contractures, vomiting, etc., occur only with simultaneous hemorrhage between the dura and the bone or the brain, as sometimes occurs from very powerful pressure *(cephalhematoma internum)*. Absorption of the cephalhematoma generally takes place spontaneously and usually begins in the early part of the second week, provided the tumor is not injured by external trauma. If the tumor is injured, suppuration readily occurs and requires incision. Under these circumstances there is danger of sepsis, meningitis, etc.

Cephalhematoma is to be differentiated from caput succedaneum, which develops immediately postpartum and disappears after twenty-four hours; from subaponeurotic or subcutaneous hemorrhages, which occur sometimes also from intrapartum pressure, but extend beyond the sutures; from congenital encephalocele, which lies between, but not over, the bones, pulsates, enlarges on crying or coughing, and can be partially reduced; and from vascular tumors, which are compressible and free from a bony wall.

The TREATMENT is purely expectant. Protection against trauma (wadding and bandage).

Meningocele.—Congenital meningocele will be spoken of under "Cephalocele" *(q.v.)*. This space will be reserved for the discussion of *pseudomeningocele and meningocele spuria s. traumatica.* These penetrating clefts of the cranial bones occur during or after birth, particularly as a result of fractures of the skull. Occasionally they also result from carious processes; for example, syphilis. The fissures grow gradually larger, owing either to the development of the brain or to the rubbing of the edges of the cranial bones against each other, and permit the escape of cerebro-spinal fluid or also portions of the brain, which protrude in the form of hernias. The tumor, which resembles a cephalocele, is usually situated on the parietal bone, and gives rise to nervous manifestations, such as hemiplegia, epilepsy, and disturbances of intellect; so that its removal is indicated and accomplished, as in cephalocele, by extirpation with the knife, possibly followed by a plastic operation (see "Cephalocele").

Cephalocele is a congenital protrusion of the brain, a hernia of the brain, through an opening in the skull. It contains in its hernial sac, which is made up of the meninges, either a compact mass of brain substance *(encephalocele)* or cerebral fluid *(meningocele)*, but usually both brain substance and more or less fluid *(hydrocephalocele)*. The presenting tumor varies in size from a small nut to a child's head. It may be either sacciform with a broad base or pedunculated. It has the color of normal skin,—at most, reddish or livid,—or is covered either partially or completely by minute blood-vessels. It is elastic, sometimes translucent and pulsating, and enlarges during crying. It may be reduced either entirely or at least partially by compression—a procedure which is quite painful and at times the cause of meningeal disturbances, such as convulsions, opisthotonos, coma, etc. The most frequent site of cephalocele is the occiput; it may also occur at the naso-frontal region, at one of the angles of the orbit, and rarely in other regions. The sharp edges of the opening in the bone can often, though not always, be distinctly felt. The diagnosis is usually not very difficult, and there is but slight liability of mistaking it, *e.g.*,

for extracranial cysts, abscesses, etc. Cephalocele differs from cephalhematoma, which it more closely resembles, chiefly by its localization, pulsation, and transparency, and the palpability of the bony edges. Cephalocele may remain small and give rise to so little disturbance, particularly if situated anteriorly, as to require no surgical interference, but merely protection against external injuries by wearing suitable caps, apparatus, etc. As a rule, cephalocele grows rapidly if let alone, and produces meningeal symptoms, paralysis, contractures, more or less pronounced backwardness in physical and mental development up to complete idiocy; indeed, most of the patients succumb within a few years.

There is nowadays, owing to the success obtained on several occasions, sufficient justification to attempt the removal of the cephalocele with the knife. Moreover tapping is of little, or at best of only temporary, benefit. Skin flaps are made, the sac is incised, the brain portions are either replaced, if possible, or removed entirely after ligating, often without leaving behind any functional disturbances. The stump of the sac and the wound in the integument are sutured, and later on, if the defect in the skull does not diminish spontaneously (which occurs occasionally), it is closed by a second osteoplastic operation. Although the loss of blood is not immaterial to such children—Trechsel lost a child from hemorrhage—and great care in antisepsis is imperative, the operation usually turns out well. Even children a few days old were successfully operated upon! The final result is sometimes also satisfactory, inasmuch as further growth of the cephalocele is prevented and the physical and mental development progresses. Of course, this is not always the case, particularly where the removal of portions of brain becomes necessary. Even those children who have passed through operations often become idiotic or blind, etc. However, as the patients affected with large and growing cephaloceles die if let alone, surgical interference is indicated. On the other hand, inoperable are the cases complicated by pronounced flattening or diminution in size of the skull, as well as hydrocephalus or other malformations, or where the opening of the hernial aperture reaches down to the foramen magnum. Cephalocele is not always congenital; it is sometimes traumatic in nature (see "Meningocele").

Spina Bifida (Hydrorrhachis).—Under this condition are classed all malformations of the spine (particularly of the lumbar and sacral regions, more rarely the dorsal, and still more so of the cervical regions) which are associated with a defect in the vertebral canal. It is a true arrest of development. Thus, in the early fetal period the usual separation of the two layers of the ectoderm—one forming the spinal cord and meninges, the other the epidermis—failed to occur; so that the external skin, the spinal cord, and membranes are united in one cavity. From the latter there may arch forward a saccular hernia, which either protrudes in the form of a tumor or remains at the opening without a tumor. Biedert says: According to von Recklinghausen, there develops, as a result of defective closure of the medullary canal, either simple rhachischisis, a cleft in the whole, or in some parts of the vertebral column, without protrusion, so that the lower (ventral) layer of the pia mater, with a thin trace of the spinal cord, lies in the cleft. If only one (sometimes a very small) portion of one arch or of several vertebral arches is involved and the pia mater, with the trace of the spinal cord bulges forward, cystlike, through the gap, a form of spina bifida develops which is designated as *meningomyelocele.* In this form of spina befida fibers of the spinal cord spread out over the cyst and re-enter the canal; the fundus of the cyst is formed by the central dura.

Meningocele spinalis is a protrusion of the pia mater,—without participation of the spinal cord,—usually into the posterior, but also lateral and anterior, parts of the pelvis. It is filled with cerebro-spinal fluid, which escapes through a fissure in the vertebral canal, between two neighboring vertebral arches, or through an intervertebral notch. The meningocele occasionally has a very thin pedicle, sometimes so small that it is hidden under masses of fat, and can barely, or not at all, be demonstrated by palpation. It is then designated as *spina bifida occulta.* To this form Virchow has added a characteristic variety: *hypertrichosis sacro-lumbalis.* It consists of a hairy portion of skin with a central cicatrical contraction which communicates with the medullary canal by means of a fibrous cord running through a cushion of fat. Finally, a third circumscribed form of spina bifida, *myelocystocele,* is met with which has its seat in

the central canal of the spinal cord. It is distended with fluid and forms a hernial protrusion through the cleft of the vertebral column.

What is generally understood by spina bifida is a cleft with a hernial tumor. *Myelomeningocele sacro-lumbalis* is its most frequent variety, and consists of a pear-shaped or spherical, fluctuating, tense, broad or pedunculated tumor the size of a nut, a hen's egg, or a child's head, with a bluish, very thin covering of skin. At the edge of this tumor the cleft of the vertebral column and to some extent the hernial orifice can usually be distinctly palpated. The cystic tumor diminishes in size on pressure with the finger (this action is often followed by twitching and tetanic conditions), and is best differentiated from other tumors (see "Sacral Tumors") by detection of the edges of the cleft in the bones.

Most children with spina bifida die when very young, often during birth, owing to rupture of the tumor and shock following rapid evacuation of the cerebro-spinal fluid. Often they die later from rupture of the sac and subsequent purulent spinal meningitis, from gangrene and ulceration with similar consequence, or from intercurrent disease. Of course, some live for months and years, occasionally to twenty or twenty-five years, but they are usually afflicted by paralysis of the bladder and lower extremities and die a slow death.

Attempts to cure spina bifida by operation have frequently been successful; often, however, they have merely hastened a fatal issue. Some aspirate and obtain at least temporary success in relieving the symptoms of compression; some physicians combine aspiration with injection of iodin; others, again, extirpate the tumor. All these methods have proved successful in some cases and fatal in others. The chief danger after an operation lies in the appearance of hydrocephalus. A clear understanding of the kind of spina bifida to be dealt with is therefore imperative. Osteopathic closure has been tried in a number of cases; a few times after the method of Dollinger, whereby the arches of the sacrum have been chiseled through and *in toto* pushed toward the center and united there; a few times Bobrove's operation was resorted to, in which is employed as a cover a flap of periosteum of the outer surface of the

ilium, together with the gluteus muscle. These operations are, however, very extensive. Halban has recently succeeded in making a much simpler closure in a case of meningomyelocele affecting a child 5 months old.

Cerebral Paralysis (see page 335).

Microphthalmos causes more or less severe disturbances of vision, depending upon the degree of the defect. It sometimes occurs in several members of the same family.

Ankyloblepharon, or adhesion of the edges of the eyelids *(cryptophthalmos)*, is congenital. It occurs either as a continuation of a fetal condition or as a product of a fetal ophthalmia. It is frequently complicated by abnormalities of the bulb *(anophthalmos, microphthalmos)*.

Atresia Pupillæ Congenita is a very rare abnormal persistence of the pupillary membrane after birth in the form of a fine, gray skin, situated in the niveau of the pupil, giving rise to defective vision. The membrane is either already perforated or made up of small pieces of skin attached to the margin of the pupil.

The prognosis is favorable. Spontaneous improvement usually occurs by gradual separation of the membrane through traction on part of the iris muscles and absorption. This malformation is not to be mistaken for an exudation or capsular cataract.

Cataracta Congenita is often hereditary. Partial and rarely diffuse opacification *(lamellar or anterior central cataract)* are the forms usually met with. In the partial form vision is still fairly good or can be remedied by iridectomy. If vision is very defective, which is soon apparent from the behavior of the children, discission or linear extraction is indicated.

Coloboma Iridis (Iridoschisma) is a congenital, usually bilateral fissure of the iris which extends downward. It is frequently hereditary. Vision is slightly disturbed. It is sometimes complicated by coloboma choroidea (when vision is more interfered with), coloboma of the upper eyelids (fissure in the palpebral cartilage sometimes without involvement of the skin), microphthalmos, and cataract.

Epicanthus.—By epicanthus is understood an abnormal infiltration of the skin at the root of the nose toward the angles

of the eyes, whereby a crescent-shaped fold develops bilaterally which incloses the inner canthi in a sort of a pouch. These pockets may reach the inner margin of the cornea. Epicanthus is always congenital and bilateral. When the defect does not disappear spontaneously at an early age, it can usually be remedied by removing a longitudinal fold from the root of the nose and bringing the margins of the wound together with fine sutures.

Irideremia is a congenital, complete or partial (only a narrow strip present), usually bilateral defect in the iris. The pupil is not clear black, but iridescent, like a cat's eye. The cornea also is usually abnormal—either oblong or cloudy (like the lens). The affected children always suffer from poor vision and the eyelids convulsively open and close, owing to too strong perception of light (see "Albinos").

Albinos are children with a congenital deficiency of pigment in the iris and choroid, a condition similar in results to irideremia *(q.v.)*. It is also associated with nystagmus, owing to defective vision. Albinos, also called "Kakerlaken," usually have a blue iris, very white skin, and very light hair.

TREATMENT.—Exclusion of superfluous light by means of blue glasses or an artificial diaphragm.

Auricular Appendages indicate an abnormal developmental process of the ear, consisting of scattered pieces of cartilage in the form of round or oblong, smooth, warty prominences the size of a lentil or pear. They are usually situated in front of the ear (often several together, bilaterally). Sometimes they are attached by a pedicle and sometimes they appear as mere duplications of the skin.

The TREATMENT consists in ablation.

Ear Prominence is an anomaly which can often be remedied in the suckling by bandaging (adhesive plaster), which should be continued for weeks. If the disfigurement is very pronounced, the child may be freed from it by a small operation.

Cysts of the Neck are of frequent occurrence in newly born infants. Aside from cystic hygroma *(q.v.)*, unilocular serous and dermoid cysts, remains of the brachial ducts, are observed at the lower angle of the jaw or in the supraclavicular fossa, usually under the sterno-cleido-mastoid muscle. All these cysts

are sometimes so tense as to be mistaken for solid, glandular tumors, and are not recognized until too late, *i.e.*, until operated upon. Blood-cysts are sometimes met in the localities mentioned and also in other situations. They are due to a protrusion of veins or rudimentary forms of the same, or to a communication of other cysts of the neck with a vein. In these cases extirpation is more difficult than in ordinary cyst of the neck, but is usually accomplished. Single unilocular hygromas of the neck, which are of occasional occurrence, are usually associated with other malformations.

Hygroma Cysticum Colli Congenitum (Lymphangioma Cysticum) is a cystic tumor consisting of several large or small, usually noncommunicating partitions. The single cysts are sometimes recognized from the outside as separate fluctuating and bulging chambers which, with thinned skin, appear transparent. Hygromas are variable in size from a small elevation under the lower jaw or over the clavicle to an enormous tumor embracing the whole neck and reaching downward to the chest and upward to the face, protruding through the oral cavity as a ranula, and finally spreading into the deep structures of the throat. The tumor usually arises from the submaxillary region, and by spreading with enormous rapidity may cause very severe disturbances. It is a condition of lymphectasia the sections of which are filled with a clear, bright, serous, or more bloody, chocolate-colored contents. A small hygroma can easily be removed by extirpation, or incision followed by iodoform packing. Large ones, however, often present great difficulties, and may prove inoperable owing to the deep extension of the tumors, which are detected during the operation and which may reach even to the base of the cranium.

Cervical Ribs are rare malformations of no practical importance. They are, nevertheless, worthy of note in order to avoid errors in diagnosis. A hard, bonelike clasp, a continuation of the transverse process of a cervical vertebra, is felt, which either ends here or continues upward and unites with the first rib.

Hematoma Sterno-cleido-mastoidei usually appears from three to five weeks after birth, but also somewhat earlier or later. It is a painful, nodular, spindle-shaped or roundish thick-

ening in the muscle in its central or sternal end. It is usually situated on the right side, but also on the left and very rarely on both sides.

Etiology.—Tension upon the muscles of the neck intrapartum,—usually in breech presentation, artificial delivery, also in spontaneous delivery,—with consequent tearing of the muscle fibers, hemorrhagic exudation, and consecutive myositis. The head is usually held in an oblique position. The pain subsides after some time and the swelling is gradually absorbed, with scar formation and induration. The wryneck also usually, but not always, disappears.

Treatment is expectant—mainly, rest to the head. The child is carried about on a large hair pillow upon which the whole body rests. For the pain, cold compresses and later light massage with potassium iodid [and ichthyol] ointment.

Congenital Prominence of Scapula.—This anomalous position of the scapula is known also as *"Sprengel's deformity,"* because Sprengel published (1891) the first four cases. Since then about sixteen cases [quite a number of them have been published; recently one case of bilateral prominence by Hirsh, of Berlin—Sheffield]. The scapula is normal in size and shape and, as a rule, simply pushed upward, occasionally obliquely. In this anomaly the scapula, usually the left [also bilateral], stands higher than the other, the difference in height varying from 1 to 6 centimeters, but also as much as from 10 to 12 centimeters. The distance from the spinal column may also vary. A few times a mild degree of scoliosis was associated with it, so that the upper dorsal column was curved convexly, partly to the deformed and partly to the normal size. There is usually no alteration in the motility of the upper extremity, except slight interference with raising of the arm horizontally. The muscles are apparently normal. The abnormality was often discovered quite late, but in several cases it was observed in the newly born infant. Sprengel having observed several times that the left arm of the child was held fixed on the back at birth, he advanced the theory that, owing to lack of liquor amnii, the uterus is unable to influence this pathological change in position through corrective contractions; so that the position remains permanent, and congenital prominence of the scapula is pro-

duced secondarily. This etiology seems to be correct, but it is equally true that corrective contraction is also interfered with by an excess of liquor amnii, changes in the uterine musculature, diminution of space (uterus unicornis and bicornis, tumors of the uterus and adnexa), and also by the child. That the anomaly is usually left sided is explained by the frequency of left vertex presentation, the left shoulder being directed backward. Congenital prominence of the scapula must not be confounded with the deformity which is secondary to scoliosis. The scoliosis is more pronounced and the higher scapula is always situated on the convex side. Furthermore, it should be remembered that there is also an acquired sinking of one scapula (follows empyema); also an acquired prominence, which is, as a rule, rachitic in nature. In this condition the surface of the scapula is more or less strongly convexly bent backward, the lateral portion of the spinous process turned downward, and the coracoid process elongated. Finally, there is a deformity of the scapula due to trauma, such as contusion or retraction of the levator scapulæ and of the upper part of cucullaris muscle. [Congenital as well as acquired prominence of the scapula is probably due to paralysis of the scapular muscles as a result of trauma or otherwise. A so-called "angel wing" deformity is sometimes met in anterior poliomyelitis with involvement of the serratus magnus.—SHEFFIELD.]

Atresia Oris (Microstoma) is a very rare malformation. When congenital the lips are either grown together entirely or separated by a small opening (in the former case an immediate operation is inevitable). It is more frequently due to syphilis (cicatricial contraction from *plaques* or ulcers), noma, gangrene, diphtheria, etc.

TREATMENT.—Cheiloplastic operation of Dieffenbach.

Clefts of the Face [Schistoprosopia] are congenital malformations caused by partial defective union of those portions of the fetus which, under normal conditions, unite to form parts of the face. The genuine facial clefts appear in two forms: The *oblique* (cleft of lip and cheek—*meloschisis*), in which the cleft begins at the upper lip, runs laterally along the nose through the cheek and reaches the lower lip; and the *transverse (macrostoma)*, which is more frequent and consists of an elonga-

tion of the oral orifice toward one side as a result of a cleft in the cheek. Occasionally clefts are observed also in the alæ nasi, and fistulæ in the bridge of the nose and at the lower lip, etc., which enter the skin for a few centimeters and then end blindly. Finally to these clefts belong also clefts of the lips (see "Harelip" and "Cleft Palate").

Cleft Palate (Palatum Fissum, Palatoschisis) is classed among the facial fissures. It is usually associated with harelip, which is designated "wolf's mouth." The cleft may be total, *uranoschisma*, or partial, *uranocoloboma*. The latter, again, consists of an anterior and a posterior uranocoloboma. In the anterior, which is a result of nonunion of one superior maxillary bone and the os intramaxillare, the harelip extends some distance into the hard palate, in an oblique direction, from the lateral to the median line. In bilateral cleft the os intramaxillare stands free on both sides. The posterior uranocoloboma, which is usually complicated by fissure of the soft palate, may be a result either of nonunion of both palatal bones, when the arch of the hard palate appears split for a short distance in the most posterior section; nonunion of one superior maxillary with its palate bone with that of the opposite side, so that the cleft runs laterally from behind up to the os intramaxillare; or finally of the latter defect having taken place on both sides, so that the vomer projects freely between the clefts. Uranoschisma also may be unilateral, although usually it is bilateral, while the soft palate always presents only one split. From both sides of the double harelip an anterior coloboma proceeds to both sides of the os intramaxillare, where the fissures meet and unite posteriorly and run further as a median cleft through the soft and hard palate. Here, again, very different combinations occur, varying from a unilateral and bilateral harelip to a unilateral and bilateral cleft palate. Various degrees of clefts of the uvula also are observed. Cleft palate impedes sucking and correct speaking even more than simple harelip and causes catarrh of the upper air-passages.

The operation on the soft palate alone (suture of the cleft palate, staphylorrhaphy) is easy, but it is much more difficult if the hard palate also is to be corrected. Although the uranoplastic operation, whereby the muco-periosteal covering of the

hard palate is employed to close the cleft, is usually accompanied by good results, it is entirely useless for correction of speech. Hence the very serviceable obturators are at present employed for closure of the cleft in preference to operative interference.

Harelip (Labium Leporinum, Cheiloschisis) belongs to the facial clefts *(q.v.)* and is produced by nonunion (unilateral or bilateral) of the filtrum (formed by the frontal process) and the lateral parts of the upper lip (formed by the superior maxillary process). Cleft of the upper lip, which occasionally heals *in utero* so that only an ordinary scar is visible in the newly born, varies in degree from a mere fissure, which is limited to the red portion of the lip or extends for some distance upward, to that involving the whole lip up to the nostril and the upper jaw, producing a large cleft, which is very rarely median, but usually unilateral or bilateral. If the anomaly is not remedied, it not only gives rise to disfigurement, but to difficulty of feeding and speech and especially of suckling. This is particularly the case if the harelip is associated with cleft palate. In simple harelip the child helps itself by grasping the nipple with the edge of the lower jaw. If the harelip is not remedied before first dentition, it also gives rise to deformity of the teeth. It is therefore advisable to remedy it long before this. The operation is not advantageous in children but a few weeks old, although successful operations have been performed even in the newly born. In delicate children or those suffering from catarrh, etc., it is better to wait for better nutrition and *restitutio ad integrum.*

The operation generally consists of freshening the edges and suturing. The mode and shape of the freshening is, of course, very variable, and depends upon the form and extent of the harelip. The operation may be so easy that every physician can perform it. On the other hand, in severe cases or in bilateral forms, especially in proboscidiform prominence of the intramaxillary bone, the operation may prove quite difficult and the final results leave much to be desired from a cosmetic point of view.

Ankyloglossia (Adhæsio Linguæ, Tongue-tie).—In this condition the insertion of the frenulum extends so far forward as

to give rise to difficulty in sucking and interfere with speech. This is, however, extremely rare. As a rule, it is so slight that normal condition gradually develops, rendering surgical intervention unnecessary. The latter ("loosening of the tongue-string") is, however, usually demanded by the parents. In order to satisfy the parents the physician performs a harmless operation by raising the tongue with the forefinger and thumb or with the myrtiform probe and dividing with the finger or scissors, the membranous portion of the frenulum. There sometimes exists a true adhesion of the lower surface of the tongue to the base of the oral cavity, which may be either congenital or acquired. The congenital form is due to adhesions between epithelial surfaces and can easily be liberated. The acquired form may be due to syphilis or mercurial ulcer, and can be removed only by an operation (severe bleeding, recurrent adhesion!). [It is advisable only to nick the frenulum with the scissors and complete the operation with the finger-nail, thus avoiding injury to the ranine artery.—SHEFFIELD.]

Macroglossia is an enlargement of the tongue. The enlargement may be so marked that the ill-shaped organ finds no room in the mouth and protrudes more or less. It is often congenital or develops soon after birth. There are two varieties of this affection. *Cavernous macroglossia*—a true lymphangiomatous tumor often affecting also the lips, *"macrocheilia"*; and *fibrous macroglossia*—an hypertrophy of the muscle fiber and fibrous tissue. Both forms are frequently combined. Enlargement and thickening of the tongue is often found in cretinism and also in acromegaly; it may also result from irritation, acute or chronic inflammatory affection of the muscles of the tongue (syphilis), tumors, etc. These secondary forms, however, are usually not designated macroglossia. Macroglossia may prove fatal, inasmuch as it renders suckling difficult or impossible; furthermore, the tongue by protruding from the mouth is apt to become injured, chapped, and cracked, and consequently greatly enlarged. Later there is also difficulty of speech. In such comparatively severe cases the macroglossia must be treated by the removal of a wedge-shaped piece. Galvano-cauterization also may be resorted to. In milder degrees of macroglossia painting with dilute tincture of iodin (1 to 9) may prove effective.

Atresia Esophagi is rare. It occurs, however, with or without formation of diverticula. The lower end sometimes terminates in the trachea.

Fistula Colli Congenita is a rare anomaly caused by defective closure of the second or third brachial duct. It is usually unilateral. The external opening is very fine and situated on the side of the neck from one to one and one-half centimeters behind and above the sterno-clavicular articulation, often in a little fossa encircled by a wall. There is sometimes moisture and redness, due to oozing of mucoid fluid. The canal is permeable by a very fine sound and either ends blindly or leads to the pharynx or esophagus. Cauterization is useless. Extirpation only can remove the fistula.

Congenital Pyloric Stenosis.—The etiology of congenital pyloric stenosis is obscure. In several cases a more or less marked congenital hypertrophy of the pyloric circular muscles with swelling of the mucosa was observed.

The principal symptoms, which are manifested immediately after birth, are vomiting and constipation. As these symptoms are also of common occurrence in many other diseases they cannot be regarded as characteristic of pyloric stenosis, unless the vomiting is regular, occurs after consumption of only small quantities of food, and is associated with dilatation of the stomach, strong peristalsis, and particularly with a palpable tumor. Cases presenting such a symptom-complex are very severe in nature and if not immediately operated upon (laparotomy, gastro-enterostomy), usually rapidly end fatally with increasing cachexia. Even operation is usually futile. In mild relative cases of pyloric stenosis operation may be postponed until the symptoms grow worse; in the meantime an attempt can be made to treat the condition by other means, particularly by gastric lavage. The existence of pyloric stenosis has recently been absolutely denied (Phaundler). It is maintained that in very many cases in which the symptoms just mentioned are present there is no organic disease, but rather a functional, spastic contracture of the pyloric muscles (as is often observed in postmortem examination of stomachs of young children), which usually disappears spontaneously, and at most requires assistance by electricity, gastric lavage, moist warm compresses, prolonged baths, and dietetic measures.

Atresia Tractus Intestini.—Atresia is the most frequent condition observed. During embryonic life the rectum grows gradually downward into the small pelvis, and instead of terminating externally it does not reach the outer layer of the skin, but, on the contrary, forms an invagination which progresses gradually farther until it reaches the cecum of the colon, where the parts unite after atrophy of the obliterating transverse membrane has taken place. If a disturbance of this mechanism occurs in the embryo, the child is born with atresia ani. The following are the usual varieties of malformation of the rectum:—

1. Atresia Ani Proper.—The rectum extends deeply down and is at this point more or less dilated. It does not reach the outer skin, the invagination of which did not take place, so that the anal orifice is absent. There is sometimes not the slightest indication of an anus, while at other times the orifice is indicated by a few comblike prominences, a small fossa, or a round indulation, the center of which is soft and compressible. There is, however, no way of being positive that the rectum is situated behind it, inasmuch as the intervening masses of fat are apt to deceive. Indeed, the cecum often terminates so low down that only a very thin layer of skin separates it from the outside. The skin is sometimes pushed down very low, so that the accumulated meconium is visible through the skin by its greenish color.

The prognosis in this form of atresia is favorable owing to the ease with which the rectum can be located.

After a careful examination by an exploratory puncture, a transverse incision is made and the cecum is often immediately reached. The incision may eventually be made a little deeper. To prevent the formation of new adhesions the rectum is packed, for the following few weeks, with small pieces of anointed gauze after each fecal movement.

2. In the second form of atresia ani the anal orifice is perfectly normal, but the child passes no meconium, appears restless, strains, cries, its abdomen is distended, it breathes with difficulty, and vomits occasionally. On entering the anal orifice, which is sometimes barely large enough to permit the passage of only the tip of a thin sound, it is found to terminate blindly at

a point about two and one-half centimeters in depth, showing that the end of the rectum has either been arrested at some distance from the anus or has taken another course, sometimes not far away from the normal—when the meconium is felt bulging above the curve—and sometimes very much farther. In the former case the condition is, of course, more favorable, and can be remedied by puncture or incision, beginning from the end of the invagination, and by consecutive dilatation. If the colon is not discernible in this manner it must be looked for—which is often very difficult—and, if the search is futile, an artificial anus must be made. The prognosis is, at any rate, pretty bad. On the other hand, if this condition is allowed to persist, the patient is sure to die within from three to eight days from rupture of the intestines and peritonitis.

3. The prognosis is still worse in ATRESIA ANI ET INTESTINI RECTI where the rectum is arrested in its development higher up (chiefly in the region of the sacro-iliac symphysis) and is associated also with absence of the anal orifice. In such cases there is no possible way to determine the exact condition, so that search for the normal intestinal tract involves serious surgical intervention and often proves useless. Only occasionally a firm fibrous cord is found which runs from the cecum to the cutis and may possibly serve as a guide.

4. In CLOACA CONGENITALIS there is also absence of the anus, the rectum ends in an abnormal place, usually in the bladder *(atresia recti vesicæ)* or in the vagina *(atresia rectî vaginæ)*, and in the male also somewhere in the urethra *(atresia recti urethræ)*. The meconium has then partly a free exit, but by communicating with the bladder there is a decomposition of the urine, cystitis, and death; and in recto-vaginal atresia the intestinal contents escape continuously, giving rise to a miserable condition demanding operative interference. After removal of this trouble the patient may reach old age.

5. ATRESIA RECTI CUTANEA PERINEI, S. VULVALIS, S. SCROTALIS, S. SACRALIS.—This form is rare. The anal orifice is located in an abnormal place in the perineum, scrotum, labium, or sacrum, which is defective and perforated. Operative interference is often successful.

6. Atresia of the Small Intestine is very rare. Its most common seat is the pylorus, at the point of insertion of the ductus choledochus and point of origin of Meckel's diverticulum. Causes: separation by fibrous bands, remaining after fetal peritonitis, or by Meckel's diverticulum. A few cases were operated upon (enterostomy, entero-anastomosis), but ended fatally.

[In this form of atresia there is usually early and persistent vomiting, rapid asthenia, and death from inanition within a week. Nothing is passed from the bowels after the escape of the meconium.—Sheffield.]

Congenital Dilatation of the Colon (usually with Hypertrophy) has occasionally been observed. It gives rise to a certain symptom-complex: Obstinate constipation from birth, due to atony of the intestinal mucous membrane, with severe meteorism, followed some time later by a more or less copious diarrhea due to irritation from retained feces, which at times may produce inflammatory conditions and ulceration. After expulsion of gases and stool, local intestinal tumors become visible and palpable, and a deep (up to seventy centimeters and over) invagination of even a thick gut may readily occur. Most children succumb early. They may, however, live a few years.

Ductus Omphalo-mesentericus, s. Entericus.—The umbilical, or vitelline, duct is the tubular communication between the residue of the germinating vesicle (yelk, or umbilical sack) and the alimentary canal. Occasionally the duct is not obliterated. Individuals thus afflicted (so far only thirty cases are on record) rarely reach old age, owing to the grave manifestations associated with this anomaly. Not only are disturbances of nutrition and intestinal catarrh present,—the open communication between the bowels and the exterior seems to predispose to catarrhal conditions,—but the portion which protrudes through the umbilicus in the form of a red, finger- or penis- shaped tumor gradually becomes larger and develops into a large hernia. Furthermore, recent observations tend to prove that, as a result of strangulation and consequent separation, ileus may develop within the abdominal cavity and sometimes also partial intestinal necrosis with fatal peritonitis, owing to the fact that the

persistent mesenteric duct in conjunction with some intestinal loops forms a sort of orifice in which other portions of the intestines are incarcerated. These dangers are usually obviated by extirpating the ductus omphalo-mesentericus, an operation that has on several occasions been successfully performed.

Obliteration of the Bile-ducts, or congenital deficiency of the excreting bile-ducts, is a rare anomaly. Protracted icterus, decolored stools, and diminution in volume of the primarily enlarged liver form the cardinal symptoms of this hopeless affection. However, postmortem examination sometimes reveals permeability, narrowness, or only partial obliteration of the bile-ducts in cases which during life presented the symptoms just enumerated. This condition, which may occur in two or more children of the same family, is very rarely syphilitic in nature and probably due to fetal peritonitis at the porta of the liver. It causes death within a few months at the latest, with or without hemorrhages from the skin, umbilicus, bowels, etc. It is almost always accompanied by enormous atrophy. Recoveries are, however, on record. If syphilis is suspected specific treatment should, of course, be instituted.

Diastasis—of the *recti abdominis muscles*—is, according to recent researches (Boedinger), not rare in children of either sex. It is usually situated upon the upper part of the abdominal wall —usually lozenge-shaped—from the xyphoid process to the umbilicus, or somewhat lower. It is not always associated with umbilical hernia, as the navel ring can distinctly be felt as a tendinous wall. Diastasis of the recti abdominis muscles is congenital, and due to defective or delayed closure of the deep layers of the abdominal wall. It usually appears after a few years, when the children are more active and begin to run, jump, etc., and generally disappears at puberty. Until then it may, under certain conditions, give rise to serious disorders, at first to paroxysmal symptoms of incarceration when portions of the stomach may, perhaps, slip into the slit, and later to more apprehensive disturbances of the general health. The children suddenly begin to avoid fermentable articles of food or complain of stomachache after eating. They are also attacked by very sudden pain associated with sudden pallor, on quick bending or active exercise, etc. The patients gradually

become anemic, etc. These symptoms are often unrecognized, and unsuccessfully treated for years as catarrh of the stomach and the like, until spontaneous recovery takes place. By applying a bandage or adhesive straps the symptoms can be quickly relieved.

Hernias.—*Inguinal hernia* occurs quite frequently in children, is almost always congenital, and presents the same signs as in adults. The prognosis, however, is better in the former than in the latter. In little children small ruptures heal spontaneously provided constipation, phimosis, and the like—which by straining either produce or at least enlarge the hernias—are relieved. It is safer, however, for the child to wear a well-fitting truss for several years. If the hernias are irreducible, progressively increase in size, present symptoms of inflammation or other evidence of disturbance, and the patient is unable to wear a truss, operation is indicated, which, in children, is quite simple and harmless. Incarcerations are very rare in older children and relatively most frequent in infants. In incessant vomiting, associated with or preceded by reflex anuria and singultus, it is very important carefully to examine the abdominal rings. *Crural hernias* are extremely rare in childhood. *Diaphragmatic hernias* are of more frequent occurrence and usually congenital in nature—due to defects in the diaphragm or to upward protrusion, owing to marked thinning of the same. They are more rarely acquired (trauma, traction from above owing to presence of scars, etc.). The more or less extensive entrance of the abdominal organs into the thoracic cavity causes disturbances of variable intensity, such as dyspnea, cyanosis, digestive disturbances, the cause of which can be detected by physical examination. The prognosis is always doubtful. The patients may, however, reach old age if they are well cared for and if injuries are avoided which may give rise to incarceration. The latter condition can be remedied only by daring operations.

As children rapidly lose in strength and the delicate intestine rapidly becomes gangrenous, the time for an operation is, in cases of incarcerated hernia, limited to a few hours. It is therefore important to heed the appearance of incarceration at the earliest moment, to proceed at once with herniotomy or radical operation and not defer too long—not over twenty-four

hours—by attempts to reduce the hernia by taxis. The latter procedure is usually successful in a warm bath or under narcosis, but is not free from danger, inasmuch as the firm pressure exerted is liable to produce intestinal hemorrhages and gangrene. On the other hand, the operation is quite simple in children and, as a rule, accompanied by good results.

Umbilical Hernia.—Two entirely different conditions are understood by umbilical hernia:—

1. Congenital Umbilical Hernia (Hernia Funiculi Umbilicalis, Exomphalos, Omphalocele Congenita, Amnion Navel) is a very rare malformation or arrest of development. The umbilicus fails to attain its full development, as a result of a defect in the abdominal coverings, and instead of the umbilicus there is a saclike dilatation of the abdominal cavity up to the size of a child's head, which contains intestinal loops, stomach, spleen, kidneys, etc. The hernial sac is made up of the amnion and parietal peritoneum. The skin forms a red, puffy ring at the fold of transition of the abdominal walls into the amnion, while the linea alba and the umbilical ring are absent. If there is considerable eventration, the children generally die early from rupture of the sac. If they live, the portions of the amnion participate in the mortification of the umbilical cord and slough away, leaving the contents of the sac denuded; so that the abdominal cavity communicates with the external air, peritonitis, gangrene, and death being often the result.

Under proper treatment, such as reposition, closure with salicylic acid collodion, and bandage, spontaneous recovery by granulation and cicatricial contraction sometimes occurs. Success is frequently obtained also by radical operation (extirpation of sac, reposition, suturing of the abdominal defect).

2. Hernia through the Umbilical Ring, Acquired Umbilical Hernia.—The disposition is frequently congenital. Exciting causes: Crying, coughing, vomiting, meteorism, straining due to constipation, diarrhea, phimosis, etc. The umbilicus is normally developed, but not sufficiently resistant. Hence the umbilical cicatrix gradually protrudes outward, as a result of internal pressure by a loop of small intestines. It is at first manifested by small, but gradually enlarging, round or oval,

soft, elastic swelling at the umbilical cicatrix, which is not painful to pressure. It is covered by skin, fascia, and peritoneum. It becomes more tense and prominent during coughing, crying, straining, etc., and upon pressure with the finger it slips back with a gurgling sound into the abdominal cavity. This symptom serves as a differential sign from bulging of the umbilicus resulting from hydrops or peritonitis.

The PROGNOSIS is favorable. Small hernias often heal spontaneously; even larger ones extremely rarely strangulate, and generally yield within three to six months to treatment with a suitable bandage. In small hernias, after reposition of the protruding parts, a fold on each side of the abdominal skin is lifted and brought in apposition and fixed in place by means of strips of adhesive plaster or collodion. In larger hernias the Rapa-Montis bandage is used. The umbilicus is painted with collodion, pushed back into the abdominal cavity, covered with a flat piece of cork, and held in place by adhesive plaster. Beginning at the umbilicus, superimposed layers of adhesive strips are applied around the abdomen to the back in such a manner that they cross one another on their return on the abdomen. The whole bandage is then painted with collodion. These bandages cannot be applied until the child is about 5 or 6 months old, as in a younger one the skin is too sensitive. The bandage is left in place until it becomes defective, when it is again renewed until recovery, which usually takes place within three to six months. The bandage does not interfere with bathing. Trusses are impracticable.

Lung Hernias.—Congenital lung hernias are sometimes seen as nut-sized tumors under the skin in front (below the clavicle) or on the back. They are elastic to the touch, change their size during respiration, and sometimes give rise to auscultatory signs as well as to a tympanitic or pulmonic sound on percussion. They contain normal or degenerated portions of lung, and at times cause obstinate coughing spells, which disappear after reposition of the hernia and protection by proper bandages. Suppuration was once the cause of death of a patient.

Cyanosis (Congenital [or "Blue Sickness"]) was formerly believed to be a result of intermixture of the arterial and venous

blood occurring as a result of defective closure of the fetal blood-channels, the ductus Botalli and foramen ovale, or as a result of a defect in the partition of the auricles and ventricles. It is now known that cyanosis often occurs in instances in which such an admixture of blood is out of question ("vitia cordis"), and may be entirely absent notwithstanding abnormal communications. Cyanosis is a cardinal symptom of congenital heart disease (see "Vitia Cordis"). The cheeks, tip of the nose, the hands, feet, and especially the nails and the visible mucous membranes appear bluish violet, particularly when the child cries, sucks, or overexerts himself. A more or less considerable fall in the temperature of peripheral parts is associated with it. A knobby (clublike) swelling of the ungual phalanges of the fingers and toes and at times also a clawlike deformity of the nails occur, especially if the cyanosis is of long duration. In addition, debility, laziness, somnolence, and backwardness of growth and intelligence are usually present.

Foramen Ovale is the opening in the septum of the auricles of the fetal heart which is gradually obliterated in extra-uterine life. With the diversion of the blood-current of the dilated right ventricle to the pulmonary artery, the blood-pressure in the right auricle is lowered, the valve of the foramen ovale falls back upon the latter and gradually adheres to its margin. The obliterating process is usually not completed until the third year of life. Occasionally it does not occur at all. Aside from the causes mentioned in connection with the ductus Botalli *(q.v.)*, there are also local anomalies of the foramen ovale or its valve which interfere with its obliteration. Notwithstanding its failure to close, overflowing of the blood from the right to the left auricle may take place where the pressure predominates in the right auricle. This occurs only when the escape of the blood from the right ventricle to the lungs is prevented, as in stenosis of the pulmonary artery, or when there are any impediments to the entrance of the blood into the right ventricle (changes in the tricuspid valve). Under such conditions cyanosis may occur with or without systolic or presystolic murmurs over the third or fourth costal cartilage, etc.

Ductus Arteriosus Botalli, the fetal duct which runs between the pulmonary artery and the arch of the aorta and in

the newborn is about as thick as a branch of the pulmonary artery, is usually quickly obliterated in the living child. Since with the establishment of respiration, a stronger current of blood must reach the lungs and is no longer able to pass through the duct into the aorta, the ductus arteriosus becomes empty. As a result of distension of the lungs it experiences, besides, a change in position, nay, even a kink, and hence immediately begins to undergo closure (owing to an obliterating endarteritis), which is completed in from two to three weeks. Only in case of deficient filling of the left ventricle—which may arise from extensive atelectasis of the lungs, fetal pneumonia, or stenosis of the pulmonary artery—may there be a delay in the obliteration, or even complete failure. In this event the blood from the pulmonary artery continues to flow through the ductus arteriosus to the insufficiently filled aorta. This delayed obliteration is capable of compensating for months the usual consequences of the previously mentioned disturbances of the right heart and of the entire venous system; but, if the ductus arteriosus remains open, then persistence of the duct, which establishes a permanent communication between the pulmonary and aortic circulations, is very soon followed by hypertrophy of the right ventricle and dilatation of the pulmonary artery. The children thus affected usually die early, but they may reach old age. In the beginning this anomaly progresses without symptoms; soon, however, palpitation sets in, a thrill is perceived over the anterior chest-wall, systolic murmurs are heard, and enlargement of the area of cardiac dullness, difficulty of breathing, cyanosis, and bronchial catarrh ensue. These symptoms are followed by disturbance of compensation, which may rapidly terminate in death.

Valvular Hematomas are small blood extravasations, up to the size of a cherry. They are sometimes observed in small and even newly born infants. They are generally found as prominent spherical tumors upon the cardiac valves, and especially upon the free border of the mitral valve. These prominences, which are situated beneath the superficial layer of the endocardium, generally develop very soon after or, perhaps, even before birth, from rupture of intravalvular vessels. They usually retrogress in the first few months of life, and it is possible that

some apparently congenital heart diseases originate from them (see "Vitia Cordis"), inasmuch as during retrogression there is possibly also a contraction of the valvular borders resulting in stenosis of the ostium or insufficiency of the valve. Sometimes small, hard, sessile or pedunculated nodules, covered by epithelium, spring up as residues.

Hydronephrosis is usually *congenital* owing to a congenital obliteration of the ureters or to valvular folds in the same, etc. It is generally unilateral. Very extensive hydronephrosis sometimes forms an impediment to childbirth, requiring dismembering of the child. It often occurs also with other congenital anomalies. In moderate hydronephrosis there are very few symptoms, and a diagnosis is very rarely possible.

Severer forms of hydronephrosis demand puncture, which is at times followed by prolonged improvement or even cure. Extirpation of the kidney has proved successful in several cases. If the other kidney becomes involved (*e.g.*, scarlatinal nephritis) the prognosis is very unfavorable. Hydronephrosis is rarely *acquired,* but it may result from obstruction of the ureter by tumors of the kidney and adjacent parts, renal stones, retroperitoneal tumors of the lymph glands, etc., and may also be caused by trauma (blow in the region of the kidney).

Fissure of the Bladder ([Exstrophy of the Bladder] Ectopia Vesicæ) is a defect due to arrest of development in the anterior wall of the bladder and abdomen, and usually also in the symphysis, so that the posterior vesical wall protrudes through a gap in the abdominal wall as a round, moist, bright-red mass, marked by two small tubercles on both sides,—the orifices of the ureters,—from which the urine dribbles continuously. As a consequence there are irritation of the bladder-wall itself and the surrounding skin, and a very offensive odor. Children with exstrophy complicated by epispadias, fissures of the clitoris, vagina, and malformations of other parts of the body usually succumb at an early age, but the milder forms of ectopia vesicæ are generally not fatal. In this case a plastic operation is indicated, for, while the fissure may diminish in size spontaneously, it never closes entirely. Two cases of intra-uterine healing of exstrophy which could be ascertained by distinct scar formations are on record. If this operation fails, wearing of

Earle's apparatus (a hollow silver shield with rubber tube and cork introduced in the bladder and held in place by means of a truss) may be employed to advantage.

Urachus.—The urachus sometimes remains patent. On pressure a small hernial tumor arches forward in the vicinity of the umbilicus. Temporary distension of the urachus may give rise to attacks of colicky pain. On examination with the catheter it is found that the urachus can be reached through the bladder. A urachus fistula may exist from birth or develop later, usually in the form of congenital stricture of the urinary canal.

If the symptoms are severe an operation must be resorted to. The presence of cystitis may compel early therapeutic procedures, as death has occurred from pyelonephritis. In addition to attention to the cystitis and the constriction of the urinary canal, it is sometimes necessary to remove the fistula, which runs from the umbilicus to the bladder. This is best done first by careful cauterization with nitrate of silver [and, if this fails, by refreshing the walls of the sinus with the knife and subsequent introduction of sutures—SHEFFIELD].

Atresia Urethræ is almost always epithelial in nature or at most membranous. In the former mere pressure with the tip of a sound is sufficient, in the latter a small incision is made and kept open by means of an appropriate small lead rod. It very rarely requires a preparatory operation in order to find the urethra. In the event of a preparatory operation the still patent urachus permits the escape of urine for the time being, and is later closed by freshening the edges and suturing. If the urethra cannot be discovered through the external wound, the bladder is punctured by means of a curved trocar, under direction of a finger in the rectum, and the urethra is looked for from within after opening the bladder by means of sectio alta.

Atresia Vulvæ consists chiefly of a cellular adhesion of the labia minora, and is either partial or total. It is due to an impeded epidermization of the cells, arising from the rete Malpighii. In total atresia vulvæ there is retention of urine. The labia generally separate spontaneously, otherwise it is to be done with the fingers or by means of a dull sound or scalpel.

Atresia Vaginæ Hymenalis (Imperforate Hymen) is a congenital malformation which usually escapes observation until puberty unless the hymen is situated directly in front of the urethral orifice and thereby gives rise to disturbances.

TREATMENT.—Incision and packing with iodoform gauze.

Cryptorchidism [Undescended Testicle] is not a rare anomaly in the newly born (about 10 per cent.) and is due to failure of one or both testicles to descend into the scrotum. The testicle is retained either in the abdominal cavity or at the annulus inguinalis *(undescended testicle)* because of an unusual narrowness of the inguinal ring, or of inflammations which lead to adhesions at abnormal places, etc. Normally it should descend about the ninth fetal month. The descent often takes place spontaneously within the first few days, weeks, or months of life, but frequently not until about puberty. In the latter event the testicle may make for itself a false passage *("ectopia testis")* and reach the anterior abdominal wall, the root of the penis, the perineum, or the crural arch, and be mistaken for a crural hernia. It also may be arrested in a wrong position and be felt normal in size or enlarged as a result of a serous exudation in the tunica vaginalis. This condition is usually not detrimental to the genitalia (in bilateral cryptochidism there is usually impotence), but is prone to excite other dangers, such as impaction of the testicle at the inguinal canal (excruciating pain and consecutive inflammation), traumatic inflammations, and sometimes reflex symptoms (epilepsy). Cryptorchidism furnishes also a marked predisposition to inguinal hernia; hence the frequent coexistence of the two affections. Not infrequently, especially at puberty, it causes atrophy of the genital organ or malignant degeneration.

The TREATMENT is expectant if no other indication is present. Gentle massage has often proved successful. For protection of the genital organ: capsular bandage. If simple remedies fail, operative interference (orchidopexy).

In an otherwise normal condition it sometimes occurs that tense contraction of the scrotum causes the testicles to be drawn up high by the cremaster, and are felt in front of the inguinal ring. With relaxation of the scrotum the organs again descend. Such a condition must not be mistaken for cryptorchidism.

Hydrocele is very frequently observed in children. It is usually *congenital,* rarely *acquired* (trauma). The anomaly consists in an abnormal accumulation of serous fluid (normally only a few drops) in the tunica vaginalis propria, *hydrocele tunicæ vaginalis,* as contrasted with *hydrocele funiculi spermatici.* Both varieties may communicate with the abdominal cavity if the vaginal process has remained patent—*hydrocele communicans.* This variety is usually associated with hernia and is sometimes difficult of diagnosis owing to the return of the fluid into the abdominal cavity. Hydrocele tunicæ vaginalis is generally unilateral, and is manifest by an oval, smooth, translucent, more or less tense, fluctuating swelling, which sounds empty on percussion. Posteriorly to it lies the testicle, which is often easily palpable. Hydrocele funiculi spermatici is usually spindle-shaped or, if several cysts are united, it resembles a string of beads; otherwise it simulates the former variety, except that the testicle lies underneath and is distinctly separated by a constriction. If the patient does not strain, cry, etc., the fluid in hydrocele communicans can with moderate pressure and without gurgling readily be forced back into the abdominal cavity.

As hydrocele often disappears spontaneously an expectant plan of treatment is indicated. At most, iodin ointment or painting with equal parts of iodin and tincture of nutgall should be tried. If the hydrocele is greatly enlarged, puncture (requiring frequent repetition) usually results in a cure, especially if aspiration is followed by the injection of a few drops of equal parts of tincture of iodin and alcohol, or of two Pravaz syringefuls of corrosive sublimate solution (1 to 5000). A radical operation is rarely necessary. In hydrocele communicans a truss should be worn to prevent hernia. [Absorption of the fluid is often facilitated by the internal administration of potassium iodid.—Sheffield.]

Preputial Adhesions.—Partial or complete adherence of the prepuce to the glans penis is at first physiological, but it quite often persists also in older children. The superficial cells from the rete Malpighii fail to undergo normal hornification, remain filled with protoplasm, and give rise to adhesions. The same pathological condition is responsible also for adhesions between

the labia minora, which at times form the cause of dysuria. The adhesions are at first tense and tight; but gradually relax with age. An attempt to push the foreskin backward is met with an impediment even in the absence of phimosis *(q.v.)*; the urethral orifice gapes and seems to be surrounded by a flat ring running along the foreskin. Sometimes a cystic swelling of the prepuce surrounds the whole anterior portion of the penis. Sequelæ: retention and sometimes decomposition of smegma; balanitis and balanoposthitis; not infrequently also interference with urination (straining, etc.), and enuresis.

TREATMENT.—In mild cases the prepuce should frequently be pushed back and forth, sometimes preceded by loosening of the adhesions with a dull probe and followed by removal of retained smegma with absorbent cotton. Application of boric acid ointment over the glans or lead-water compresses to the penis [see "Phimosis"].

Paraphimosis is a constriction of the penis resulting from retraction of a narrow foreskin (see "Phimosis") behind the corona of the glans penis. It may be either *congenital* or *acquired* (through playfulness or during onanism). The prepuce is firmly contracted and cannot again be replaced. Paraphimosis is occasionally a result of constriction by means of bands, threads, rings, etc. Sequelæ: edema of the glans, cyanotic discoloration, and—in protracted paraphimosis—even gangrene.

TREATMENT.—Reposition of the preputium by compression of the glans with both thumbs, and simultaneous, slow traction of the prepuce forward by means of both index and middle fingers. In some cases this procedure must be preceded by prolonged action of cold water upon the glans to reduce the swelling and sensitiveness. If the swelling is very marked the glans may be surrounded by a narrow Esmarch bandage, or the contracted part may be incised.

Phimosis is a stenosis of the preputial orifice, particularly of the inner lamellæ, so that the glans cannot pass through. It is usually *congenital,* but also *acquired* as a result of inflammations, hypertrophy of the foreskin, cicatrices, etc. It is often associated with adhesions of the prepuce to the glans; so that two impediments to the retraction of the prepuce exist. The prepuce is frequently found elongated and hypertrophied,

and considerably overhangs the glans, rendering micturition very difficult. Urination is attended by crying, pressing, and straining, and often causes hernias and prolapsus ani. The urine escapes in a fine stream or by drops, often causing erythema and eczema of the abdomen, scrotum, and thighs. There may also be (*e.g.*, from fear of pain) retention of urine and even fatal uremia. The entrance of urine between the preputium and glans causes decomposition of smegma, balanitis, and balanoposthitis, with consequent further swelling of the prepuce (sometimes with copious granulations) and new obstruction to urination. Concretions are sometimes formed in the sulcus retroglandularis. Phimosis is also often the source of nervous disturbances—*e.g.*, pavor nocturnus, painful erections, tendency to masturbation (which, on the other hand, leads to paraphimosis), irritability, cough, strabismus, convulsions, and even epilepsy.

Treatment.—Mechanical dilatation, or rather immediate division, of the prepuce followed by a continuous suture (dermatol, nosophen [aristol], dressing) or circumcision *(q.v.)*. These operations can easily be performed under Schleich's method of infiltration anesthesia [preferably ether or chloroform].

Circumcision is especially indicated in severe phimosis, when the prepuce is very much elongated and hypertrophied at the orifice. It is best performed after Emmert's method as described by Albert: "The prepuce is retracted as much as possible, then slit along the dorsum by a simple incision, and allowed to return to its normal position, in order to determine how much of it hangs over the glans penis. The superfluous portion of the prepuce is removed as far as the frenulum by a circular cut with the scissors. The wound is then sutured all around. The operation may also be done by one stroke of a knife by catching the distal end of the prepuce, pulling it strongly forward, and clipping it at the glans, but the apprehension of injuring the glans induces the surgeon to clamp the prepuce right in front of the glans by means of a thumb forceps." In this manner it is performed on boys seven days old by the "circumcisers" in accordance with the Mosaic rite. Formerly (it no longer occurs) when it was the custom of the circumciser regularly to "suck" the wound,

this method was quite dangerous, owing to the frequent infection with syphilis, tuberculosis, and diphtheria. Even at the present day misfortunes arise either through accident—*e.g.*, hemorrhages in children suffering from hemophilia which are arrested with difficulty or prove fatal; or ignorance on the part of the circumciser—*e.g.*, accidental wound infections in consequence of insufficient asepsis; intoxication owing to abuse of iodoform, carbolic acid, etc.; once also luxation of penis owing to lack of skill. Although such occurrences are quite rare since the advice of a physician is being more commonly sought, Pott's recommendation, that ritual circumcision should be under the control of the government and be performed only by educated and licensed circumcisers, is in every way justifiable.

Epispadias corresponds in its origin, consequences, etc., with hypospadias *(q.v.)*, but is much rarer than the latter. In epispadias the urethral opening terminates at the dorsal surface of the penis, either more or less anteriorly or, in very bad cases, which are also associated with ectopia, much farther back. Even in the mildest degrees of epispadias incontinence of urine exists, and a plastic operation is often an absolute necessity.

Hypospadias.—This term is used to designate an abnormal opening of the urethra due to defective development. The urethra ends upon the inferior surface of the penis. In mild degrees of hypospadias the opening is still limited to the glans, in severer cases it runs farther backward, at the bottom of a canal, which runs along the lower portion of the penis until it reaches that opening, and which may split in two parts not only the whole urethral canal (when the glans and penis are present in a rudimentary form), but also the scrotum and perineum. In this event the bladder terminates in this cleft, and gives rise to pseudohermaphroditism. These severe degrees are very rare. Generally the urethra opens at the glans or somewhat farther back. Even then, however, it causes a great deal of inconvenience to the patient, inasmuch as the urine passes downward very slowly in a thin stream, wets the adjacent skin, and causes intertrigo, erosions, and ulcers. The farther backward the urethral canal terminates, the worse the case and the more apt in this condition to interfere with virility. Hypospadias is usually remedied by a plastic operation, but this complicated surgi-

cal interference is not always entirely successful, inasmuch as fistulæ are very prone to persist.

Congenital Sacral Tumors.—Albert, whose treatise on the subject in question is essentially followed here, distinguishes the following varieties:—

1. Double Formations are decidedly more frequently observed in the female than in the male. They are either complete, so that two individuals of the female sex are grown together at the buttocks, or incomplete so that one rudimentary form is attached to the buttocks of a fully formed individual. The latter condition is designated as parasitic formation. The parasite may present itself either as a separate part of the body—*e.g.*, as a third leg—or as a tumorlike mass included in the integument of a complete individual. It may be firmly adherent to the surrounding parts, even to the sacrum and the coccyx, and consist of a conglomeration of incomplete and deformed portions of the body, such as sections of extremities and of the trunk, rudimentary pieces of intestines, etc.; at times also of cysts or cystosarcomatous growths *(included double formations)*.

2. The Sacral Hygromas are simple or multiple cysts with fibrous walls, epithelial lining, and more or less fluid contents. They are attached by a broad base to the dorsal surface of the sacrum. Their etiology is obscure.

3. The Tumores Coccygei are neoplasms which arise from the anterior surface of the coccyx and sacrum and hang between the anus and coccyx. They are inclosed in a fibrous cavity, which is connected with the periosteum of the sacrum and coccyx, and send out roots into the internal parts. The tumor is made up of a fibrous or granular mass, generally of sarcomatous nature. Occasionally carcinomatous structures are met, and sometimes masses of fat, cartilage, or even bone. The fibrous layer is covered by integument. The tumor may reach very considerable, nay, even an immense, size. It never extends above the lower border of the gluteus, but may spread within the pelvic cavity. The condition of the spinal canal is of clinical importance. It is either abnormally closed and free from any involvement; or dilated at the sacral region and invaded by the tumor; in this event the tumor is either fixed

upon the dura spinalis or it surrounds a hernial dural protrusion. The origin of the growths is as yet entirely obscure. In certain cases a sarcomatous degeneration of the dura seems to form the starting point; in others, the origin is sought in the remains of the chorda dorsalis, and in others again in Luschka's coccygeal gland.

4. Caudal Formations and Lipomatous Attachments. —The former manifest themselves either as an enlargement or increase in number of the coccygeal vertebræ, and thus represent a tail, or as an ordinary lipoma.

The course of these tumors varies. While the caudal formation is a mere disfigurement, the parasitic formation may give rise to a pronounced deformity. Futhermore, coccygeal tumors are also dangerous. But few children thus afflicted live beyond $^1/_2$ to 1 year of age. The majority of them die earlier with symptoms of marasmus. More favorable is the character of sacral tumors in which the deformity is merely associated with vulnerability.

The diagnosis of the individual tumors, except the caudal formations, is not easy. Even in sacral hygromas it is hard to tell whether or not they stand in any connection with the spinal canal (see "Spina Bifida"). In the parasitic formations the nature of the tumors is easily detected if only one organ of the parasite is found, but the diagnosis is very difficult if the whole mass is included beneath the integument of the affected individual. As this condition must chiefly be distinguished from a coccygeal tumor, two points will have to be borne in mind: (1) the coccygeal tumor is always more or less attached to some part of the coccyx, and never extends above a certain limit; (2) it grows and enfeebles the child.

There are a few more points of interest, especially in reference to the feasibility of operative interference. An excessive blood-supply is discerned by an increase in the external heat and by swelling of the tumor in a hanging posture. The mode of attachment is determined by careful palpation, by the degree of mobility of the tumor, and, to some extent, by an examination of the pelvis through the rectum.

Caudal formations should unhesitatingly be removed. Sacral hygromas are also treated by extirpation. In complete para-

sites extirpation is also attended with success. In coccygeal tumors there are weighty reasons against surgical interference; but even here, with proper care, very good results are obtained.

Osteogenesis Imperfecta is a bone disease of the newly born. It is of very rare occurrence. The majority of those affected died during or immediately after birth. It is not, as previously believed, identical with rachitis, but is something specific, which can sharply be differentiated macroscopically and microscopically from other bone diseases. The bones are so soft that they can be cut and bent, splintered, and fractured in several places. The microscope reveals an unusual persistence of the interstitial cartilaginous substance and deficiency of osseous structures and lime salts in the primary zone of calcification.

[**Achondroplasia (Chondrodystrophia Fetalis)** is a term used to designate a special type of fetal bone disease resulting in arrested growth of that part of the skeleton which is ossified in *cartilage* in *early* fetal life (third to sixth month). Thus we have shortening of the long bones of the arms and legs, including the metacarpals, metatarsals, and phalanges. The fingers do not lie parallel as in a normal hand, but show a curious divergence, two fingers sloping to the ulnar side and two to the radial side of the midline of the hand. The bones that are formed in *membrane* or those that remain cartilaginous until after the sixth month of fetal life—the sternum, patella, costal cartilages, tarsal and carpal bones—show no abnormalities. The trunk is normal in length. The pelvis is narrow. The head is larger than normal, being prominent in front and at the sides. The skin, hair, and nails are normal in development. The gait is usually waddling. Mental development is normal. Achondroplasia differs from cretinism in the absence of the mental defects which characterize the cretin and in the presence of a thyroid gland.

A large number of cases of achondroplasia die *in utero* or shortly after birth, but those that survive develop well except with regard to their height—rarely exceeding four feet.—Sheffield.]

Congenital Unilateral Hypertrophy is rare. So far only twenty cases are on record. The malformation is usually lo-

cated upon the right side. To a great extent the growth of the hypertrophied side progresses proportionately with the increase in years. The etiology is unknown. According to Frélat, it is due to partial paralysis of the vasomotors.

Ichthyosis [Fish-skin].—An hyperplasia of the horny layer of the epidermis may take place within the uterus; so that children are born with thick, gray or grayish-white scales, which envelop almost the whole body, like a shell. Between the scales are red furrows and crevices. As a rule, the children die within a few hours or at most a few days. In other children the disease develops in the course of the first year of life, but not in so intense a degree. The tendency to this pathological hypertrophy of the horny layer of the epidermis is surely inherited. Often several members of the same family are affected by it. The horny hyperplasia of the epidermis appears either circumscribed or diffuse; so that larger or smaller, thicker or thinner scales and plates are visible. The affected children may be otherwise quite well, although at times they seem to feel quite miserable, have pain, cry, are restless, etc.

Very careful attention and alimentation (mothers' milk) are required in order to keep them alive. Occasionally ichthyosis is curable; or at least it may greatly be improved by baths containing 1 gram [gr. xv] of potassium permanganate, rubbing with soap (salicylic acid soap), and subsequent inunction of the skin with fat (salicylic acid or sulphur salve). Internally arsenic and thyroid therapy may be tried, the latter especially in severe cases. More rarely the *follicular* form of ichthyosis is observed which manifests itself by elevation of horny follicles of the skin, so that the skin resembles fine prickles. The treatment is the same as in the former variety.

VI.

Growth and Development of the Body.

Weight of a Child.—The child's normal weight after birth is about from 2500 to 5500 grams; on an average, 3250 (boys, 3200; girls, 3000 grams). During the first two to four days there is a physiological decrease in weight of from 150 to 250 grams, and in artificially fed from 200 to 250 grams. The original weight should be reached on the tenth day at the latest; in premature and artificially fed infants it often takes from two to three weeks. The regular gain in weight should be:—

In the	1st	month,	per	day,	about	25	grams;	per	week,	about	200 grams.
" "	2d	"	"	"	"	23	"	"	"	"	185 "
" "	3d	"	"	"	"	22	"	"	"	"	175 "
" "	4th	"	"	"	"	20	"	"	"	"	160
" "	5th	"	"	"	"	18	"	"	"	"	145 "
" "	6th	"	"	"	"	17	"	"	"	"	130 "
" "	7th	"	"	"	"	15	"	"	"	"	120 "
" "	8th	"	"	"	"	13	"	"	"	"	100 "
" "	9th	"	"	"	"	12	"	"	"	"	95 "
" "	10th	"	"	"	"	10	"	"	"	"	80 "
" "	11th	"	"	"	"	8	"	"	"	"	65 "
" "	12th	"	"	"	"	6	"	"	"	"	50 "

In artificially fed infants the gain is often somewhat less and more irregular. Otherwise, in the absence of disease, especially gastro-intestinal and acute febrile diseases, insufficient gain in weight indicates insufficient or incorrect feeding, faulty wet-nurse, feeding at too long intervals, or excessive dilution of the artificial food. There is a loss of weight during dentition, but sometimes a rapid gain soon after the appearance of the teeth. It is sufficient to weigh the child once a week (daily weighing is apt to lead to error), best after the morning bath before a meal, after evacuation of bladder and bowels. After five to six months the original weight should be doubled; at

the end of a year trebled; at the age of six years the child's weight should be double that at the end of the first year, and at the age of twelve years double that at six years.

Length of the Child.—The newly born infant measures on an average 50 centimeters in length. It increases in length 20 to 25 centimeters in the first year (at first 4 centimeters per month, later 2 centimeters, and in the last few months 1 centimeter), 10 centimeters in the second, 7 centimeters in the third year, and from then on from 4 to 6 centimeters every year. Growth is delayed in the presence of constitutional diseases, especially rachitis, and hastened during and after febrile affections.

Cranial Circumference.—The diameter in the fronto-occipital periphery is:—

In the newly born child	33 to 36 cm.
In the ½ year old child	42 to 44 cm.
In the 1 year old child	45 to 46 cm.
In the 2 to 3 year old child	47 to 48 cm.
In the 5 to 12 year old child	50 to 55 cm.

In rachitis and hydrocephalus the circumference is greater and in premature synostosis smaller.

Fontanelles.—The small fontanelle closes soon after birth, the large one gradually diminishes in size in healthy children after the first few months of life, and is entirely ossified about the end of the twelfth or the fifteenth month at the latest. It closes much later in rachitis. In some pathological conditions the presence of open fontanelles is of clinical importance. They are tense and prominent in hydrocephalus and sunken in collapse.

Head Murmur.—In quiet children with open fontanelles—*i.e.*, during the first two years of life—a more or less loud murmur is often heard on auscultation over the large fontanelle, more rarely over the closed one or over other places of the head, isochronously with the heart systole. It is to be differentiated from other sounds, *e.g.*, respiratory sound, by feeling the radial pulse. Hennig declared it physiological if audible from the twenty-second or twenty-third week of life up to the end of ossification. Henoch, however, found it, as a rule, in

anemic and rachitic children—in the latter, perhaps, because the fontanelles remain open for a longer period—and but rarely in healthy ones. He was unable to determine the cause of it with any degree of certainty, and considers it clinically immaterial. The head murmur disappears with increased intracranial pressure, as in pronounced hydrocephalus.

Chest Circumference — measured across the nipples and scapulæ—is in the newborn from 32 to 34 centimeters.

It increases in the 1st year about 12 ctm.
It increases in the 2d year about 3 ctm.
It increases in the 3d to 7th year about 1 ctm.
It increases in the 7th to 12th year about 1 ½ ctm.

At the end of the second or the beginning of the third year the chest circumference should exceed that of the head; otherwise there is a suspicion of chronic lung trouble or rachitis. At the end of the fifteenth year the chest circumference should be half of the body length.

Dentition. — In healthy children the milk teeth usually erupt in pairs at certain periods, in the following order:—

2 central lower incisors between the 5th and 7th months.
2 central upper incisors between the 8th and 10th months.
2 lateral upper incisors between the 8th and 10th months.
2 lateral lower incisors between the 11th and 12th months.
4 anterior molars between the 14th and 16th months.
4 canines between the 18th and 20th months.
4 posterior molars between the 22d and 30th months.

Thus, at the end of the first year the child possesses 8 incisors; at the end of the second year, 16 teeth; in the third year, 20 teeth. Some children get their teeth earlier and more quickly one after another; at times they are even born with them, under which circumstances they usually soon fall out; others, again, even strong and healthy children, get them later than normally and at longer intervals. The latter anomalies, however, are usually observed only in rachitis *(q.v.)*, in which disease the order of eruption of the teeth is often irregular, not in pairs, etc. In such children cutting of teeth is at times (in healthy children very seldom!) complicated by indisposition, such as restlessness, peevishness, insomnia, slight fever, and

gastro-intestinal affections from swallowing of sputum, which is greatly augmented through reflex influences. During this time the children are certainly more susceptible to diseases than otherwise, and manifest increased irritability and sensitiveness (increased flow of blood to the cranium?). They may become subject to a reflex cough, skin affections, and even convulsions. Such an etiology, however, must not be depended upon. It is better to look for other etiological factors than *dentitio difficilis*, and to combat them. If dentition is the cause and serious in nature, it may be alleviated by potassium bromid, or, according to Naegeli-Akerblom, by tincture of gelsemium *(q.v.)* or by local application of cocain *(q.v.)*. Scarification of the gums, to hasten the eruption of teeth, is not to be practiced, as it is entirely useless. As a measure of prophylaxis it is advisable, especially in children who are rachitic, nervous, etc., to avoid changes in the diet (weaning) and surgical procedures (vaccination) before and during the eruption of a tooth. Second dentition ("change of teeth") takes place between the fifth and sixth years of life. As a rule, it begins with the molars and is followed, usually in the same rotation as with the temporary teeth, by loosening of the temporary and appearance of the corresponding permanent teeth. In the twelfth year four molars appear, and finally between the sixteenth and twenty-fourth years the last four teeth.

Dental Caries should immediately be attended to even during first dentition. The physician should urge the parents to have the mouth of the child regularly examined every half-year from the third year on. Rational care of the mouth is of great prophylactic value. The suckling should not receive a nipple or sucking bag; should later not be fed on sweets, particularly chocolate cakes, etc. If such are allowed, the teeth should immediately carefully be cleansed of all residue. Up to the third year the gums and also the teeth of the child should carefully be washed two or three times a day with a clean cloth dipped in cool water containing salt or boric acid. From the third year on a toothbrush may advantageously be used with water or a mild tooth soap or paste (Unna's potassium chlorate paste), and the child should be taught to rinse the mouth morning and night, preferably with plain, cool water. If, in spite of all precautions, dental caries occurs its progress must be arrested even

in first dentition. Opinions are divided as to the advisability of filling temporary teeth. Up to the fifth year filling of teeth is quite a difficult matter, so that dentists are apt to favor extraction. The question depends upon the length of time the affected tooth is to remain in the mouth, as it would be injudicious to cause the child to become nervous by an operation upon a tooth that is soon to change. Individualization is a matter to be left to the dentist, who should always be consulted, for aside from other reasons the soundness of the milk teeth is of great value to the permanent set of teeth. It may, by the way, be emphasized that the first permanent tooth—the large molar which appears during the fifth or sixth year, often also earlier—is frequently looked upon as a milk tooth and more or less neglected. This is to be deplored, for it is just this tooth that has a great tendency to decay.

The permanent teeth must, of course, receive still more attention, since, aside from the importance of a good full set of teeth to the nutrition, digestion, etc., of the child and later also of the adult, dental caries is apt to prove very dangerous to life. Not only is there danger of extension of the process to the deeper underlying structures, but dental caries may readily prove the carrier of infections to the interior of the body. Indeed, many pathogenic micro-organisms originally located in the mouth, *e.g.*, diphtheria and tubercle bacilli, travel to the cervical glands, multiply there, and gradually infect the whole body. Many glandular tumors of the neck are produced in this manner, and other infections also occur through the same channel. The prevention or removal of dental caries is therefore imperative.

VII.

Diseases of the Nose, Throat, and Ear.

Adenoid Vegetations are tumorlike hypertrophies of the lymphoid tissues of the naso-pharynx and especially of the pharyngeal, or Luschka's, tonsils. They occur usually at the age of from 5 to 15 years or earlier, and are observed even in the newborn.

Etiology.—There is sometimes an hereditary disposition, or the development of the growth is preceded by an inflammatory disease of the nose, the mucous membrane of the naso-pharynx and pharynx, or by acute infectious diseases. Sometimes the patient is rachitic or scrofulous.

Symptomatology.—The patient breathes through the open mouth, owing to nasal obstruction. The tonicity of the masticating muscles is gradually changed, owing to continued stretching by the permanently sunken lower jaw. There are fullness of the naso-labial folds and a dull, fixed, irresolute expression of the face. Owing to a deficient function of the sense of smell, inactivity of the alar cartilages, with consecutive atrophy of the respective muscles, occurs later on. With gradual atrophy of the levatores alæ nasi et labii superiores, the depressors alæ nasi, and the septum mobile, the nose becomes pointed and thin. The external angle of the eye is deeper than the internal. The upper lip is thick. There is eczema at the anterior nares. The patient is unable to blow his nose, and the latter is therefore filled with mucus. The submaxillary glands are swollen. The patient snores during sleep, and his sleep is usually very restless. The lower jaw falls down and backward and with it the hyoid bone and the tongue, which latter drops on the epiglottis and produces stenosis. Breathing is thus rendered more laborious, until the child, half-asleep, lifts the tongue upward and breathes easier again. When sleep becomes sounder the previously mentioned condition returns. In the morning the patient

is tired and drowsy, absent-minded, and weak mentally. In addition to this, there is impairment of hearing,—sometimes the chief complaint on the part of the parents,—due to occlusion of the ostium pharyngeum by the vegetations and to spreading of the naso-pharyngeal catarrh. Otitis media, catarrh of the Eustachian tube, etc., are present in about three-fourths of the cases of adenoids. Chronic unilateral otitis and frequent headache are especially suggestive of adenoids. No wonder, then, that such children get along so badly in school!

Further symptoms: Dead, toneless speech (*m* and *n* sound like *b* and *d*); also stuttering, abolition of the sense of smell and taste, more rarely hemorrhage (from the vegetations), reflex paralysis of the vocal cords, asthma, etc. Finally, in advanced cases changes in the throat occur, owing to the difficulty of breathing. There is a widening above, due to the powerful action of the auxiliary respiratory muscles, and narrowing below, owing to the increase of the negative pressure in the thorax ["pigeon-breast"]. With these symptoms in view, the diagnosis is often made by mere superficial examination and by the history alone, without local inspection. On inspection the anterior arch of the upper jaw is found more pointed than in the normal state, thus leaving insufficient space for the teeth, and causing their displacement. The palate is narrow, vaulted, high, arched and pointed, sometimes asymmetrical and angular. The tonsils are greatly hypertrophied (in one-fifth of the cases) and sometimes also inflamed. The velum projects farther from the posterior pharyngeal wall, and cannot be raised as high as usual. Upon the posterior wall of the throat there are often large granules, and at times the lower portions of the vegetations are visible, especially when the velum is raised. Anterior rhinoscopy reveals behind the nose a pale-red, smooth protuberance which permits distinct recognition of the light-reflex. The nasal fossa is generally very wide, owing to atrophy; sometimes, however, it is narrow, due to swelling.

The reflected light of the mirror "dances" during phonation, because this action raises the velum, and the nasal surface which presses against the vegetations lifts the latter upward, showing that the tumor is not in the nose. Otherwise it would be uninfluenced by the motility of the velum. Posterior rhinos-

copy, which is difficult, shows that (after removal of the mucus) the septum and choanæ are not (or only little) visible through the pale-reddish, semicircular, fissured tumor—cracks and cone- and crest- shaped projections. The velum projects far out from the posterior pharyngeal wall, and is therefore incapable of approaching it. Palpation is very valuable as a supplementary diagnostic procedure. The soft masses are usually felt blocking the rhino-pharynx. At times, if the adenoids are very small, they are on examination scarcely visible, and nasal breathing, speech, etc., are normal; nevertheless, the condition is to be suspected from the intractable manifestations: inflammations of the ear, repeated recurrence of rhinitis, pharyngitis, bronchitis, swelling of the bronchial lymphatic glands; scrofulous symptoms, nervous cough, pseudocrouplike attacks, headache, enuresis nocturna, and epilepsy. Finally, in view of the fact that adenoids quite often lead to deaf-mutism; that it may form a *nidus* for tubercle bacilli, and give rise to some pathological changes, energetic treatment must be inaugurated as soon as possible.

Treatment.—Medicines may be tried at the inception of the disease; local applications of Lugol's solution and the internal administration of iodid of iron *(q.v.)* and other alteratives; mineral baths. The progress of the disease is sometimes temporarily arrested by these means, but actual cure is rare. A cure is attained only by operation, performed as early as possible, at all events before second dentition. The operation is painful and disagreeable, and the nervous shock may remain a source of trouble for a long time after. To obviate this, and particularly to remove all vegetations and prevent recurrences, the operation is preferably done under anesthesia (ethyl bromid or half chloroform). [Ether is by far safer. Deep anesthesia is usually unnecessary.—Sheffield.] Gottstein's curette, which has been recently advantageously modified by Kirstein [and Beckman] or Hartman's curette is usually employed; more rarely sharp spoon or cold snare. Bleeding is generally not severe. Very rarely profuse secondary hemorrhage follows several hours after operation, sometimes even after four to five days [rarely, unless caused by retained shreds]. It is then manifested by sudden vomiting of blood, fainting, etc. The hemorrhage is controlled [by injecting through the nares about

$^1/_2$ ounce of peroxid of hydrogen or a solution of suprarenal gland extract—SHEFFIELD] by snugly adjusted cotton-tampons, with two strong silk threads, which are carried from the mouth around the velum to the naso-pharynx and packed tightly against the posterior pharyngeal wall and fornix. The threads are fastened outside of the mouth to the ear. The tampons should be removed after twenty-four hours.

After-treatment.—Cold, fluid, chemically nonirritating food. For a few days the patient is to be kept in the room. Delicate children are to be given iodid of iron, codliver-oil, cold baths, etc.

The results are very quickly noticeable. All symptoms, even the disturbances of hearing, disappear gradually, and usually without special medication. To regulate nasal breathing, prolonged gymnastic exercises, with closed mouth, are often required. Also speech at times remains somewhat impaired from paresis of the velum resulting from its inactivity or from accustomed disuse of the muscles of speech. This must be remedied by electricity and instruction in speaking. Recurrences are rare, but sometimes several operations are necessary at short intervals. However, recurrences take place even after years. For the prevention of recurrences Hagedorn recommends insufflation of xeroform in each nostril, morning and night for several months.

Rhinitis. — Acute *coryza* is very frequently observed in children, who manifest a great disposition to catarrh of the air-passages. Aside from "catching cold," infectious diseases, such as influenza, pertussis, and particularly morbilli, may act etiologically. While coryza is almost never a serious affection in older children, it is quite serious in infants, even dangerous to life in prematurely born, owing to narrowness of the interior of the nose and the choanæ, and the tendency of the affection to extend rapidly downward (bronchitis, pneumonia). Rhinitis may interfere with suckling, cause dyspnea and even severe acute attacks of asphyxia, and also sudden conditions of asphyxia during suckling, disturbances of sleep, etc. It not rarely produces severe impairment of the general health, high temperature, and inflammation of the ear.

Every case of rhinitis in infants, therefore, requires attention. Rest in the room, warmth, calomel (0.01 to 0.015 gram

[gr. $^1/_6$ to $^1/_4$] every two hours); locally frequent tickling of the nose with a small brush dipped in oil, vaselin, etc., to cause sneezing and supply air. In hypersecretion instillation (by means of a spoon) of lukewarm salt water solution may be resorted to, and if there is marked swelling, the mucous membrane of the nose may be painted three to four times a day with a 2-per-cent. cocain solution. It is better to instill into each nostril by means of a dropper from 1 to 3 drops of this solution. In stubborn cases the application of silver nitrate, 1 to 50, once a day, is useful. Careful feeding, if need be by means of a spoon; the same should be done even with the mother's milk. Plenty of fresh air.

So-called *pseudomembranous rhinitis* is more intense. It frequently occurs in scarlatina and diphtheria, but also idiopathically. By some clinicians it is considered diphtheritic in nature. It is characterized by swelling of the mucous membrane, which is covered by gray, easily detached *plaques* (often invisible, when situated in the posterior portions), muco-purulent secretion, and redness and excoriation of the nostrils. In some cases the neighboring parts are edematous, and there is often obstruction of the naso-lacrymal duct, injection of the conjunctiva, and swelling of the glands.

Chronic rhinitis is frequently due to hereditary syphilis, in which it is one of the earliest and most constant symptoms, often preceding all other manifestations. In obstinate rhinitis of nurslings the suspicion of syphilis is therefore always justifiable. *Syphilitic rhinitis* is sometimes manifested only by snuffling respiration; later by sero-mucoid and at times bloody secretion and obstruction of the nostrils by gray or greenish-black scabs. Chronic rhinitis is sometimes due to scrofula, but it may also result from acute coryza, administration of iodids, and hyperplasia of adenoid tissue. Unilateral rhinitis may be due to foreign bodies (prolonged retention causes a purulent, ill-smelling discharge), polyps, abnormal bone-processes, crista septi, and deviation of the nasal septum.

Treatment.—Antisyphilitic or antiscrofulous remedies or removal of other etiological factors. Regular cleansing of the nose with salt or boric acid solution. Painting with silver nitrate (1 to 50), tannin or alum (1 per cent.); also powder in-

sufflations, *e.g.*, thioform, or ointments (5-per-cent. nosophen ointment in scrofulous rhinitis).

Epistaxis is not rare in children. It may occur in the first year of life, and even antepartum. Melena neonatorum is sometimes based upon latent epistaxis. It is therefore important to examine the nose and arrest bleeding, if present. In older children epistaxis may develop from local causes, such as traumatism (blows and falls), erosions (especially of the septum, *e.g.*, in chronic rhinitis), and also from habitual boring into the nose, from foreign bodies, and neoplasms. Epistaxis also arises from general causes. Thus, at the onset and during the course of infectious diseases, such as morbilli, pertussis, typhoid, sepsis, etc.; in passive congestion, heart disease, emphysema, general plethora, struma and adenoid vegetations; and in diseases of the blood, such as hemophilia, scorbutus, Barlow's disease, leukemia, and anemia. In school children epistaxis is sometimes due to overexertion and stooping posture (tight neckwear), especially in overheated classrooms, and in older girls it is sometimes a result of vicarious menstruation (occasionally also in young ones—*menstruatio præcox*).

Treatment during the Attack.—Sitting posture, head erect, and hands folded over the head; cold application to the nose and neck, pieces of ice in the nose or instillation or injection of cold water into the nose (with some vinegar or alum, $^1/_4$ to 1 teaspoonful to $^1/_2$ liter of water; also tannin or liquor ferri sesquichloridi). If unsuccessful, tamponing of the anterior part of the nose with strips of iodoform gauze, dipped in alum [antipyrin, peroxid of hydrogen, or suprarenal extract in solution—Sheffield], or pledgets of cotton dipped in the solutions just mentioned. Internally, if something must be given: mistura acidi Halleri (5 to 10 drops in water *t. i. d.*) [or stypticin]. Removal of local causes [by application of 1 to 2 per cent. of nitrate of silver] or other injurious influences (school exertion) and attention to the general etiological factors. School children suffering from frequent epistaxis should be sent to some health resort during vacation.

Nasal Tumors are rare in children. Those most frequently met are mucous polypi, which are usually soft and jellylike, or fibrosarcomas, which, as a rule, are hard and pedunculated.

Nasal tumors may give rise to hemorrhages, rhinitis, discharges (bloody purulent, if ulcerating), obstruction to breathing if the tumors are large in size, mouth-breathing, snoring, speaking through the nose, obstruction of the lacrymal duct (lacrymation) or of the Eustachian tube (disturbances of hearing); also chronic irritable cough, migraine, and asthmatic conditions.

They should be removed with the cold snare, galvanocautery, or by torsion with a slender forceps. To arrest bleeding tampons (strips of iodoform gauze with powdered alum) should be resorted to for twenty-four hours. Tamponage is also useful in the after-treatment, and should be alternated with instillations of 2-per-cent. boric acid solution. Recurrences are frequent. For the radical removal of large nasal tumors more extensive special operations (splitting of the nose, etc.) are sometimes necessary.

Pharyngitis Chronica develops after repeated attacks of acute angina *(q.v.)* or is scrofulous in nature. Development is slow; the familiar symptoms gradually become more intense; the tonsils gradually enlarge until permanent hypertrophy is established. The latter symptom is manifested by loud snoring during sleep, noisy respiration during the day, nasal speech, and difficulty of hearing, owing to obstruction of the orifices of the Eustachian tubes. Often it is also associated with mouth-breathing, stupid expression of the face, headache, dizziness, fainting spells, pavor nocturnus, enuresis, cough, and prolonged hacking. In severe cases the patient remains mentally backward and also presents a deformed thorax ("chicken-breast"). In advanced stages there is nothing to be done therapeutically but entire or partial removal of the hypertrophied tonsils (tonsillotomy). Incipient pharyngitis may often be cured by painting the throat with tincture of iodin *(q.v.)* or tannic acid *(q.v.)*. [See also "Angina."]

Retropharyngeal Abscess is a rare affection, particularly of children under 1 year of age. It runs a rather latent course and consists of an abscess between the cervical vertebral column and the pharynx. It is imbedded in the latter and gives rise to disturbances of deglutition and respiration. The pain in swallowing is at first not noticeable, or the patient merely distorts his face as a result of pain. Snoring respiration, especially dur-

ing sleep (mistaken for catarrh), is the first symptom of retro-pharyngeal abscess. On inspection a reddened swelling of the pharyngeal mucous membrane is seen which is often covered by mucus. With gradual increase in volume there is a gradual increase in the respiratory disturbance. The patient sleeps with his mouth open, wakes frequently, and anxiously gasps for air. The noisy, snoring respiration which may be mistaken for croup becomes gradually more labored and is accompanied by attacks of suffocation; the patient refuses food or makes a painful face while drinking, or regurgitates the food consumed; his voice sounds dull, he often holds the neck stiff and bent backward. Diffuse unilateral or bilateral swelling is sometimes felt in the upper region of the neck, and sometimes there is swelling of several superficial glands. Occasionally there is turgescence of the external jugular veins.

The DIAGNOSIS is made certain only by a digital local examination, which must be made with caution, as it may cause asphyxia, convulsions, etc. This reveals a round or oval fluctuating swelling the size of a pigeon egg or walnut situated in the median line, more rarely laterally either immediately behind or deeper below the velum. Other fluctuating tumors are rare in this locality in children. One case of lipoma and one of abscess between the tongue and epiglottis are on record.

As soon as the diagnosis is made the abscess should be incised with a straight or, if deeply located, curved bistoury (tenatome) [guarded by adhesive plaster]. In very deeply situated abscesses a guarded pharyngotome may be used. [It is best gently to perforate the abscess by means of a pointed artery clamp and to widen the perforation by opening the clamp.—SHEFFIELD.] After the incision the patient's head should be immediately flexed downward, and the nose and throat cleared of blood and mucus by an injection of boric acid solution. The operation is often quite difficult in children whose oral and pharyngeal cavities are small. It may also be followed by attacks of suffocation. It is nevertheless manageable in almost all cases. The dyspnea disappears immediately after the operation, and the patient is well and lively. Sometimes two or three incisions are required if the first one was too small.

The PROGNOSIS in idiopathic retropharyngeal abscess is good; septic symptoms never follow the operation; in delicate, weak children, however, the prognosis is doubtful. The abscess should be opened as early as possible, as otherwise it may lead to suffocation by occlusion of the air-passage or after spontaneous rupture (especially during sleep), inspiration of the pus (suffocation or pneumonia), involvement of large blood-vessels, and, furthermore, spreading of the pus to the mediastinum or externally between the muscles of the neck. Rupture into the pharynx is very rare.

Retropharyngeal abscess is usually idiopathic in nature or originates from the glands which lie in front of the vertebral column, especially in affections of the nose, throat, and ear, but particularly in scrofula. More rarely it is due to a metastatic abscess or to spondylitis of the cervical vertebræ (here the abscess usually pursues a slower, afebrile course), or a septic abscess, *e.g.*, in scarlatina, morbilli, diphtheria, and erysipelas (associated with a very acute hyperpyretic course); finally, to phlegmons following trauma of the posterior pharyngeal wall by foreign bodies, *e.g.*, glass splinters, etc.

Elongated Uvula is very frequently met in children as a residue of inflammations of the pharynx. The elongation sometimes gives rise to slight disturbances or none at all; but if it is pronounced it may interfere with speaking or sleeping, produce troublesome tickling and coughing, and in very young infants even attacks of laryngismus. It is remedied by applications of alum [or tannin], 20 per cent., or by shortening the uvula with the knife [or scissors].

Angina [Tonsillitis].—Children, like adults, are subject to several varieties of angina: *Angina catarrhalis, tonsillaris, phlegmonosa* [*quinsy*], *parenchymatosa*, etc. The symptoms of angina in children are similar to those in the adult except that in small children the local manifestations, such as pain in swallowing, are not so marked, while, on the other hand, the onset of the disease is usually more violent. Immediate inspection of the throat of children suffering from fever is therefore imperative. Angina is manifested at first by despondency, lassitude, vomiting, and a rapid rise of temperature, which may reach 104° F. Convulsions frequently occur, and the pulse-

rate may reach 120 to 140, and thus suspicion of a more serious sickness may arise. In catarrhal angina these symptoms usually disappear the next day and the disease runs a milder course—is often afebrile or associated with evening exacerbations, and subsides in from three to five days. In angina phlegmonosa and parenchymatosa the course is more protracted and severe. The pus must escape spontaneously or by surgical interference before these conditions are relieved. Angina *follicularis* often resembles diphtheria, particularly if the crypts become confluent and form gray or yellowish streaks. The distinguishing feature of this deposit, however, is its yellowish color, which is not found in the diphtheritic deposit, and the fact that it can easily be removed. The similarity between diphtheria and angina follicularis is particularly noticeable when gray pseudomembranous spots are found on the tonsils and palatine arches. The bacteriological examination, which reveals streptococci or staphylococci or sometimes also pneumococci in angina, renders the diagnosis certain. When it is impossible to make such an examination, decision must be reserved until from twenty-four to thirty-six hours have elapsed, when an angina is usually found improved, while diphtheria assumes a worse turn. Angina is especially suspicious if it simultaneously affects several children, involves the nose, and the urine contains albumin. Certain children are afflicted by angina once or several times a year (sometimes hereditary disposition), and gradually acquire chronic angina or pharyngitis.

TREATMENT.—In the beginning purgation with calomel, a few days' rest in bed, and bland diet. Cold or Priessnitz's compresses externally, and in severe cases external applications of ice, swallowing of ice, a few large doses of quinin and potassium chlorate (the latter, also, as a gargle). In angina phlegmonosa and parenchymatosa early incision is indicated [abscess formation may be hastened by hot poultices]. In children with a predisposition to angina daily painting of the throat with silver nitrate (1 to 20). [As a routine prophylactic measure: Cleansing of the nose and throat twice daily with mild antiseptic or warm salt solutions. Many cases of angina are rheumatic in nature, and sodium salicylate, salol, or aspirin is very useful for the prevention, as well as for the cure, of the disease.—SHEFFIELD.]

Laryngitis [Spasmodic Laryngitis, Croup].—*Acute laryngitis* usually develops from "colds." Effeminate, scrofulous, and anemic children and those whose nasal breathing is interfered with by hypertrophy of the tonsils, adenoid vegetations, etc., are especially predisposed to it. It is also due to diseases of the nose or larynx (rhinitis, pharyngitis) and to infectious diseases, such as measles, typhoid, etc. It seldom begins in severe form, but generally first as a simple catarrh with the following symptoms: Alterations of the general condition (anorexia, languor, etc.); generally moderate fever; often sore throat; also pain to the touch externally over the larynx; change of voice—muffled; hoarseness; in very severe cases complete aphonia; and a harsh, dry or barking cough. In some children the cough has a metallic sound, not necessarily indicating a serious laryngeal affection. The harsh, hoarse, short, "croupy" cough is more suspicious, particularly if the voice is altered and inspiration, especially during weeping or screaming, is accompanied by loud stridor. Respiration in general may be quiet. Such a sudden onset of threatening laryngitis sometimes sets in, *e.g.*, in the first few days after an attack of pseudocroup, but it usually yields rapidly to an emetic. Generally under suitable *treatment*—rest indoors, a few days' rest in bed, induction of diaphoresis by hot drinks (tea, Emser water with milk), Priessnitz's compresses around the neck, also inhalation of [compound tincture of benzoin in boiling water] common or Emser salt in water, and internal administration of a solution of ammonium chlorid or infusion of ipecac,—the cough loosens, the voice clears up within from one to two weeks, and complete recovery soon takes place. [In protracted cases moderate doses of creosote carbonate.] Sometimes, especially in neglected cases and after measles, laryngitis may become chronic and the hoarseness, particularly, continue for a long time. In this event it must be determined by the laryngoscope whether tumors, paralysis of the vocal cords, syphilitic affections, etc., exist.

Chronic laryngitis may occasionally develop primarily, especially in scrofulous children, and is usually associated with disease of the larynx, nose, trachea, and bronchi. In order to cure chronic laryngitis it is naturally important first of all to remove existing constitutional anomalies and affections of the

throat, nose, etc. Frequent inhalations as before mentioned should be ordered, and a nitrate of silver solution (1 per cent.) applied locally. Very obstinate cases improve by water treatment at a spring, such as Ems, Salzbrunn, etc., or by a climatic change (mountains, sea, the South). Sometimes there is great danger of the laryngitis suddenly becoming more intense and giving rise to threatening symptoms. Such an occurrence must always be anticipated. The catarrhal swelling may increase, sero-purulent infiltration, edema glottidis, appear and lead to a fibrinous exudation. In all three eventualities an acute laryngostenosis may supervene and render the symptoms already enumerated still more intense. Furthermore, dyspnea may soon develop and, with hardly accelerated respiration, be accompanied by unusually prolonged inspirations and expirations and a sawing noise, audible from a distance. This noise is not always the same in intensity; it may disappear now and then, particularly after vomiting, and is loudest during sleep. Notwithstanding all these symptoms there is sometimes complete euphoria. If energetic treatment is not instituted early—unfortunately sometimes in spite of it—an increase in the stenotic symptoms soon develops; the pale children gradually become cyanotic, grasp at their throats, and look anxiously for help; the voice grows gradually hoarser, the cough less loud, and finally hardly audible. Such an acute laryngostenosis may be due to other underlying causes and principally diphtheria. The throat should therefore be carefully inspected. Laryngoscopic examinations cannot often be made in children. Even if the throat is apparently clear diphtheria may, nevertheless, play a part, inasmuch as the deposit may already have been cast off and thus made invisible to the examiner. Nevertheless the examination is to a degree helpful in excluding diphtheria and placing the responsibility upon the three causes already mentioned.

If severe catarrhal swelling is present the stenosis will usually yield to energetic antiphlogosis. From two to six (according to age) leeches are immediately applied, closely together, best over the manubrium sterni, so as to leave the laryngeal region free for other measures, and to possess a firm basis for compression to arrest bleeding (after-bleeding should not be

allowed!), should any occur. This is followed by an emetic, inunction of mercury ointment (1 gram [gr. xv] two or three times daily on the sides of the neck), and finally by an application of vesicants over the larynx; the wounded surface thus made should be covered with mercury ointment. Under this treatment the threatening symptoms usually rapidly subside, provided edema glottidis *(q.v.)* or fibrinous exudation does not set in, *i.e.*, if croup or pseudomembranous, fibrinous laryngitis does not develop, which, unfortunately, is often the case.

It must be emphasized that, while in most cases true croup is diphtheritic in nature, a *primary inflammatory laryngeal and tracheal croup* undoubtedly also exists, and every simple acute laryngitis may end in this way. This is especially the case in measles. Croup may also begin with bronchial catarrh and become suddenly complicated by fibrinous tracheo-laryngitis—"*ascending croup.*" This is particularly the case in very young children who are attacked by pertussis with diffuse bronchitis and fall victims to croup. In such cases, owing to the extension of the bronchial affection, the symptoms of laryngeal stenosis reach a very high degree of severity, become more intense from hour to hour, do not yield even to tracheotomy, and finally end in death within one to four days. Occasional remissions are of no prognostic moment, inasmuch as the extreme respiratory difficulty soon returns. If, as it often occurs, small or large, white reticulated shreds (which float in water) and often also complete cylinders with dichotomic ramification or multiple dendritic branchings are coughed up, it proves that not only the trachea, but also the bronchi, are affected. This "*bronchial croup*" renders the prognosis more unfavorable. Improvement from expectoration of membranes must not be relied on, for the latter very quick re-form.

Altogether the PROGNOSIS is very dubious. Notwithstanding energetic treatment, the pulse very often becomes gradually weaker, more interrupted, the cyanosis more intense, the respirations more superficial, and the sound of stenosis weaker. The patients fall into a sopor and die from collapse, which is frequently preceded by twitchings and convulsions. The temperature is not characteristic in croup; usually it is not very high except in the evening, but sometimes it rises very high also

during the day. The prognosis, however, is not always so bad. The children sometimes survive the attack even without tracheotomy [or intubation], provided depletion, emesis, etc., are energetically carried out; the children are not allowed constantly to lie on their backs, but are carried on the arm in a half sitting posture; and are well nourished with soup, milk, and wine. As a rule, tracheotomy [or intubation] is necessary to save the child. The disease may end, however, fatally even under the best method of treatment. Not infrequently fatal brain symptoms occur as a result of consecutive passive venous congestion in the brain or transudation into the ventricles, etc. If tracheotomy [or intubation] is to be performed, it should not be too long delayed. It should be done with the first appearance of threatening symptoms of stenosis, preferably with the advent of continuous forcible inspiratory retraction of the lower portions of the thorax. The results of tracheotomy [or intubation] are far better in primary croup than in diphtheria.

Pseudocroup ([Spasmodic Croup] Laryngitis Stridula) develops either very suddenly or is preceded for a few days by a mild catarrhal condition (snuffling, sneezing). It usually affects young children, and, as a rule, occurs in the middle of the night. Having gone to bed apparently well and slept until about midnight, the patient wakes with a hollow, croupy cough, interrupted by deep, inspiratory stridor; he gasps anxiously for air, and grasps often at his throat; the face is bathed in perspiration, the voice hoarse, and the whole clinical picture appears very alarming. There are only slight redness and swelling of the throat and inflammatory edema of the subchordal tissue in the larynx. Such an attack seems to develop from a catarrh which descended from the nose into the larynx. The secretion desiccates during the night, and gives rise to swelling of the stenosed larynx and consequent attacks of dyspnea, which sometimes pass in a few minutes and sometimes persist hours. The attack is usually followed by quiet sleep, though occasionally one or more similar attacks occur during the same night. Such attacks may also temporarily be produced by pressure upon the larynx. Except a slight, harsh, barking cough, which is soon followed by a loose cough, the child is apparently well during the day. Occasionally the attacks return one, two, and three nights afterward, and disappear within from one to two weeks.

The PROGNOSIS is generally good, except in rachitic children with changes in the thorax, etc. Some children, especially with an hereditary laryngeal stenosis and a family disposition to croup, are frequently attacked by pseudocroup, and, as a rule, do not outgrow it until they are about six or seven years old. On the other hand, false croup is not infrequently the beginning of pertussis or measles; or more rarely of true croup which may follow within from twenty-four to forty-eight hours. Sometimes, again, the attack is so severe that intubation or tracheotomy must be resorted to. The attack is especially apt to occur after morbilli and influenza. In the majority of cases, however, an expectant plan of treatment usually suffices. Copious drinks of warm milk, sugar-water, etc., hydropathic or dry compresses or a slice of pork around the neck, hot mustard baths; inhalation, in closed tent, of salt water, compound tincture of benzoin, and rarely emetics are indicated. [It is always a good plan to begin the treatment with emesis.—SHEFFIELD.] During the day vapor-inhalations should be continued, and internally also infusion [preferably wine of ipecac] administered. Rest in bed, and careful observation until the catarrh subsides. Except avoidance of exposure to cold, attention to every nasal catarrh, etc., there is no remedy which will prevent a recurrence of the attacks.

[PROPHYLAXIS.—Plenty of fresh air during the day; light supper. Removal of local causes, such as adenoids, enlarged tonsils, follicular pharyngitis, etc.—SHEFFIELD.]

Laryngeal Tumors.—Aside from granulomata, which at times develop at the site of the wound after tracheotomy, and the fibromas and malignant tumors (endothelia, enchondromata), which are rarely met in children, various kinds of papillomata quite frequently occur in one and the same individual. They are sometimes congenital. Obstinate, severe cough, hoarseness, difficulty of breathing and even suffocation form the symptomatology of laryngeal tumors, and usually demand operative interference. According to the recent statistics of A. Rosenberg, 231 cases of laryngeal tumors in children have so far been reported and variously treated. The results with tracheotomy were 37 per cent. recoveries and 38.5 per cent. recurrences. Among 34 cases treated with simple tracheotomy, 4

recovered spontaneously, 12 were permanently cured by endolaryngeal treatment preceded by tracheotomy, 1 was temporarily relieved, and 3 had recurrences. With exclusive endolaryngeal treatment there were 50 per cent. recoveries in children up to 4 years of age; 70 per cent. from 4 to 8 years, and over 50 per cent. beyond 8 years of age. Evidently endolaryngeal treatment is deserving of a trial and should be continued as long as the dyspnea is not severe and can be relieved by intubation; otherwise tracheotomy is to be performed and further endolaryngeal treatment resumed. Thyrotomy should be resorted to only in very severe cases requiring immediate attention.

Edema Glottidis (Laryngitis Phlegmonosa) is a sero-purulent, mucous or rather submucous infiltration of the vocal cords and the surrounding tissues which not infrequently complicates laryngeal croup, simple acute laryngitis, or ulcers of the larynx. Sometimes it also accompanies intense pharyngitis, a burn of the esophagus, tonsillar or retropharyngeal abscesses, phlegmon of the throat, erysipelatoid processes, etc.; and finally, also, acute nephritis. The symptoms are the same as in acute laryngeal stenosis (see "Laryngitis"), but so severe that suffocation is threatened at any moment, and apt to occur. The latter can best be obviated by tracheotomy [or intubation]. Antiphlogistic treatment (see "Laryngitis") is very rarely effective.

Laryngeal Syphilis is not rarely met in hereditary syphilis. The most prominent symptom is permanent hoarseness, which, especially in conjunction with other signs of syphilis, must always arouse suspicion. As a rule, it is a question of simple catarrhal inflammation. Other severe affections, such as hypertrophies of the mucous membrane, perichondritis, mucous patches, gummata in the form of vegetations (usually of papillomatous nature), ulcerations, etc., also occur, and may prove fatal by complicating edema glottidis. Such dangers are usually preventable by early specific treatment or by tracheotomy as a last resort.

Laryngeal Paralyses occur chiefly as sequelæ of infectious diseases, such as pertussis, typhoid fever, pneumonia, and particularly diphtheria. They are also not rarely observed in hysteria and in cases due to compression, as in scrofulous lymph-

glands, struma, pleuritic and pericarditic exudates, infiltration of the pulmonary apices, etc.

Foreign Bodies in the Ear are very often found in children, as the latter are in the habit of putting in the ear everything they can get hold of. The history, however, must not too much be relied on. An examination of the external auditory canal should be made to determine whether the foreign body (or several of them) is still there. If found there, the foreign body is best removed by syringing the canal with warm (boiled) water, a 3-per-cent. boric acid solution [preceded by instillation of alcohol], or with glycerin, if the foreign bodies [bean] have a tendency to swell. In the majority of cases this method proves successful. Otherwise it is best to let instruments alone for the time being and to await developments, unless inflammation and suppuration have already set in from unskillful attempts at removal. The foreign body in itself is almost never harmful, even if left in the auditory canal for years. It is often expelled spontaneously, or it is later removable by syringing. If this is impossible, and there is an indication for rapid removal, a cautious attempt at instrumental removal of the foreign body is justifiable. This is best accomplished by means of a hair-pin or Daviel's spoon, introduced behind the foreign body. If this fails it is better to send the case to an ear specialist or surgeon, who will remove the foreign body by an operation (loosening of the concha, etc.).

Otitis.—Otitis, especially middle ear disease, is an unusually common affection of childhood. It is frequently observed in sucklings. In atrophic children dying early, postmortem examination reveals otitis in from 70 to 80 per cent. of the cases. An affection of the inner ear is also a particularly frequent complication in previously healthy children who contract marasmus from one cause or another. Its connection with severe disturbances of the general health, and particularly of the intestinal tract, is at present the subject of much discussion. Heermann sets forth the following views:—

1. Middle ear inflammation in early childhood develops as an otitis concomitans in connection with severe wasting diseases.

2. It is a complication of the underlying disease, does not produce any independent symptoms, and, as far as can be

proven, exerts no influence upon the course of the diseased process.

3. The disease-producing bacteria are found also in the normal Eustachian tube and tympanic cavity. In the debilitated organism they find a favorable soil for their growth.

4. In some cases otitis concomitans seems to assume the rôle of a severe complication. Its differential diagnosis from genuine otitis media, which differs from it etiologically, can be made with difficulty or not at all.

5. Otitis concomitans *per se* requires no therapeutic measures. If, however, it produces acute symptoms, the treatment conforms with that of genuine otitis.

6. Syringing of the auditory canal is to be deprecated in this form as in genuine otitis. It is equally important to limit, as much as possible, the use of the syringe for the purpose of facilitating diagnosis. In cases in which suppuration persists, cautious dry cleansing of the auditory canal must be resorted to, and practiced by the physician himself.

As regards the effect of otitis of sucklings upon the digestive apparatus, Hartmann recently arrived at the following conclusions:—

(a) Acute febrile otitis causes loss of weight or cessation of growth.

(b) Otitis accompanied by severe septic general symptoms may cause diarrhea.

(c) Acute febrile otitis occurring in the course of intestinal diseases may aggravate the general symptoms, and, by diminishing the power of resistance, aggravate the intestinal trouble, cause a recurrence, and retard a cure.

(d) The question whether or not latent otitis, which is demonstrable only by otoscopic procedures, explains chronic atrophy must be determined by further investigations.

Ear disease, whether otitis media catarrhalis or purulenta, may here manifest no symptoms and be overlooked until post-mortem; or it presents symptoms identical with those observed in older children, *i.e.*, more or less high temperature, depression of general health, and, in severe cases, septic and pyemic symptoms and spontaneous pain in the ear, which increases on pressure. The little patients are very restless, cry violently and

spasmodically, grasp possibly the head or ear with the hands, or glide their arms over these parts. There is sometimes infiltration in front or back of the concha auris, and very often, particularly in young children, meningeal symptoms, such as twitching and even convulsions. Opisthotonos, strabismus, nystagmus, facial paresis, etc., also occur, which, even in the worst form, are not indications of extension of the inflammatory process to the meninges, but, on the contrary, not rarely exist in the absence of any demonstrable anatomical cause. They usually disappear rapidly after spontaneous discharge of the pus or after paracentesis, and are simply nervous in character, caused by central toxic irritation or hyperemia. Indeed, such symptoms may sometimes occur in nurslings as a result of severe obstruction to nasal respiration. As long as the fontanelle is not tense or arched, it is not necessarily a question of meningitis; and, even if such is the case, the meningitis is simply serous in nature and curable.

Acute otitis media is very frequently a result of diseases of the naso-pharynx, caused by obstruction of the Eustachian tubes or invasion of bacteria through this channel into the ear and direct spreading of the inflammatory processes. In this manner rhinitis, rhino-pharyngitis, hypertrophy of the turbinated bones and tonsils, adenoid vegetations, etc., frequently lead to otitis. It occurs particularly often in rachitis, scrofulous and tuberculous children, in whom it is prone to become chronic. Furthermore it very often is found in acute infectious diseases, such as scarlatina, morbilli, diphtheria, influenza, pertussis, and pneumonia. It is very important regularly to examine the patients' ears in the course of these diseases, and to pay particular attention to the ears, notably if special symptoms, such as congestion of the tympanum, inexplicable fever, earache, etc., occur, in view of the fact that incipient processes, even existing serous exudations, may frequently be removed by early revulsive and antiphlogistic methods of treatment (ice to the ear, one to three leeches in front of it, and calomel internally).

In case the exudation and the other symptoms do not disappear after from two to three days, it is better to resort to paracentesis, as by this means the frequently persisting defects in the drum-membrane are obviated. The secretion often be-

comes purulent notwithstanding treatment, the fever and earache become more pronounced, the general condition grows worse, hearing is suspended, and the strikingly reddened and swollen membrane gradually arches forward and appears gray or yellow in color. In such cases paracentesis should immediately be performed, for by it not only are the symptoms relieved, but the danger of the pus finding its way inward instead of outward is obviated; and, finally, it enables the physician to select for the pus a favorable outlet, which, if spontaneous perforation takes place, is sometimes very large and draining badly. After an artificial opening has been made, all that is necessary is to remove the pus from the external auditory canal and protect the parts against external injurious influences (bacteria). This is best accomplished by the dry method. The physician, under guidance of the mirror, thoroughly dries the parts once or twice a day, and directs placing in the ear a piece of clean cotton three to four times a day. Besides, as should be the case at the onset of otitis, the patient is kept in bed until a few days after subsidence of the fever. If there is obstruction to the secretion or suppuration is very profuse, the ear should be syringed once or twice daily with 3-per-cent. boric acid solution, and then thoroughly dried.

Under this method of treatment the secretion usually begins to diminish after from six to eight days, and ceases six or eight days later. The perforation then begins gradually to close and cicatrize without leaving any disturbances of hearing. If the sense of hearing returns too slowly, as is often the case; if the pus has escaped spontaneously or the perforation has become extensive and the suppuration continues, Politzer's air-inflation method should be resorted to every two or three days. Slow recovery is not necessarily due to irrational treatment. Unfortunately this sometimes occurs even under the most careful method of treatment, whether the process is grave from the beginning, as is often the case in scarlatina or influenza, or a dyscrasia is responsible for its chronicity. In this event a more energetic plan of treatment must be instituted and an attempt made to arrest the secretion by astringents. A solution of silver nitrate or lead acetate (10 to 20 per cent.) should be instilled into the ear by means of a dropper and allowed to remain for

from five to ten minutes. In large perforations methodical insufflation of boric acid sometimes acts splendidly. When the secretion has diminished, the perforation usually soon heals, or at least it becomes very much smaller.

Sometimes everything fails. In this instance otitis may cause more or less impairment of hearing or even deafness, and in small children deaf-mutism. Since the introduction of Okunev's method of cauterization of the tympanum by trichloracetic acid, however, the prognosis in such obstinate cases has improved; very chronic suppurations are often arrested and old perforations heal under this method of treatment. In acute as well as in chronic cases, however, it is well to remember that as long as pus re-forms it must be given free exit. Any retention of secretion is a source of danger, inasmuch as the secretion may seek another way of escape and the inflammation readily spread inward. This may take place in chronic otitis, *e.g.*, in scrofulous and tuberculous otitis, even under the best plan of treatment. The mastoid cells, the entire petrous portion of the temporal bone, the auditory ossicles, etc., sometimes become the seat of carious processes, which may cause sinus thrombosis, meningitis with abscess formation. If sensitiveness over the mastoid process is detected during the course of otitis, it is to be carefully watched and immediately treated with antiphlogosis (icebag, also leeches); and if the sensitiveness persists and the affected part becomes doughy and edematous, and, notwithstanding perforation of the tympanum, the fever persists, operative interference must be immediately resorted to. According to Wilde, the latter first consists in incision, and, if this fails, opening of the mastoid process with the chisel, whereby further danger is often obviated.

There is a "*dry*" middle ear inflammation which usually affects children who suffer from rhinitis, pharyngitis, adenoids, etc., and which is manifested by moderately severe symptoms, such as dullness of hearing, "tearing" of the ear, and locally by retraction of the drum-membrane and adhesions. The treatment which is usually successful in this condition consists, in addition to removal of the primary disease, of air inflations (Politzer).

Of less frequent occurrence than otitis media is *otitis externa*, which in mild cases is manifested by simple erythema (redness, desquamation), which subsides spontaneously, and in severer cases by catarrhal symptoms, such as increased secretion; swelling, with consequent dullness of hearing; also pain; or even by phlegmonous inflammation (marked swelling, severe pain, formation of abscesses and furuncles). Otitis externa may result from extension of skin eruptions (*e.g.*, eczema) into the ear, from mechanical irritation by foreign bodies, or their irrational removal, living insects, scratching with dirty fingers, entrance of bath-water or milk, from colds, and from infectious diseases, such as scarlatina, measles, influenza, typhoid, etc. It may be gonorrheal or syphilitic in nature. It occurs in scrofula, tuberculosis, and rachitis, in which it is prone to become chronic and cause papillary polypoid deposits, chronic myringitis, etc.

In the treatment of the diverse forms of otitis externa alleviation of the pain is of primary importance. This may be accomplished by Priessnitz's compresses of corrosive sublimate (cotton saturated with a 0.2-per-cent. corrosive sublimate solution is introduced in the ear and covered with rubber tissue and bandage), glycerin, or cocain solutions. In catarrhal otitis attention must be paid to removal of secretion by syringing the ear several times daily with 3-per-cent. boric acid or 2-per-cent. aluminum acetico-tartrate solutions. After each cleansing a tampon of gauze should be introduced into the auditory canal. In chronic cases a solution of silver nitrate (0.1 to 0.2 per cent.), lead acetate (1 per cent.), or zinc sulphate (1 per cent.) should be used. In phlegmonous otitis a Priessnitz corrosive sublimate compress should be applied, or the abscess or furuncle should be incised and drained with gauze. To prevent recurrences after a cure has been effected small pieces of cotton covered with boric acid or zinc salve should be introduced into the auditory canal for some time afterward.

Stammering and Stuttering.—Both of these disturbances of speech, which are so often met in children, are frequently confounded. They are, however, entirely distinct conditions. While they are sometimes associated, they occur also independently and manifest different features. In *stammering* the patient is unable to utter single sounds; he distorts and replaces

them by others or omits them entirely. In *stuttering*, on the other hand, single sounds are correctly articulated, but the patient is unable to utter sentences or words in uninterrupted succession; so that he falters in the beginning of a word or syllable, inasmuch as speaking is interrupted by tonic or clonic contractions of the muscles of respiration, speech, or articulation. At present stuttering is considered by most authorities a spastic co-ordination neurosis caused or fostered by an hereditary predisposition, general physical and mental debility, organic changes, such as naso-pharyngeal affections [chiefly adenoid vegetations, according to B. Fraenkel, Th. S. Flatau, R. Kafemann, and M. Schereschewsky, among others], nervousness, imitation, etc. Some specialists (*e.g.*, Denhardt) lay the greatest stress upon the psychical condition, and believe that fear, delusions, etc., are the primary causes, while the spasmodic disturbances develop secondarily. Liebman is inclined to attribute stuttering to the comparative prolongation of consonants in speaking. He bases his view upon the fact that whenever vowels are prolonged, as in whispering, singing, etc., the anomaly of speech disappears.

The methods of treatment in vogue by different "teachers of speaking," which sooner or later lead to good results if the speech defect is not due to brain trouble and if treatment is instituted early, correspond with the various views relative to the etiology of the anomaly. Treatment of this condition is very necessary, since persistence of the anomaly is often prone to lead to defective intelligence, mental shortcomings, and often to psychical alterations (anger over being teased or left behind in school, grief over the future, etc.). In the past the treatment of these speech defects was solely in the hands of laymen. At present, however, several physicians are engaged in the care of such cases, and by methodical breathing and speaking exercises endeavor and often succeed gradually to restore the normal power of speech in a number of instances.

The patient who *stammers* is, as previously mentioned, unable to utter several sounds at once, and, therefore, replaces them by others. For example, instead of "cap" he says "tap"; instead of "soldier," "foldier"; instead of "soup," "toup"; instead of "lesson," "letton," etc. Or he omits some sounds,

e.g., instead of "stool," "tool"; instead of "flower," "fower." Such a mode of speaking is, of course, physiological in small children ("baby language"), but pathological if it persists beyond the fourth year. The causes of the anomaly are partly the same as those mentioned for stuttering, partly of a local nature, and partly due to anomalies of the mechanism of speech. Children often miss only a few sounds and sometimes most of them. Some children replace all of them by *t—Hottentotism;* others, again, form a language of their own from "their" sounds. Others, again, omit most of the words which form the sentences and make themselves understood by means of a few short syllables—*agrammatism.* They say, for instance, instead of, "I want a stool," "a tool."

Sometimes the children are able to utter all sounds except *s,* and those cognate to it *(ss, sh* [*ce*], foreletters *j* and *ch).* The latter form is designated as *sigmatism,* and comprises three varieties; *sigmatism simplex* (simple lisping), in which the tongue, in pronouncing the sound *s,* instead of remaining behind the lower row of teeth appears with the tip between the teeth. This is rather an esthetic defect, so that speech is intelligible. It is different in *parasigmatism* (sideways lisping), in which condition the *s* sounds are not differentiated, and a single disagreeable hissing is all that can be perceived. This is due to the escape of air from the mouth, over the right and left premolars instead of over the lower central incisors. The disturbance is said to be favored by a certain position and defects of the teeth and anomalies of the jaw. More rare than those named is the variety known as *sigmatism nasalis* (speaking through the nose), in which the pronunciation of *s* and other hissing sounds is manifested by the escape of air through the nose instead of the mouth. Defective separation of the naso-pharynx from the oral cavity, as produced, for example, by shortness or rigidity of the velum palati, is the underlying cause of this defect in speech.

There remain to be mentioned two more anomalies of speech: *Rhinolalia clausa and aperta.* Under normal conditions the oral cavity is separated from the nose by elevation of the velum palati in pronunciation of all sounds except the three nasal sounds—*g, n,* and *ng.* If this is impossible owing to anatomical defects, diphtheritic paralysis, etc., all sounds are

wanting except these three nasal sounds (rhinolalia aperta). On the other hand, if the air cannot escape through the nose, owing to hypertrophies in the nose, the nasal sounds cannot be uttered; *m* sounds like *b*; *n* like *d*; *ng* like *g* (rhinolalia clausa).

Deaf-mutism is just as frequently acquired as inherited. Direct inheritance is very rare, particularly if only one of the parents is a deaf-mute; it is more frequent if both parties are affected. Consanguineous marriages and dyscrasia potatorum in the parents are etiological moments in congenital deaf-mutism; in very many cases, however, it is impossible to detect the cause. Deaf-mutism is chiefly acquired as a result of brain affections (also cerebro-spinal meningitis), acute infectious diseases, particularly scarlatina and typhoid fever, more rarely measles, small-pox, diphtheria, parotitis, and still more rarely injuries to the head and syphilis. Energetic treatment can do a great deal in the line of prophylaxis.

VIII.

Diseases of the Digestive System.

[**The Digestive Tract.**—The digestive tract of children shows, according to L. Freyberger, many anatomical and physiological peculiarities. The oral and buccal mucous membrane in the newly born is practically dry; the salivary and mucous glands of the oral cavity secrete properly from the end of the third month; the diastatic and fermentative qualities of the saliva are not fully established before the end of the second year. The stomach occupies a more or less vertical position; the fundus is imperfectly formed, the muscular coat feeble; there is generally much hyperemia of the mucous membrane. The capacity of the stomach grows gradually, but is subject to much fluctuation, owing to temporary conditions of distension through overfeeding or fermentation.

Capacity of stomach at end of first month....	3	to	4	ounces.
Capacity of stomach at end of second month..	3½	to	5	ounces.
Capacity of stomach at end of third month..	4	to	5½	ounces.
Capacity of stomach at end of fourth month..	4	to	6	ounces.
Capacity of stomach at end of fifth month....	4½	to	6	ounces.
Capacity of stomach at end of sixth month...	5	to	7	ounces.
Capacity of stomach at end of seventh month.	6	to	7½	ounces.
Capacity of stomach at end of eighth month..	6½	to	8	ounces.
Capacity of stomach at end of ninth month...	7	to	8½	ounces.
Capacity of stomach at end of tenth month..	8	to	9½	ounces.
Capacity of stomach at end of eleventh month.	8½	to	10	ounces.
Capacity of stomach at end of twelfth month.	9½	to	12	ounces.
Capacity of stomach at end of second year....22		to	25	ounces.

Hand-fed babies often have distension of the stomach during the first few months, whereas breast-fed babies suffer from it at the time of weaning. The stomach of the newly born contains mucus, pepsin, rennet, and free hydrochloric acid, but in relatively much smaller quantities than in adults. In

breast-fed infants the mothers' milk leaves the stomach in from one to one and one-half hours after feeding; in hand-fed babies the food remains for two hours and longer. The chemical reaction of the gastric juice immediately after a milk meal is amphoteric or alkaline; about thirty minutes later the reaction is distinctly acid, partly in consequence of the formation of lactic acid from the milk-sugar. The secreted free hydrochloric acid is at once taken up by the milk. In the presence of lime-salts the rennet contained in the infantile stomach at once produces the formation of fine clots (mothers') milk; when cows' milk is given, the clots are larger; peptonization and partial resorption of the dissolved albumins takes place, but the chief part of the absorption occurs in the small intestine. The gastric mucosa absorbs a portion of the milk-sugar and salts, but the bulk is absorbed in the duodenum, jejunum, and upper ileum; a partial absorption of water takes place in the stomach and duodenum. The bowels, especially the small intestine, are relatively longer than they are in adults; their capacity is larger. In the newly born the small intestine is about six times the length of the body, and in the adult about four and a half times. The follicular system of the infantile intestinal mucosa is in its development much ahead of that of the glandular structure; hence the want of ferments, but the great power of resorption. The muscular coat is thin and feeble; hence the tendency to constipation and flatulence. The *bile* has few organic salts, especially bile acids, and is therefore unable to help to assimilate large quantities of fat or to prevent fermentation to the same extent as is the case of adults. The liver is comparatively large and much hyperemic. The *pancreatic juice* in the newly born has a feeble power of splitting up fats and of peptonizing; saccharification does scarcely ever begin before the third month. The chyme after leaving the stomach is alkalinized by the gall and pancreatic juice; the peptonized albumins are precipitated, but are redissolved by trypsin and then absorbed; the fats are, through the action of the pancreatic juice, split up into fatty acids and glycerin; the fatty acids are saponified by the bile, and the fat emulsion and the ash to a large extent absorbed. The albumin which is not absorbed is decomposed in the colon and forms a large quantity of gas; the sugar

to a great proportion is transformed into butyric and lactic acids; hence the acid reaction of the feces of many babies.

Of the chief constituents of the mother's milk, sugar and albumin are almost completely utilized; of the fats, about 96 per cent.; of cows' milk, albumin in 1-per-cent. solution is well absorbed, but the amount of absorbed fat is considerably less—namely, about 92.5 per cent. About 95 per cent. of water is reabsorbed. Cows' milk feces contain more phosphoric acid and more lime-salts; mother's milk feces, on the other hand, are richer in iron.—SHEFFIELD.]

Saliva is produced from birth on, but in so small quantity that the oral cavity remains dry, and sugar formation is out of question. The secretion of saliva becomes more marked about the second month, but it is not sufficient to digest amylaceous foods until the child is 4 months old. Exceptions occur sometimes; even newly born infants are able to utilize a considerable quantity, *e.g.*, of Nestlé's [or Carnrick's food among others], and thrive on it; but feeding with amylaceæ before the fourth or sixth month is entirely irrational, and causes dyspepsia, etc.

Salivation.—Aside from salivation usually accompanying affections of the oral cavity [and mercurialism], increased salivary secretion is almost regularly found in otherwise healthy children during first dentition, as a result of increased blood-supply to the oral cavity. Salivation usually sets in before eruption of the teeth and persists for some time thereafter. It also occurs after dentition is completed. Salivation observed particularly in the second or third year of life and in delicate children is probably neurotic in nature, and usually disappears spontaneously in the course of a few years; so that, as a rule, it no longer exists when the child has reached the fifth or seventh year. It usually demands no treatment. If medication appears desirable, iron is about the best remedy. According to Bendix, the following may be given to a child 2 years of age:—

℞ Ferri lactatis ..... 2.0 [3ss].
Sacchari lactis ..... 18.0 [3ivss].
M. Sig.: A knifepointful three times a day.

That form of salivation which is so often observed in cretins and idiots, and frequently associated with intestinal worms, must be regarded as a neurosis. In severe salivation continued wetting with saliva may give rise to extensive eczema.

[PROPHYLAXIS.—Astringent mouth-wash.]

Stomatitis. — 1. STOMATITIS CATARRHALIS is the mildest form of this disease and occurs particularly during first dentition, but also later. It is usually produced by chronic thermal and mechanical irritations, such as that from dentition; carious teeth; sucking nipples, toys, too hot and spiced food; use of mercury, iodin, and antimony. It also occurs in febrile diseases, especially the acute exanthemata, and is probably secondary to lack of cleanliness and attention to the mouth.

Symptomatology.—Redness and velvetlike softness of the mucous membrane, swelling of the gums, coated tongue with prominent papillæ, often marked salivation, so that the sputum dribbles from the half-closed lips; pain, particularly during eating. The patient is restless, cries, and refuses food—the breast or bottle. More or less high fever and some constitutional symptoms are frequently observed.

The *prognosis* is good. With arrest of the irritation, cool fluid food, and care of the mouth (cleansing with 3- to 5-per-cent. boric acid solution) recovery often rapidly takes place. Otherwise potassium chlorate *(q.v.)* externally and internally.

2. STOMATITIS APHTHOSA (APHTHÆ) consists of a fibrinous exudation beneath the epithelium, which gradually undergoes necrotic disintegration. It is probably an infectious disease (by the staphylococcus). Several cases are sometimes seen at once, and not infrequently several children of one family are attacked. It usually occurs during first dentition. Aside from the symptoms already enumerated,—which are, however, more intense in nature,—the mucous membrane of the anterior portion of mouth, especially of the tongue, more rarely of the hard and soft palate and tonsils, is covered by firmly adherent, irregularly distributed, sharply defined, small, grain to lentil-sized, flat, rounded, irregularly serrated or (rarely) lineate, yellow, grayish-yellow, or grayish-white foci surrounded by a dark-red areola. Sometimes tough, spongy plaques the size of a five-cent piece raised above the surface of the remaining reddened mu-

cous membrane are also observed. The edge of the hyperemic, easily bleeding gums, which surrounds the teeth is often disintegrated into a yellowish-gray, crumbling *detritus*. *Fœtor ex ore;* glandular swelling; dribbling of sputum from the swollen, reddened, and half-closed lips; and often considerable initial fever and severe general symptoms are present. Under proper treatment recovery usually takes place within from eight to fourteen days.

Treatment.—Cool, fluid food; washing of the mouth with potassium chlorate *(q.v.);* also local application of carbolic acid (3 per cent.), silver nitrate (2 per cent.), or potassium permanganate (0.1 gram to 15.0 cubic centimeters [gr. iss to ʒiv] of water), and in obstinate cases salicylic acid *(q.v.)*.

The local clinical signs are sometimes observed in severe cases of scarlatina and measles. Here, however, copious hemorrhages from the tongue and lips usually occur.

3. Stomatitis Ulcerosa (Cancrum Oris, Stomacace) is the severest form of stomatitis. It sets in with copious exudation and a tendency to ulcerative disintegration. It is more frequently observed in older children, particularly in those who are delicate; uncleanly; have a tendency to scorbutus, diabetes, etc.; and live under bad hygienic conditions. It also occurs in acute infectious diseases and intoxications with mercury, bismuth, phosphorus, etc. It is often produced by the process of dentition (second dentition), owing to defective care of the teeth and mouth. The mucous membrane of the entire oral cavity is swollen, livid in hue, bleeds easily, and is here and there covered by a discolored deposit and grayish-yellow mass and by numerous ulcers with raised red borders. The ulcers are also found on the tonsils, usually on one side, under which circumstances the stomatitis may be mistaken for diphtheria. The gums are spongy and on pressure pus often oozes from between the teeth. The cheeks, submaxillary region, and the lips are edematous and swollen. This form of stomatitis is associated with intense *fœtor ex ore,* profuse salivation, fever, and severe constitutional symptoms.

Treatment.—Cool, fluid food. Internally potassium chlorate in conjunction with decoction of cinchona (see "Potassium Chlorate"). Frequent cleansing of the mouth with boric acid

and potassium chlorate [peroxid of hydrogen]. Painting the affected parts with zinc sulphate (2 per cent.), and in obstinate cases also with solutions of carbolic acid *(q.v.)*, corrosive sublimate *(q.v.)*, or salicylic acid *(q.v.)*.

Recovery usually takes place within one to two weeks under this treatment. There are also protracted cases, which may end fatally from exhaustion, inanition, etc. More rarely the process extends to the periosteum of the jaw and alveoli (loss of the teeth, partial necrosis of the jaw-bones).

Recently Goeppert suggested the use of aneson *(q.v.)* or orthoform *(q.v.)* to relieve pain and facilitate partaking of food.

[In all cases of stomatitis silver nitrate in 1- to 2-per-cent. solution is the most effective remedy, in addition to removal of the etiological factors. It is very important thoroughly to cleanse the mouth after each feeding, particularly after drinking of milk.—SHEFFIELD.]

Soor (Schwämmchen [Thrush, Aphthæ, Muguet, Sprue]) is a very frequent disease occurring particularly in nurslings, but also in older children. Henoch rightly distinguishes two forms of the affection:—

FIRST FORM.—Isolated, white, slightly elevated, firmly adherent deposits in the form of dots and maculæ, which are situated upon the unaltered mucous membrane of the lips, tongue, and cheeks, particularly in the folds between the lips and gums and between the cheeks and alveolar borders. They differ from fragments of coagulated milk, inasmuch as the latter can easily be detached with a spatula, while the removal of aphthous deposits is difficult and often followed by bleeding. This form is not infrequently observed in otherwise healthy children who are not kept very clean.

SECOND FORM.—The whole buccal mucous membrane down to the pharynx is dark red, very dry, and covered with numerous white, rounded, or irregularly shaped puncta and maculæ, which here and there become confluent and seem to be painful during sucking. In later stages it may form large, white membranes, covering particularly the tongue, cheeks, and hard palate. The latter form is observed especially in atrophic children and in those exhausted from disease. In these cases the mucous mem-

brane often appears more anemic and pale and the spots dirty gray or yellowish instead of milk white.

The aphthous deposits gradually become more firmly adherent the longer they persist. Microscopically they consist chiefly of fungous threads and spores associated with streptococci and staphylococci, fat, blood-corpuscles, etc. "The fungous threads appear in the form of long, slender, straight or variously curved, transparent, sharply defined cylinders made up of several segments. Almost all ripe threads present one or several similarly shaped branches, which start from the main stem at a point where segmentation is marked by septa. The interior of the threads usually contains a few nuclei and several minute oval bodies, which probably are spores in the process of development." (Henoch.)

Thrush is an infectious disease. The causative factor is not as yet definitely determined. Formerly the *Oïdium albicans* was considered to be the exciting agent, but at present the fungus *Monilia candida*, which grows upon moldy wood, fresh cow manure, and sweet fruits, is accepted as the etiological factor. The thrush fungus is widely distributed. It lives in the air of rooms, clings to dirty rubber nipples and to the nipples of the breast, and in this manner reaches the mouth of the infant. Once firmly implanted, it seems to spread, provided the mucous membrane of the mouth is not intact. Indeed, thrush can develop in healthy children only when the mucous membrane is irritated by brisk rubbing or washing, or when, through lack of cleanliness, milk particles are allowed to accumulate and decompose in the mouth. Even slight gastro-intestinal disturbances favor the growth of the fungus, and in debilitated (diarrheal) and atrophic children it spreads very rapidly. Diarrhea, vomiting, prostration, etc., which so often go hand in hand with thrush, are probably not sequelæ, but rather the active underlying causes.

The disease occasionally extends to the deeper portions of the pharynx and esophagus, and not infrequently also to the stomach, but never to the nose. Of the respiratory organs, only the mucous membrane of the glottis, which is provided with pavement epithelium, is now and then affected. The fungus seems to develop only upon pavement epithelium.

Older children are only exceptionally attacked by thrush; for example, in exhausting diseases, such as phthisis, typhoid fever, etc.

The DIAGNOSIS of thrush is quite easy. In mild cases confusion with deposits of casein fragments from milk, and in severe cases with diphtheria, may, however, occur. It may be mistaken also for the membranous epithelial desquamation which sometimes involves the tongue and especially the gums in the form of thin, grayish-white deposits. These are occasionally found exclusively under the tongue as milk-white diagonal cords. The microscope immediately differentiates this condition, however, as it reveals an amorphous, granular mass, but no thrush fungi.

The duration of the disease varies according to the extent of the affection. In the first form repeated cleansing of the mouth with water, especially after meals, suffices to arrest the trouble in a few days; mechanical rubbing with the finger wrapped in fine linen or absorbent cotton—slight bleeding need cause no anxiety—also accomplishes the same result. In cases of the second form and in exhausted and atrophic children it is necessary to administer tonics and also to treat underlying diseases, such as diarrhea, etc. Locally, the mouth should be washed, according to Henoch, with alkaline solutions, such as borax or sodium benzoate (2.0-5.0 to 60.0 grams [ʒss-j to ℥ij] of distilled water) or salt-water (half a teaspoonful of table salt to a glassful of water). According to Baginsky, it is best to use potassium permanganate (1 per cent.), and, according to Bendix, borax with glycerin (2.5 to 10.0 grams [gr. xl to ʒiiss]). Escherich recently recommended "boric acid sucking bags," which remove the deposit and prevent a recurrence without mechanical interference. A pledget of sterilized cotton, well covered with finely powdered boric acid mixed with some saccharin, is wrapped in a small, sterilized piece of silk or fine gauze and given to the child to chew and suck upon. The powder is gradually dissolved by the saliva and the thrush is thus rapidly cured. The "sucking bags" are, as a rule, renewed once in twenty-four hours. In obstinate cases the application of silver nitrate, 1 to 3 per cent., once daily [or 10 per cent. of iodin in glycerin] acts very well.

[The following is a very useful "*mouth-wash*":—

℞ Boric acid..... 3ss (2.0).
Borate of soda..... 3j (4.0).
Hydrogen dioxid,
Glycerin.....aa 3iv (16.0).
Alcohol..... 3ij (8.0).
Rose-water.....q. s. ad ℥iv (120.0).

SHEFFIELD.]

To prevent the first attack as well as recurrences, the strictest cleanliness of the sucking nipples, breast-nipples, bags, etc., must be observed. The breast-nipples must be washed with an alkaline solution before and after nursing; this is necessary also for the protection of the breasts. The rooms must be kept well ventilated, etc., the general health must be improved, and gastro-intestinal disturbances remedied. In thrush involving the œsophagus and stomach the internal administration of resorcin (0.5-1.0 to 100.0 grams [gr. viiss-xv to ℥iij]) is very useful.

The PROGNOSIS of soor in atrophic and debilitated children is not very bad if energetic treatment is instituted; the disease often persists for weeks, however, and not rarely ends fatally.

Noma ([Cancrum Oris, Gangrenous Stomatitis] Water-cancer) is a rare, highly malignant, gangrenous process located upon the face (see farther) of children usually from 3 to 8 years of age. It usually affects cachectic or debilitated children who live in miserable circumstances (bad food, damp dwellings, etc.), or those just recovering from exhausting diseases, such as morbilli, scarlatina, pneumonia, typhoid, or dysentery. More rarely it develops from ulcerative stomatitis. It usually begins with a moderately large, glossy, tense, painless or nonsensitive (to pressure), pale swelling of one-half of the face (especially the cheek, half of the upper lip, sometimes also lower lip and chin), and presents a deep, diffuse, hard mass in its most prominent portion. This is associated with a fetid, often gangrenous, odor from the mouth. The odor is sometimes not very marked. There is difficulty in opening the mouth and in depressing the tongue, owing to swelling. An examination (if possible) will usually reveal on the buccal mucous membrane, or most frequently near the angle of the mouth and rarely on the upper or

lower lip, a small, rapidly spreading, brownish, greenish, or grayish ulcer with raised, edematous edges, or sometimes a flabby, ugly looking blister, which within a few days develops into a large focus covered by a brown, eroded, fetid mass. There is also dribbling of fetid saliva from the mouth, swelling of the submaxillary glands, and sometimes tumefaction of the whole side of the neck. The general health may, nevertheless, be good, if not already preceded by exhaustion. The patient may play, have a good appetite, etc. Usually, however, there is fever (from 102° to 104° F.), and sometimes severe diarrhea, as a result of decomposition of the intestinal contents by the swallowed gangrenous pieces, and even sudden death from rapid collapse. More frequently there is a very rapid extension of the process to the exterior; so that all soft structures—gums, periosteum of the maxilla, also the tongue and lips—become rapidly gangrenous; the teeth fall out and the bone is denuded. The process, which is now visible from the outside, is manifested first by a red spot on the cheek, which turns black within a few hours, rapid decomposition, together with rapid spreading and sloughing; so that the whole thickness of the cheek has the appearance of a dirty, greasy scab. After the slough has fallen off the destroyed oral cavity can be inspected. A great portion of the cheek, lips, and eyelids may be destroyed in this manner. The patient, nevertheless, may be free from pain, and often have a good appetite and relatively good health even until perforation. Then, however (usually before), there is rapid loss of strength, diarrhea, broncho-pneumonia, septicemia, high temperature; weak, irregular pulse; delirium, and sopor. Death usually takes place in from two to three weeks after perforation and rarely suddenly as a result of entrance of air into the veins. Recovery is extremely rare, but is possible even in the last stages. If recovery takes place the face remains fearfully deformed from cicatricial contraction (ectropion of the eyelids, union of cheek with jaw, narrowing of the oral cavity, etc.).

Treatment.—Strengthening food (if need be, administered by rectum), roborants, and stimulants. The gangrenous portion should be destroyed as soon as possible with the Paquelin cautery, and the mouth should be frequently washed with a solution of boric acid [nitrate of silver] or salicylic acid [peroxid of

hydrogen or Labarraque]. Externally, cotton saturated with wine of camphor or a 10-per-cent. Peru balsam ointment should be applied. Success is rare. Sometimes when a patient is apparently saved, and cicatrization is established, sudden collapse and death occur. Noma is rarely located upon the *genitalia*, especially of young girls (after measles). In one case of gangrenous vulvitis Freymuth and Petruschky found Loeffler's bacillus, and diphtheria antitoxin acted favorably. Some cases of facial noma are, perhaps, due to the same etiology and remediable by the antitoxin treatment. Indeed, several cases of the kind have recently been reported.

Ranula is frequently observed in children as a globular, usually unilateral, tense, cystic swelling the size of a pea to pigeon's egg, which is located on the floor of the oral cavity, sometimes close to the frenulum. This tumor should not be mistaken for the two tubercles on each side of the frenulum,—the glandulæ sublinguales,—which are not rarely seen in young children. Here it is a question of dilatation of Wharton's duct or of single glandular lobules. The tumor sometimes has thin and sometimes thicker walls and contains a thin or viscid fluid. A small ranula does not disturb the child; a larger one may interfere with suckling, swallowing, and breathing. In this event the anterior wall should be incised and cauterized several times with silver nitrate. A ranula with thick walls should be extirpated *in toto*. In small children it usually suffices to dry up the cyst by the introduction of a hair seton or silk thread. Occasionally it heals spontaneously, *e.g.*, after suppuration.

Produzione Sottolinguale Dell Infanzia [Sublingual Growth, Riga's or Fede's Disease] is a term used by Italians to designate a benign neoplasm located at the point of insertion of the frænum linguæ. It is caused by irritation by the incisors or hardened edges of the gums during awkward suckling. It is often observed in Italy among nurslings. A German author, Reinbach, observed it also (in 1897) in a breast-fed child 10 months old. In this case the neoplasm appeared centrally and symmetrically under the tip of the tongue from four to six weeks after the eruption of both middle incisors. It was as large as a five-cent piece, round and flat, with a broad, erect, whitish-red pedicle, hard in consistency and slightly roughened.

It was first incised, but, as it returned after from three to four weeks and became much larger in size, extirpation was resorted to. Reinbach considered it a fissured angioma, Mikulicz a vascular tumor. [One case of this kind was observed (1902) in this country by S. Amberg. The child in question was 7 months old. The parents of the baby were of American birth and free from constitutional and particularly specific diseases. The tumor underneath the tongue was from 1 to 1.5 centimeters in diameter and about 5 millimeters thick. The oral surface of the tumor was pearly white in color and surrounded by a reddish margin. The tumor was removed without recurrence.—SHEFFIELD.] Although the tumor, as a rule, does not alter the general health [sometimes debility, anemia, splenic enlargement], it is best to extirpate it, as a less radical method of treatment is of no avail.

Pityriasis Linguæ (Leukoplakia Linguæ, Lingua Geographica) is a partial detachment of the epithelium of the tongue frequently associated with thickening of the epithelium of other parts, so that the organ presents a spotted appearance. This is an innocent affection, and is sometimes observed in chronic gastric catarrh. It is of no significance. No treatment is necessary [except cleanliness].

Glossitis.—The tongue usually participates in all catarrhal, phlegmonous, ulcerous processes of the oral and pharyngeal mucous membrane. The changes produced by syphilis, aphthæ, diphtheria, scorbutus, etc., will not be discussed here. The tongue is subject to two independent catarrhal diseases: The so-called *erythematous glossitis* and *desquamative glossitis ("geographical tongue")*. In the first variety, which is very distressing and usually accompanies dyspeptic diseases, but occurs also without them, the very painful tongue appears dark red, especially at the edges, somewhat thickened, and the papillæ are prominent. The children are usually also feverish and restless and refuse food. Swabbing with borax or 1-per-cent. nitrate of silver solution hastens recovery. The latter, however, usually takes place very slowly, unless the affection disappears simultaneously with the dyspeptic symptoms. The "*geographical tongue*" is not as often supposed a sign of syphilis, but merely a purely local and innocent process consisting in desquamation

of epithelial cells in some parts and hyperplasia in others. As a rule, a brownish thickening appears first at the margin of the tongue and gradually spreads and coalesces. The epithelium is then thrust off, so that the affected parts of the tongue become red and traversed by irregular, circumscribed lines of thickened epithelium. This may go on alternately for years in otherwise healthy children. The affection requires but little treatment [except cleanliness].

Bednar's Aphthæ are round or, more rarely, oval, small (seldom over one centimeter in diameter), whitish-yellow to dirty-greenish, superficial, easily bleeding erosions, surrounded by a red zone. They are observed in earliest infancy and appear symmetrically at the posterior border of the hard palate laterally from the middle line of the niveau of the apophysis pterygoidea. They are not syphilitic, nor do they originate from those miliary tubercles of the palate which are limited to the raphé and are sometimes seen in the newly born infant under 3 months of age. They are simply decubital erosions arising from desquamation of the epithelium during the act of sucking; thus, as a result of friction and pressure against the dorsum of the tongue (anemia of the mucous membrane).

In otherwise healthy children there is generally rapid, spontaneous recovery; in cachectic and atrophic children, however, ulcerations follow as a result of infection by micro-organisms, which spread along the surface, grow deep, and eventually reach even to the bone. They sometimes assume the shape of a roll or butterfly, and extend from the raphé to the alveolar border of the jaw. Owing to the great pain, restlessness, and interference with sucking, the child rapidly loses in weight, if the disease is not remedied early.

Treatment.—Local application of silver nitrate (1 to 50 or 30) or zinc sulphate (1 to 15 or 10).

Prophylaxis.—Regular, gentle cleansing of the mouth.

Epithelial Pearls are small, slightly elevated millet-seed to pin-head-sized, round or oval, yellowish-white nodules which are at times surrounded by a narrow, red zone and resemble milia of the external skin. They were previously thought to be occluded mucous follicles or dermoid cysts until Epstein proved that they are remaining defects in the mucous membrane after

the union of both halves of the palate and that these clefts are filled with epithelium. They are quite frequently found either singly or in groups on the hard palate of the newly born infant (in the first six weeks), usually close by and on both sides of the raphé. Epithelial pearls are innocent growths which require no treatment. They rarely ulcerate and form either small or sometimes deeper ulcers with gray or yellowish-gray base and red margins. The ulcers may interfere with sucking. Under these circumstances they must be touched with lunar caustic, when they rapidly disappear.

Esophagitis may develop secondarily to affections of the mouth and throat, such as stomatitis, aphthæ, and diphtheria. With early energetic treatment of the original diseased focus further extension can usually be prevented, particularly in stomatitis and aphthæ. If, however, these processes continue, the esophagitis can usually be remedied within a short time with proper diet (gruel, milk), swallowing of ice, Priessnitz compress, and internal administration of sodium benzoate or sodium biborate. In diphtheritic and scarlatinal necrosis the inflammation extends deeper and causes ulcerations. If the patient survives the underlying disease, the esophagitis may, nevertheless, persist for a long time and produce secondary stricture (see "Esophageal Strictures"). This is also the case with esophagitis following mechanical, thermal, or chemical irritation (foreign bodies, burns, caustics, etc.).

Esophageal Strictures are rarely congenital. The children swallow with difficulty from the first day on and the milk is regurgitated through the mouth and nose. If the stricture is not as severe, the patient may reach old age. Esophageal strictures are occasionally also a result of compression by neighboring organs and tumors. Carcinomatous degeneration of the esophageal walls has been observed. Henoch once saw this disease follow severe scarlatinal necrosis (see "Esophagitis"). Most frequently esophageal strictures follow burns and the effects of caustics—drinking of hot fluids, caustic potash, etc. In this event evidences of caustic action are visible in the mouth and pharynx a few days after the accident. After expectoration of mucus and blood the patient is unable to swallow, owing to severe pain; he is hoarse and loses his voice as a result of

cauterization and swelling of the laryngeal passages. There is also intense gastritis. Later esophageal stricture develops, which produces the well-known manifestations.

The DIAGNOSIS is established by introduction of an elastic catheter, or a whale-bone sound provided with small, olive-shaped steel tip.

The TREATMENT consists of gradual dilatation by daily introduction of bougies or olive-shaped metal or ivory-tipped sounds which are left in the esophagus for from five to six minutes. Sometimes only thin catgut strings can be passed in the beginning. Great patience and caution are required to avoid perforation. If this treatment is not continued for weeks or months, success is only temporary. Even then improvement may not be of long duration. In frequent recurrences operative interferences (esophagotomy, gastrotomy) may be resorted to.

[For introduction of the bougie the patient is placed in a sitting posture with the head extended slightly backward. The oiled instrument is guided over the dorsum of the tongue and the epiglottis into the esophagus by the first two fingers. The question of feeding is very important. If the stenosis is so pronounced as not to permit the passage of liquid food, rectal feeding must be resorted to.—SHEFFIELD.]

Esophageal Diverticula are rarely found in children. They are either congenital or acquired through traction by contracting tissues, *e.g.*, bronchial glands and scars. They present the same symptoms as in adults. Sudden death sometimes occurs as a result of ulceration and perforation. Operative attempts to eliminate the esophageal diverticula have so far failed.

Dyspepsia is very often observed in children and even in sucklings. Not every act of vomiting—particularly that which occurs in entirely healthy, well-nourished children immediately after feeding or somewhat later—is due to dyspepsia. The latter form of vomiting is merely a result of too hasty or too frequent drinking or eating. If, however, vomiting occurs repeatedly without these moments; if the appetite is distinctly impaired; if the vomitus is mixed with masses of mucus or, perhaps, has a sour or fetid odor; if the general condition of the patient is more or less altered; and the child does not gain, but, on the contrary, loses strength, then, of course, dyspepsia gastrica is

to be dealt with. The dejecta in this condition may at first be entirely normal. Frequently, however, they very soon undergo certain changes. The feces become greenish, mucoid, or fetid, and meteorism and flatulence soon appear. In the early stage the number of stools may be normal or constipation may exist. Often this condition is very soon attended by dyspepsia intestinalis, in which vomiting is absent or insignificant. There is usually anorexia, coated tongue, and scanty urination. Intestinal disturbances, such as flatulence, colic, and diarrhea, with thin, fluid, green stools containing flocculi and clumps of mucus (see also "Fat Diarrhea"), predominate and form the transitional stage to true intestinal catarrh *(q.v.)*.

Dyspepsia is usually caused by faulty or at least improper feeding. This may also be the case with breast-fed infants receiving milk that has become changed in quality, owing to emotional effects, acute diseases, or menstruation in the nursing mother, and is improperly digested. Infants very often become dyspeptic during weaning. Dentition occasionally furnishes an increased predisposition to dyspepsia. Babies artificially fed are much more frequently affected. Bad quality of milk, deficient cleanliness, invasion of the alimentary canal by chemical and bacterial toxins, and overfeeding cause dyspepsia in some infants, while pure farinaceous food, at a time when they are unable to digest it, or eating "everything their parents eat" is the cause in others—no wonder that fermentative and putrefactive processes are soon established or that real catarrhal conditions soon develop as a result of continued irritation!

As the symptoms develop gradually and imperceptibly the dyspepsia is very often neglected for a long time, and the patient when seen by the physician is already in a condition of atrophy or at least suffering from severe gastro-intestinal catarrh. At times, especially when the mode of dieting has been greatly abused, dyspepsia begins very acutely, with severe symptoms, resembling cholera nostras (these cases always occur, however, sporadically, and also in the winter!), and may cause serious, even fatal, results in a few days. This form of dyspepsia is characterized by violent vomiting and frequent, profuse, thin, offensive evacuations, which gradually turn lighter and more colorless; also enormous thirst, exhaustion—sinking

of the eyes, cool skin, depression of the fontanelles, barely perceptible pulse; then apathy, somnolence, and convulsions.

Dyspepsia does not always end fatally; on the contrary, it may readily be cured if the irritating substances are rapidly eliminated and treatment is instituted early and energetically. In less violent cases, also, treatment must be thorough in order to obviate danger. First of all, the diet must be regulated, *i.e.*, the harmful food must be removed and an appropriate diet substituted. If overfeeding is the cause of the dyspepsia, the child is to receive the breast less frequently, or, perhaps, not at all for a few days. Instead of the mother's milk, thin oatmeal or barley gruel or albumin-water (white of an egg to 1 glass of water, mixed with a little cognac) may be given. If a wet-nurse proves unsuitable for any length of time, a change in the nurse is imperative. In bottle-fed babies the question of artificial feeding must be based upon a rational foundation. If milk was for some reason or other never given it should at once be tried, as it may prove to act kindly. If the vomiting still persists, it may often be arrested by teaspoonful doses of cooled milk. If milk is not tolerated (sometimes it is favorably influenced by the addition of lime-water), it may be diluted with soup or gruel of barley, rice, or oatmeal or artificial milk foods [*e.g.*, Reed & Carnrick's, in infants; somatose in older children] or other food-preparations may be used.

In acute cases with violent symptoms lavage (with resorcin, 0.1 gram [gr. iss] to $^1/_2$ liter of water) should be tried. One or two such irrigations may change the symptom-complex surprisingly. The medicinal treatment is begun with calomel and for some time followed by hydrochloric acid (with some opium if indicated). If this is ineffective, creosote *(q.v.)* and resorcin *(q.v.)* may be tried, both of which are especially serviceable in dyspepsia intestinalis. If the latter predominates, bismuth should be resorted to, preceded by a few doses of calomel. In chronic cases silver nitrate, tannin, or its substitutes (tannigen, tannalbin, tannoform, tannopin) may be given.

Dyspepia is not rare in older children, and is caused by overloading the stomach. It is manifested by anorexia, coated tongue, *fœtor ex ore*, headache, thirst, fever (may be absent or very high!), constipation (also diarrhea), sensitiveness to pres-

sure over the stomach and abdomen, but, above all, by vomiting. Also reflex symptoms—*e.g.*, *asthma dyspepticum*—may occur. In acute cases in which vomiting has not taken place, an emetic followed by a purgative often acts marvelously, merely requiring a few days' administration of hydrochloric acid [or orexin tannate] and regulation of diet. Chronic cases are usually the result of neglected acute cases or are secondary to tuberculosis, anemia, etc. In addition to regulation of diet, they call for stomachics, mineral waters, etc.

Gastromalacia ([Morbid] Softening of the Stomach) is an alteration in the stomach-wall sometimes observed in cadavers of children dead from severe gastric diseases (neglected dyspepsia). The mucous membrane, chiefly of the fundus and posterior gastric wall, although free from signs of inflammation, is pappy, soft, and also converted into a greenish-yellow or brownish-black jellylike mass. This condition is not, as previously assumed, a disease *per se*, but according to Henoch a process of self-digestion of the gastric wall, postmortem. According to Widerhofer, cases are met (tuberculous meningitis, atrophy) in which gastromalacia occurs in the living child immediately before death.

Bulimia (Excessive Hunger) may be due to bad habits, under which circumstances only palatable articles are usually craved. Often, however, it is a symptom of a disease. Intestinal worms, hysteria, and brain disease are especially liable to lead to bulimia. In such cases even badly tasting, raw food, or almost anything, is swallowed. Bulimia due to worms disappears after expulsion of the worms. In the other cases treatment offers poor prospects of cure.

[Singultus (Hiccough) is very common in young infants. It is usually due to some irritation in the stomach. It occurs also from chilling of the surface of the body during a bath and from suddenly taking the child from a warm to a cold place. It is sometimes symptomatic of inflammatory lesions of the abdominal viscera (strangulated hernia and intestinal obstruction). In older children hiccough may occur as a pure neurosis, sometimes through the influence of imitation.

The PROGNOSIS is generally good except in cases associated with severe intestinal lesions.

Treatment.—In the majority of cases a few teaspoonfuls or hot water, with or without a carminative, are usually effective. "In cases of so-called *essential hiccough* we may see relief obtained by rapid and uninterrupted respiratory movements (Mathieu), a spray of ether to the epigastric region (Regoni), or other cutaneous revulsives, or by the swallowing of liquids while the ears are closed with the tips of the fingers." Very rarely drugs, such as belladonna, phenacetin, chloral, sulphonal, etc., have to be resorted to.—Sheffield.]

Cardialgia is rarely caused by indigestion and its concomitant symptoms or by ulcus ventriculi *(q.v.)*, which is rare in children. It is more frequently due to a dilatation of the stomach. Cardialgia occurs most frequently in older children, particularly chlorotic girls, at the time of puberty, and seems to be due to an arrest of gases in the stomach by a spasm of the gastric orifices. It is manifested by bloating and tension at the epigastrium during the attacks, so that tightening of the clothing cannot be tolerated. Suitable diet, regular exercise, evacuation of the bowels, and attention to the chlorosis gradually relieve these symptoms. During the attacks warm cataplasms and in severe cases small doses of aqua amygdalæ amaræ, cocain, morphin, etc., should be administered until relief is obtained. Small doses of silver nitrate (0.03 to 100.0 grams [gr. ss to ℥iij], 1 teaspoonful three or four times a day) often act exceedingly well. In cases due to indigestion a quick emetic acts best. The latter, however, is contra-indicated if inflammatory conditions or injuries of the organ (*e.g.*, scalding) are suspected.

Dilatatio Ventriculi [Dilatation of the Stomach] is not frequent in small children. It is rarely produced by a single overfeeding. It is more frequently observed after prolonged overloading of the stomach, especially in rachitic children, who often have a ravenous appetite, and in improperly fed (amylacea) children of the poorer classes. The fermentative dyspepsia resulting from bad feeding is, however, the chief etiological factor. Strict diet; frequent, small meals; avoidance of all quickly fermenting foods, etc.; frequent washing of the stomach; administration of antifermentative remedies, such as calomel, bismuth [orphol], resorcin, etc.; strengthening the tonus of the gastric musculature (tincture of nux vomica), and antirachitic treatment usually quickly cure this ailment. The

prognosis is better in children than in adults, provided, of course, it is not a question of that (rare) *congenital pyloric stenosis (q.v.)*. The most frequent cause of dilatatio in the adult, the late forms of pyloric stenosis, does not exist in children. The symptoms of dilatation of the stomach are sometimes met in girls at puberty and more rarely in boys. In these cases, however, hysterical symptoms precede or accompany this condition, and are then to be regarded as an hysterical spasm of the orifices of the stomach. Lavage acts very well in these cases. The faradic current is also useful, but its effect is only transient, lasting hours or at most days. Dilatatio usually disappears spontaneously in a few weeks or months.

Ulcus Ventriculi [Ulcer of the Stomach] is very rare in children under 10 years of age. It has been observed in sucklings; one case in a child 2 months old is recorded. It gives rise to the same signs and complications in children as in later years (fatal hemorrhages, perforation peritonitis). Ulcer of the stomach is quite frequently observed in older chlorotic girls. Nervous and hysterical conditions must not be mistaken for it.

The TREATMENT is the same as in adults. [Liquid diet, and in obstinate cases rectal alimentation. Bismuth, silver nitrate, and small doses of morphin. In obstinate vomiting, minute doses of carbolic acid or tincture of iodin.—SHEFFIELD.]

Constipation.—Chronic constipation occurs very frequently in children of every age. Aside from constipation caused by gross abnormal anatomical relations or diseases, which will not be discussed here, this condition is also due to hereditary disposition, congenital atony of the bowels, or a dyscrasia (anemia, rachitis). Constipation is very often caused by the food consumed. The latter cause may be potent even in sucklings, when either the milk of the wet-nurse does not agree with them or is insufficient in quantity. The small quantity of stool then depends upon the insufficient quantity of milk ingested; or the woman's milk contains too much or too little of one or more of the constituents of the milk. Too early feeding with amylaceous foods, etc., is sometimes the cause of constipation even in older children. In some children constipation is produced by consumption of food that does not stimulate peristalsis, such as an exclusive diet of milk, meat, eggs, etc., and no potatoes, bread,

vegetables, etc., by insufficient exercise or by habitual suppression of the bowel-movement; in others it is dependent upon an anatomical defect (stenosis, dilatation).

In treating constipation it is important first to look for the underlying causes and remove them. When this is accomplished the constipation will successfully be overcome. In sucklings the constipation can often be relieved by slight changes in the food (the percentage of dilution) by the addition of more sugar, or fat in the form of cream or butter, and sometimes by more radical measures, such as change of wet-nurse, weaning, or Gaertner's fat milk. The addition of malt extract to the milk (1 teaspoonful twice daily) may be tried. In older children regular evacuations may sometimes be produced by buttermilk, honey, raw or cooked fruit, or a glass of cold water taken on an empty stomach. Sometimes a Priessnitz compress around the abdomen during the night acts splendidly; equally worthy of recommendation is abdominal massage. The latter two procedures are especially useful in atony of the bowels. In these cases tincture of nux vomica may also be tried for a long time, in addition to attention to dyscrasias. If all these measures fail, medicines must be resorted to. Effective and relatively harmless are the following: Soap and glycerin suppositories, enemas with small quantities of glycerin or larger quantities of water; internally magnesia usta, magnesia and rhubarb, compound licorice powder, or syrup of rhubarb. In larger children also compound licorice powder, castor-oil, extract of cascara sagrada, essence of tamarind (Dallmann), and bitter waters (Hunyadi Janos is best known and tastes [bad!] and acts well). [In the majority of cases of constipation in small children the trouble lies in the rectum and lower portion of the colon. It is sometimes chiefly the question of stimulating the rectum to initiate the muscular effort. For this purpose gluten or medicated suppositories are very effective and preferable to drugs by mouth.

℞ Extracti nucis vomicæ..... gr. j (0.06).
Extracti belladonnæ..... gr. ss (0.03).
Aloini..... gr. j (0.06).
Olei theobromatis.....q. s. ut ft. suppos. no. xij.

Sig.: One to be introduced into the rectum every evening. (For a child 3 years old.)—SHEFFIELD.]

Colic (Enteralgia, Neuralgia Enterica) is a very painful spasmodic contraction of the intestinal musculature. The colicky conditions occurring with other affections, such as enteritis, peritonitis, intestinal invagination, intestinal strangulation, etc., are not included here. Here belong chiefly reflex spasmodic conditions caused by pathological irritations, which act by way of the peripheral cutaneous nerves or the sensory intestinal nerves. Among such irritations may be mentioned dyspeptic, retained or toxic (decomposed) intestinal contents, accumulation of gases *(colica flatulenta)*, worms, and cold (cold feet). Colic may be caused also by the milk of nursing mothers whose psychical condition is altered. Colic sometimes appears as a pure neurosis, caused by as yet unknown processes in the intestinal nervous system. It also may be purely hysterical in character. Rarely colic is produced by poisoning, *e.g.*, lead, as by cleaning the drinking utensils with shot or sucking a nipple the rubber of which contains lead. Colic develops suddenly, often during apparently the best of health, and disappears after a shorter or longer time. The duration depends upon the time required to get rid of the gases or stool. During an attack the patient's face is spasmodically drawn and bathed with cold sweat. The child refuses food, cries out continuously, and draws its legs upon the abdomen. The pulse is small and the extremities cold. In small, very excitable children the reflexes spread to the central organs, and, as a result, there are twitching, convulsions, coma, and sometimes a fatal termination. As a rule, the termination is not quite as unfavorable, but, on the contrary, the colic usually ceases, especially under suitable treatment. Heat, either in the form of fomentation, rubbing of the abdomen with warm oil, or drinking of chamomile or peppermint tea, is a very efficient remedy. This must be preceded, of course, by rapid evacuation of the flatus or stool, which is best accomplished by means of warm water irrigations, followed by a few doses of calomel. If the colic does not cease, small doses of opium act best. This drug need not be dreaded except in very weak children. Sometimes extractum belladonnæ by mouth or in suppository, tinctura moschi (4 to 5 drops every half hour), or spiritus ætheris nitrosi (5 to 10 drops every half hour) act well. After cessation of the colic strict diet should

be ordered, and calomel with bismuth and magnesium carbonate to disinfect the bowels. In purely nervous colic, bromid, and, in convulsions, enemata with chloral hydrate, are to be given.

Enteritis (Intestinal Catarrh) usually affects young infants, and is caused by the same injurious influences which give rise to dyspepsia *(q.v.)*. Sometimes the latter serves as an etiological factor. In other cases the enteritis may be primary, and often later be associated with a disease of the stomach, resulting in gastro-enteritis. In older children enteritis is caused chiefly by chemical and bacterial irritants in the food, and also by mechanical (*e.g.*, foreign bodies) and atmospheric (getting wet, "catching cold") influences. Enteritis also occurs secondarily to other affections, such as measles, scarlatina, typhoid, pneumonia, bronchitis, sepsis, uremia, rachitis, syphilis, etc. The chief symptom of enteritis—in this form of the disease the *small intestine* is most frequently involved—is diarrhea. The number of stools varies, but is always larger than in normal condition. The feces are usually expelled with noise, owing to the fact that enteritis, like any other catarrh, is manifested mainly by an increase of mucous secretion. This gruel-like to liquid stool contains, aside from normal masses of feces, undigested remnants of food, and more or less mucus in the form of shreds or small clumps. As already stated, the diarrhea is frequently associated with gastric symptoms, such as meteorism and colic. Enteritis usually develops gradually with or without slight remittent fever. Some cases of enteritis begin acutely with high fever and even eclamptic attacks. This is usually the case with catarrh of the *large intestine (enteritis follicularis)*, in which, in addition to the catarrh, ulcerative processes readily develop. The stools, which are passed with severe tenesmus and colic, often lose the fecal character and consist chiefly of masses of mucus and blood or pure blood. The prognosis, especially in young children debilitated by other diseases, or in those with a dyscrasia, is more serious than in catarrh of the small intestine, which usually rapidly subsides under energetic methods of treatment. Generally every case of enteritis must from the beginning be looked upon as serious, as the mesenteric glands are very apt to become swollen and caseated, and its chronicity is apt to prove fatal *per se*. Owing to the prolonged loss of vital

fluids, the remittent fever, etc., the patients become pale, flabby, and emaciated, prolapsus recti and edema set in, and a condition of complete atrophy gradually supervenes.

In primary enteritis particularly it is of vital importance immediately and thoroughly to investigate the cause, which is usually found in the mode of feeding, and to suitably correct the latter, without which recovery is impossible. In older children also strict diet is of primary importance. Gruel-soup, rice, barley, acorn-cocoa, bilberry dessert [somatose], red wine, black tea, and cognac only should be given for a long time. All foods which are digested with difficulty and easily ferment should be avoided, even at a later period. In acute cases a purgative (calomel or oleum ricini) is best. In cases in which thin stools have existed for some time immediate administration of an infusion of ipecacuanha with opium; the latter in powder form in combination with bismuth subnitrate [orphol or dermatol] is also indicated; or the latter in combination with pulvis Doveri. Also a decoction or tincture of radix colombo or cortex cascarillæ is of service. Very useful also are the preparations of tannin [tannigen, tannopin] instead of tannin itself, and, in acute febrile enteritis, quinin tannate. In chronic cases, notably in follicular enteritis, silver nitrate and lead acetate are to be administered. Also irrigations of the bowels with 200 cubic centimeters of lead acetate (5 to 1000), alum, or tannin solution (20 to 1000 [℥v to Oij]) are also of value.

Cholera Nostras (see page 221).

Dysentery (see page 224).

Fatty Diarrhea is a term used by Demme and Biedert, among others, to designate a symptom-complex which in addition to symptoms of dyspepsia is characterized by the passage of copious, acholic, fatlike, glistening, and very fatty stools. Biedert attributes it to duodenal catarrh, which impedes the entrance of the saponifying secretions (bile, pancreatic juice) into the intestines. According to recent observations, the fat-content of the feces, however, is so variable even in the healthy infant, and especially in those suffering from diarrhea, that it is not advisable to lay special stress upon the increased fat-content. Henoch, therefore, does not concede to it a separate place, but maintains that it belongs simply to dyspepsia *(q.v.)*.

Ileus (Obstruction of the Bowels) in children is almost identical with intestinal intussusception. Incarcerated hernia, peritonitic adhesions, scybala and other foreign bodies (in one case impaction of roundworms), tumors and scars in the intestine or its vicinity (compression), and trauma (*e.g.*, blow in the abdomen) may also lead to ileus whether by simple obstruction of the lumen of the bowels or by pulling, axis rotation, and invagination of the bowels (volvulus). The latter condition is sometimes congenital and a result of fetal peritonitis, encroachment by Meckel's diverticulum, etc. The children thus affected live, however, only a few days.

The SYMPTOMS and TREATMENT of ileus are identical with those in the adult. [Full doses of atropine are said to act splendidly.—SHEFFIELD.]

Typhlitis, Perityphlitis, and Appendicitis. — These affections are quite frequent in children. They have occasionally been observed in sucklings, but are comparatively rare in children under 2 years of age. Retention of feces, foreign bodies (such as fruit pits), etc. [acute catarrhal inflammation—*e.g.*, influenza—SHEFFIELD]; trauma (*e.g.*, blows in the abdomen); too brisk exercises, as in the gymnasium, are the most prominent etiological factors.

The symptomatology of these affections is the same in children as in adults, except that pain is very often absent in children. It may be emphasized that, in the beginning of the disease, when the tumor and, perhaps, also the other symptoms are not sufficiently characteristic,—especially as the child is generally incapable of localizing the pain, if present,—incorrect diagnoses are not infrequently made, and prove momentous to the patient. Indeed, if dyspeptic symptoms predominate, such cases are only too often diagnosed as simple gastric catarrh with constipation, and carelessly combated with cathartics! Too often ileus is diagnosed, and accordingly treated with high enemas! It is therefore important always carefully to examine the region of the vermiform process whenever a child complains of "bellyache," etc. According to Karewski, many children have premonitory signs, consisting of constantly recurring dyspepsia, for months and years which, perhaps, indicate the existence of a simple appendicitis! In such children or in those

with an hereditary diathesis,—for there is surely a congenital disposition to typhlitis,—or in children who once suffered from typhlitis, such a warning should particularly be borne in mind. If the child is not operated upon, the region of the appendix often remains a *locus minoris resistentiæ* for life, and a gross error in diet, brisk exercise in gymnastics, etc., may re-excite the inflammatory process. Sometimes the first symptom of typhlitis is referred to the bladder (strangury).

It is important to arrive at a diagnosis as early as possible, and immediately to adopt an energetic method of treatment, such as absolute rest; fluid, bland diet; ice locally; internally large doses of opium [?]. Under these circumstances the prognosis is generally good, except, of course, in septic gangrenous cases, in which, owing to rapid perforation, even immediate operation often proves futile. On the other hand, the prognosis is always dubious if the case is neglected. In this event there is, as in adults, an extension of the process to the peritoneum; the previously circumscribed process becomes diffuse, frequently ends in perforation, etc.; and an operation, which is usually attended by a very high mortality, is the only remedy left.

Regarding early operation, the opinions of clinicians and pediatrists differ greatly from those of surgeons. The former refer to their experience, which shows that very many cases, even those with pus formation, very frequently recover spontaneously under internal medication; that in children especially unexpected changes for the better in apparently hopeless cases are by no means rare (Baginsky). On the other hand, surgeons lay stress upon the dangers attending procrastination; declare that recoveries without operation are only apparent, inasmuch as diseased foci always remain which sooner or later become a source of danger (frequent recurrences and other affections at the diseased focus, such as tuberculosis), while the surgeon radically removes the diseased focus. It is often very difficult for the practitioner to decide whether or not he should adopt the expectant plan of treatment or recommend operation. If serious symptoms persist,—*e.g.*, persistence of the abscess notwithstanding internal medication, etc.,—it is advisable not to depend upon spontaneous recovery, as such delay may render

an operation useless. On the other hand, even in apparently hopeless cases the physician should not remain idle, since even here surprisingly good results are sometimes obtained by operation.

Should an operation be performed in diffuse peritonitis during shock? Karewski is of the opinion that in such cases an error in diagnosis is readily made, inasmuch as severe local inflammation sometimes produces diffuse and radiating pain, and that the symptoms in these cases usually subside in twenty-four hours. He, therefore, advises delay until, as is quite possible, encapsulation has occurred. On the other hand, if the acute symptoms persist, an operation is imperative. The author advises operation in all cases with partial retrogressive exudation and recurrent attacks, as the mortality after an operation is *nil.* [An operation is always indicated between the attacks, and the sooner it is done the better.—SHEFFIELD.]

Intestinal Invagination (Intussusception) is a particularly frequent disease of childhood, especially of babies, notably in the first few months of life. Invagination of the cecum and a portion of the lower part of the ileum into the colon is called *cecal* or *ileo-cecal intussusception.* That in which the ileum passes through the cecal valve without invagination of the colon is called *ileo-colic intussusception.* The first variety is usually observed in children under 1 year of age. Intestinal invagination usually affects children who have previously been perfectly well. Apparently in the best of health the child suddenly shrieks, becomes restless, tosses from side to side, and presents all the symptoms of a sudden colic. With severe tenesmus, stools of blood or blood and mucus, later chiefly blood, are passed. Restlessness increases. The very feeble, prostrated patient begins to vomit. The abdomen is very painful and tympanitic. Often a circumscribed, more or less hard, "sausage-shaped" tumor is felt in the abdomen and sometimes also a rounded, convex tumor—the invaginated portion—is also felt in the rectum. If not remedied, the vomiting grows worse [sometimes stercoraceous], the abdomen more distended, collapse more pronounced, and the patient dies, after from two to four days, during the latter (also with convulsions). Spontaneous improvement and recovery by spontaneous reduction of an

invaginated part is exceptional and most frequent in older children. Sometimes there is improvement after the first severe attack: the vomiting, meteorism, tenesmus, and bloody stools cease, but the diarrhea (mucous masses) continues and the colicky pain now and then returns. After a few days a piece of gangrenous intestine is discharged *per anum* and gradual improvement takes place. In this process the opposed serous layers of the gut become adherent, the invaginated portion of the intestine strangulated, venous stasis takes place and is followed by gangrene. Often, again, this is followed by a prolonged state of sickness, and finally a fatal issue. This process is always associated with danger of perforation and peritonitis, and many patients succumb to it.

The PROGNOSIS is therefore always doubtful, notably in the first year of life, when the tendency to a violent course is especially great. Spontaneous reduction of the intestinal invagination, which is rare, can never be depended upon. Separation of the gangrenous slough is fraught with great danger.

As soon as the condition is diagnosed it is therefore advisable immediately to employ therapeutic measures—*i.e.*, to attempt artificial reduction of the invaginated bowel by copious injections of cool water [rather, warm water—100° to 104° F.] into the bowels or by air insufflations with the aid of taxis. Both procedures are to be carried out very carefully with gradually increased pressure to avoid perforation of the intestine.

To relieve symptoms: narcotics, especially opium, for the pain; ice-water and lavage for the vomiting. If these measures are not followed by marked improvement in the condition within a few hours, immediate laparotomy is indicated, and, if performed early before adhesions have formed,—may occur within twenty-four hours, render reduction very difficult, and greatly affect the general condition,—is accompanied by very favorable results. [For inflation an ordinary hand bellows with a catheter attached is to be used. It is best done very gently under anesthesia, and should be tried only for about fifteen minutes. For the water injections an ordinary fountain syringe, suspended about five feet above the patient's bed, answers the purpose. The escape of the fluid from the rectum is prevented by pressing the buttocks tightly together. Occasional

inversion may be practiced in both procedures. Recurrence of intestinal invagination is not rare.—SHEFFIELD.]

Acute Peritonitis occurs, even in the newly born infant, usually as a result of septic and pyemic processes (puerperal infection). As a rule, it appears in conjunction with disease of the umbilical cord, such as inflammation of the umbilical vessels, etc. The symptoms are then so complicated by severe constitutional manifestations that it is usually impossible to make a diagnosis during life. Acute peritonitis is occasionally caused by rupture of the bowels during birth, congenital atresia of the bowels, and sometimes also by syphilis. In older children acute peritonitis not infrequently develops after infectious diseases, such as scarlatina, particularly in scarlatinal nephritis, morbilli, diphtheria, erysipelas, and typhoid without perforation. Peritonitis after perforation of abdominal organs is less frequent in children than in adults, owing to the fact that perforation is not very common in typhoid, and other etiological factors, such as ulcer of the stomach, are only exceptionally met in children. Perityphlitis *(q.v.)* is the most frequent cause, but acute peritonitis sometimes develops from rupture of diphtheritic or dysenteric intestinal ulcers, and even a severe attack of enteritis. Intestinal invagination also may produce the disease in question; the same is true of lesions caused by foreign bodies (scybala). Sacculated peritoneal abscesses (pelvic empyema) are also occasioned by traumatism, such as a blow, fall upon the abdomen, contusion, *e.g.,* while practicing gymnastics. Peritonitis occasionally follows gonorrheal vulvo-vaginitis. In some cases no distinct cause can be detected, under which circumstances the peritonitis is usually attributed to a "cold." As to the etiological factor, the mystery is in part elucidated by Weichselbaum, who in a few instances found the pneumococcus as the exciter of acute peritonitis; quite often the bacterium coli is responsible.

The SYMPTOMS of acute peritonitis in children are not always as characteristic as in adults. Severe enteric processes are particularly apt to be mistaken for peritonitis. Quite typical clinical cases are, however, not rare. It begins with severe pain and vomiting (the latter symptom is not constant!); rapid distension of the abdomen (which is often very hard,

tense, and very sensitive); sometimes distinctly demonstrable exudation; high fever, especially in the first few days; very frequent, small pulse; scanty urination and often complete anuria; pinched face (collapse), etc.

The PROGNOSIS is dubious. It is very bad in the newly born, but it is also otherwise dangerous. Traumatic peritonitis offers the most favorable prognosis. In favorable cases improvement usually sets in within from one to two weeks, with gradual decrease in the intensity of the symptoms. Occasionally, the pus breaks through the umbilicus, and more rarely through the rectum. Early application of ice, arrest of intestinal peristalsis (by small doses of opium), in addition to very careful and strengthening diet and administration of analeptics, may save many cases. Otherwise laparotomy must be considered. This procedure has often proved successful.

Chronic Peritonitis, with exception of the tubercular variety (see further), is rare. There certainly exists a chronic, serous, nontubercular peritonitis which is often obscure in its etiology and sometimes caused by traumatism (kick in the abdomen, etc.) and also by acute peritonitis *(q.v.)*. Chronic peritonitis usually runs a very slow and latent course. It is often manifested only by gradually increasing ascites, while the general condition of health is frequently but very slightly altered. The intestinal function remains normal and the sensitiveness is very slight. Sometimes, however, a nodular thickening of the intestinal walls develops which may be mistaken for tumors (sarcoma). The prognosis is doubtful, with a tendency to recovery.

TREATMENT.—Puncture—to be repeated several times if necessary—and, if ineffectual, laparotomy, which usually leads to recovery, should be resorted to.

Intestinal Ulcers develop in many diseases of the intestinal mucous membrane, thus: in intestinal, especially follicular, catarrh, tuberculosis of the intestine (see "Tuberculosis of the Lower Bowels"), intestinal syphilis, dysentery [amebic], and typhoid. Duodenal ulcers are frequently met in melena neonatorum and burns.

The TREATMENT consists in removal of the primary disease; strict diet; attention to individual symptoms, such as pain,

diarrhea, etc.; small doses of opium with bismuth, lead acetate, tannin, tannalbin, and the like.

[The proctoscope and microscope are often of great diagnostic value. Protracted cases of intestinal ulceration are best treated by means of daily high intestinal irrigations (through a colon tube) with a $^1/_4$ to $^1/_2$ per cent. of silver nitrate solution, followed by irrigation with salt solution. Later, the silver solution can be alternated with an emulsion containing iodoform, ʒij; bismuth subnitrate, ℥ss; olive-oil, Oj.—Sheffield.]

Intestinal Syphilis is very rare, but has been observed even in the newly born infant. It is manifested either in the form of gummatous, ring-shaped indurations of the muscles and mucous membrane surrounding and constricting the lumen of the small intestines and chiefly resembling Peyer's patches, or in the form of condylomatous neoplasms and ulcerations of the mucous membrane. Cell infiltration of the small arteries is the lesion in question, and is said to cause obliteration and anemic necrosis. [See also "Syphilis."]

Chylous Cysts.—Until 1898 but two cases of chylous cysts, affecting old people, were observed. In that year Sarwey reported a case of chylous cysts, with milky contents, in a girl 11 years old, which were situated between the stomach and transverse colon. They were covered by the posterior layer of the peritoneum and reached the anterior abdominal wall after perforating the gastro-colic ligament. The true nature of the fluid was disclosed by laparotomy and extirpation (with final recovery). Rosenheim saw a case of ileus in a child 4 years old in whom autopsy revealed a volvulus in the small intestine caused by mesenteric cysts filled with chyle.

Abdominal Tumors are usually sarcomatous in character and often assume enormous dimensions, involving especially the kidney *(q.v.)*. They may, however, arise from any part of the abdominal cavity (even the pancreas). Multiple lymphosarcomas are quite often encountered. Sarcomata may also originate from the connective tissue and glands of the peritoneal and retroperitoneal space as well as from the pelvis. Medullary and fungous sarcomata occur in the peritoneum and in the pelvis; lymphomas may arise from the retroperitoneal glands and reach high up in the abdominal cavity. Bergman success-

fully extirpated one osteochondroma weighing one-half kilogram in a girl 11 years old. Hagenbach removed a large carcinoma of the pelvic cellular tissue from a child 11 months old. Abdominal tumors may be mistaken for enlargement of the spleen and liver, sacculated abscesses in the peritoneal cavity, inflammatory thickening of the intestinal walls (chronic peritonitis), or for hemorrhages in the abdominal wall, particularly of the recti muscles, occurring, *e.g.*, during typhoid or in traumatism. (See also tumors of the bladder, stomach, intestine, kidneys, etc.)

Ascaris Lumbricoides (Roundworm).—This worm is cylindrical, brownish to reddish gray in color, transversely striated, and resembles the earthworm in form. It is of considerable size (females up to four hundred millimeters; males half that size), and tapers toward the extremities. The mouth, with three lips, is situated at the very end of the body. The eggs, which are elliptical structures covered by small, pointed protuberances and enveloped in a thick, closely striated, roughened capsule, reach the human small intestine from the ground or with the water, fruit, and vegetables. An enormous number of these worms is found in this location without giving rise to any symptoms. On the other hand, they are often dangerous to life when a large number of them coil up and obstruct the lumen of the intestine (the tumor is sometimes palpable) or give rise to ileus. As a rule, not many worms are present, and hence no symptoms, so that the diagnosis is not made until some eggs or worms are passed with or without feces. The ascaris sometimes migrates into the stomach (causing nausea and vomiting), the esophagus and pharynx, and from here into the larynx (danger of suffocation [relieved by turpentine]) ear, nose, and even into the lacrymal duct. Steffen found a worm in the tracheotomy tube of a diphtheritic child who had been tracheotomized and had a sudden recurrence of stenosis. Koebel reports a case of a child suffering from purulent otitis media, in whom a worm perforated the drum and appeared in the external meatus. The ascarides rarely perforate the intestinal wall (see "Worm Abscess"). In Archambault's case they perforated the stomach. They may creep into the ductus choledochus or hepaticus, occlude them, and give rise to icterus and hepatic abscess.

[They may also enter the appendix (Caillé's case).] A pale complexion, dark rings under the eyes, *fœtor ex ore,* itching of the nose and general urticaria, colic, headache, dizziness, languor, apathy, chills, dilated pupils, and exstatic conditions are symptoms very suggestive of worms. Some authorities claim to have observed neuroses, eclampsia, epilepsy, chorea, contractures, trismus, amaurosis, and strabismus. With such a varied symptomatology the examination of the stools for worms or their ova is always advisable. Of course, positive findings do not prove that the worms are responsible for all these manifestations.

Ascarides are readily expelled by the administration of santonin [with calomel].

Worm Abscess probably never exists. It was formerly thought that ascarides perforated the intestines, produced peritonitis, and escaped with evacuation of the pus. It is true that worms are sometimes found in such abscesses; but the worms undoubtedly made use of a pre-existing intestinal defect (follicular, tubercular, etc., ulceration) around which a circumscribed pus collection had already formed, so that they directly entered the abscess. [See "Appendicitis."]

Teniæ [Tapeworms] frequently occur in children (also in conjunction with oxyuris and ascaris), usually at an age when raw meat is consumed. *Tenia mediocanellata* develops from eating beef; it is usually several yards long, provided with four anterior suckers. *Tenia solium* is caused by hog-meat; it is also several yards long, with four anterior suckers and one proboscis surrounded by a circle of hooks. Teniæ are also observed in children who eat no meat, and even in nurslings. *Tenia elliptica, s. cucumerina,* a thin and small worm only ten to thirty centimeters long, develops from swallowing dog-ticks that infest the hair of dogs and cats. As a rule, tapeworms give rise to no symptoms and are not detected until segments (proglottides) are from time to time passed with or without feces, particularly after eating herring or bilberries. They may, however, cause nausea, gastric and intestinal colic, diarrhea, tenesmus, itching of the legs, ravenous hunger, water brash, etc. Expulsions of the worms should not be undertaken until the child is over 1 year of age and not until the expelled segments are seen by the physician himself. The parents

cannot be relied on, because they blame worms for everything and desire to have them removed.

TREATMENT.—The day before a purgative should be given and the diet restricted to fluids, followed by eating of herring and onions in the evening. The next morning the child is allowed some sweet coffee and the tapeworm remedy is then administered. Extract of male fern [Merck] is the safest and best remedy, but also pomegranate root, kousso, kamala, or pelletierin tannate may be given. If the bowels do not move after an hour, a purgative should be administered. The expulsion of the worm should for some time be followed by the administration of enemas of water every two hours. If only a part of the tapeworm has passed through the anus and the other part remains inside, it is not to be carelessly pulled down, but rather fixed to the buttocks by means of sticking plaster, and forced out by the administration of another cathartic or by enemas.

Cysticercus.—These small vesicular bodies, which develop from the ova and *tenia solium,* are observed also in children, especially in the brains of children from 5 to 10 years of age or younger. Soltmann described multiple vesicles in the cerebrum of a boy 1 year old. They are always solitary. These small structures usually do not produce local symptoms, but rather diffuse, meningeal disturbances. Cysticercus has also been observed in the posterior chamber of the eye and under the skin of the eyelid, occasionally also beneath the mucous membrane of the mouth and in the phalanges, in which location a clinical picture resembling that of spina ventosa developed.

Oxyuris Vermicularis (Round-, Seat-, Thread-, or Pin- worm) is a white worm about nine to ten millimeters long and one and one-half millimeters wide, with a pointed, tapering tail. The males are smaller and have a spindle-shaped tail, which is coiled upon itself. Its chief seat is the rectum. It escapes from here with or without the feces, especially in the warm bed, and wanders to the anus, causing itching and even pain, so that the children are often rendered frantic by the irritation. If this occurs every evening it is apt to be mistaken for intermittens larvata. The worms sometimes migrate to the vulva and excite vaginitis and onanism. Further migration is quite improbable,

owing to rapid desiccation of the worm outside of the body. The eggs are oval in shape, flattened on one side, and covered by a thin shell. The worms gain entrance into the mouth, nares, in skin eruptions, etc., from soiled fingers, sponges, and the like. In the same manner they are conveyed from brother to sister or parents. They may also gain entrance by swallowing desiccated and dispersed feces. Frequently immense numbers of them are formed in the intestines. Anemia, exhaustion, excitability, pavor nocturnus, etc., are sometimes sequelæ of oxyuris.

The TREATMENT must be continued for some time in order to kill all the worms. Medicated enemas are usually very effective. They are best given in the evening and retained for a long time. Any of the following preparations will answer the purpose: infusion seminæ cinæ (from 10-15 to 100 [℥iiss-iv to ℥iij]); or corrosive sublimate (0.005 to 100 [gr. $^1/_{12}$ to ℥iij]); naphthalin, 1.0, to olive-oil (60.0 [gr. xv to ℥ij]); garlic; vinegar water ($^1/_3$ vinegar) [a decoction of quassia wood]. Internally, santonin [and calomel]. To kill the oxyurides which have infested the vagina: sublimate injections (0.05 to 100 [gr. $^3/_4$ to ℥iij]). To relieve itching see "Pruritus."

Pruritus Ani is due chiefly to intestinal worms, and must be remedied by teniafuges and suppositories of santonin *(q.v.)*. It is caused also by simple constipation. In this event, regulation of the bowels (laxatives). To relieve itching: unguentum hydrargyri nitratis should be applied a few times a day.

Prolapsus Recti is very frequently met in children. It is either congenital, owing to weakness of the sphincters, or acquired through pressing and straining (constipation, diarrhea, pertussis, oxyuris, phimosis, vesical calculus, or constant crying). A part of the rectum, rarely the mucous membrane, almost three to four centimeters in length, comes down during the act of defecation in the form of a round or sausage-shaped, glistening red or bluish-red, frequently bleeding mass. It either returns in place spontaneously or remains outside, and is usually easily replaced by the mother, but later prolapses again. The trouble is often of years' duration before being seen by the physician. The prolapsed portion sometimes becomes the seat of catarrhal or even diphtheritic changes. Otherwise the prognosis is favorable and the treatment simple.

First, reposition should be tried; in severe cases preferably in the knee-elbow position or even under narcosis. Beginning with its central part the prolapsed portion is slowly pushed up into the anus with the fingers (wrapped in oiled linen cloths); a thick compress of absorbent cotton or a sponge is placed over the anal orifice and the nates are for some time held together with a bandage or adhesive plaster. To prevent recurrences the patient should not be permitted to defecate into a pot placed upon the floor [or into a large commode]. The pot should be put on a table or footstool so that the legs of the child hang down loosely and hard straining is avoided. This procedure will sometimes remedy the trouble provided etiological factors are removed. Schmey considers every prolapsus recti a manifestation of rachitis, and claims to cure every case by the administration of phosphorated codliver-oil. In stubborn cases subcutaneous injection of strychnin *(q.v.)* or extract of ergot *(q.v.)*, in the vicinity of the anus, or repeated painting with silver nitrate, 5 per cent., or balsam of Peru is useful. Rehn cures prolapsus recti by momentary cauterization, from five to eight times, of the margins of the anal mucous membrane with lunar caustic, to be repeated once every five days. Where these measures fail an operation which consists either of excision of a few folds of skin at the anus or punctiform or linear cauterization of the prolapsed portion with the Paquelin must be resorted to. [In mild cases protrusion of the bowel may be prevented by the use of an adhesive strap, two or three inches wide, placed tightly across the buttocks, and regulation of the bowels. —Sheffield.]

Polypus Recti is not very often observed in children. It is the most frequent cause of bleeding from the rectum. Rectal hemorrhage is much more rarely caused by melena neonatorum, intussusception, colitis, dysentery, typhoid, tumors (other than polypi), ulcer of the stomach, and hemorrhoids. Hemorrhage is the first and only symptom of a rectal polypus, and if it occurs in girls it is apt to be mistaken by parents or relatives for precocious menstruation. In the latter event, however, the blood stain is in front, while in a rectal polypus in the back of the shirt. The bleeding is rarely spontaneous, but usually during or immediately after the act of defecation. The

blood is usually found on the surface of the feces, and never thoroughly mixed with it. A few drops of blood, rarely more, are usually passed, sometimes with pain and tenesmus. The polyp occasionally comes down during defecation, when it is usually found attached to the rectum, a few centimeters above the sphincter, by means of a short or long pedicle. The polyp appears at the anus as a dark-red bean- to a cherry- sized (rarely larger), roundish tumor with a bleeding surface. It usually, but not always, re-enters the anus immediately after defecation. Occasionally there are several polypi. If the tumor cannot be seen during the act of defecation, recourse should be had to a rectal examination in knee-elbow position. Even then, however, the polyp may escape observation with the rectoscope if its pedicle is long. [A digital examination is more reliable.—SHEFFIELD.]

The PROGNOSIS is favorable, although daily recurrence of even slight bleeding is apt to give rise to anemia and debility. Demme reports recovery from eclamptic convulsions following removal of a rectal polyp. Spontaneous cure sometimes takes place by tearing of the thin pedicle during passage of hard feces. Otherwise operative interference is indicated. It may be clamped off with the fingers or pulled down with thumb-forceps, ligated, and cut off; or the galvanic snare may be employed.

Fissura Ani is not infrequent in children, and probably develops as a result of trauma, such as passage of hard scybala. It is rarely due to congenital syphilis. The fissure causes severe pain and violent outbursts of crying during defecation. After repeated ineffectual attempts to defecate the children finally desist, and remain constipated for several days, owing to reflex contraction of the sphincter ani arising from the anal fissure. When feces finally are expelled they consist of stone-hard scybala, at times mixed with bloody mucus or a few drops of clear blood. The fissure usually becomes larger and results in a true circulus vitiosus; but it sometimes remains very small, and is situated so high that a very careful examination is required to reveal it. It is usually remedied by a few applications of silver nitrate stick, an ointment of silver nitrate (2 per cent.) or tannin (1 to 20), several times a day, in conjunction with the

administration of purgatives. Severe pain in defecation is usually relieved by cocain. In aggravated cases the painful contraction of the sphincter is relieved mechanically by passing the little finger into the rectum and partially tearing the sphincter muscles by stretching. Even excision or splitting of the fissure and the adjacent portions of the sphincter may be demanded.

[℞ Balsami Peruviani ..... 0.4 (gtt. vj).
Ichthyolis ..... 0.8 (gtt. xij).
Cocainæ ..... 0.016 (gr. ¼).
Olei theobromatis .....q. s. ut ft. suppos. no. vj.

Sig.: One to be introduced into the rectum twice a day.—SHEFFIELD.]

The Liver.—The liver is very large in the newly born infant, but soon gradually diminishes in size. In the first few years of life the lower margin of the liver is found in children deeper than in adults. Mistakes in diagnosis are therefore frequently made regarding the size of the liver, so that, *e.g.*, moderate swelling may appear much more pronounced. The cause of this appearance is not so much the greater development of the liver as the relation of the ribs which descend laterally at a lesser angle, leaving a greater portion of the liver exposed and causing the margin to appear deeper.

Icterus Catarrhalis is not a rare disease of childhood, especially in children over 3 years of age. In younger children it is not as common, notwithstanding the frequency of gastro-intestinal affections during the nursing period. The symptoms are the same as in adults. The onset is sometimes, though rarely, sudden, with high fever, apathy, delirium, headache and severe nausea, tympanites, and foul breath, so that before the appearance of the jaundice cerebral disease is first thought of. As a rule, in the beginning as well as during the course of the disease the fever is moderate and often entirely absent. Aside from icterus and enlargement of the liver, which latter can sometimes be ascertained especially on percussion, there are observed anorexia, nausea, languor, tendency to somnolence, change in the urine (bile-stained) and stools (scanty, firm, decolored, gray, rarely frequent, fluid, clayey, and fetid). The pulse is usually not retarded in small children—from 100 to 120. This is prob-

ably due to the readily excitable nervous system, such as fear during the examination. In phlegmatic and older children retardation is almost invariably present.

The PROGNOSIS is good, and under suitable treatment recovery usually takes place within eight to fourteen days. Treatment consists of rest in bed, and strict diet—gruel and flour soups, zwieback, barley, rice, apple-sauce, light coffee, cocoa, etc., one-fourth to one-half a bottle of Wildunger daily. No fat, meat, or milk [and no eggs] should be allowed until the stools begin to regain their normal color; then meat, squab, chicken, spinach, and eggs can gradually be added to the diet. Upon disappearance of the icterus gradual return to milk and ordinary food is permissible. Medicinally, one dose of calomel in the beginning, and, in persistent vomiting, ice-water and calomel in conjunction with bismuth subnitrate; also infusion of senna. Henoch recommends early administration of hydrochloric acid, while the author prefers sodium bicarbonate, either in solution with tincture of rhubarb or as a powder with magnesia carbonate, powdered rhubarb, and bismuth subnitrate. In obstinate cases Carlsbad Mühlbrunnen, from 2 to 4 tablespoonfuls every three hours to a child 3 to 6 years old, or "sal Carol. factit.," from 1 to 2 teaspoonfuls to tablespoonfuls in conjunction with copious irrigations of the bowels with from 1 to 2 liters of lukewarm water [saline solution], often acts splendidly.

Hepatitis, especially *interstitial hepatitis* with consecutive cirrhosis, is rare in childhood, since its most frequent cause—alcoholism—is comparatively rare in children. The *atrophic granulated liver* in the form of *cirrhosis* is only exceptionally observed. *Hypertrophic cirrhosis*, which usually begins with icterus, palpable splenic tumor, hemorrhages (nose!), and very severe ascites, but may appear without any clinical manifestations, is more frequently observed. The prognosis of cirrhosis is bad and its course usually rapid. Not infrequently, however, hepatitis develops during the course of infectious diseases, such as scarlet fever and measles, and is manifested by icterus with palpable swelling of the liver. After a few weeks recovery takes place, or very rarely the hepatitis persists in the form of interstitial hepatitis after these diseases have terminated. It is at times observed also in heart affections, *e.g.*, valvular

disease and myocarditis, as a result of passive congestion in the region of the hepatic veins. Such hepatitis is mild in nature. *Syphilitic hepatitis* is much more frequent than these varieties. The liver in these cases is granulated and often increased in volume. *Tuberculous hepatitis* is not rare. It is due either to extension of the inflammation from chronic tubercular affection of the peritoneum to the porta hepatis and from there onward, or to irritation of numerous miliary tubercles in the liver substance. Clinically, however, the symptomatology is generally obscured by that of chronic peritonitis. Sometimes, especially in children of from 5 to 12 years of age, the cause of the hepatitis cannot be learned. Judging from the failure of specific treatment and the decided benefit derived from a treatment in Carlsbad, the condition is not syphilitic in nature.

Liver Abscesses are rare in children, except in the newly born infants in whom it is septic in nature. They sometimes result from traumatism, suppuration of hydatid tumors, invasion by roundworms, and pyophlebitis following perityphlitis and extension of the inflammation through the inferior mesenteric vein. Finally, it may be secondary to typhoid or to suppuration of the mesenteric glands. Sometimes no etiological factor can be discovered.

[SYMPTOMATOLOGY.—Chills, hectic fever, tenderness over the liver, marked gastro-intestinal disturbance, jaundice, enlargement of the liver, sometimes fluctuation, and "pus" on aspiration.

TREATMENT.—Aspiration or incision and drainage.—SHEFFIELD.]

Liver Atrophy.—Acute atrophy of the liver sometimes occurs in older children, usually from 4 to 7 years of age, but also in younger ones. In the newly born it is septic in nature. Greves has reported a case in a child 1 year old. Anatomically and clinically it does not differ from that in the adult. Treatment is futile.

Cholelithiasis [Biliary Calculi] is very rare in children, but has been observed in very young infants, even in the newly born. The treatment is the same as in the adult. According to Jacobi, the continued use of sodium salicylate for months is very useful.

Tumors of the Liver are rare in children. Occasionally echinococcic tumors *(q.v.)* and sarcomas are seen, more rarely carcinomas and cavernous angiomas.

Echinococci occur also in children, particularly in the liver; also in the spleen, kidneys, lungs, brain, and the muscles. The symptoms, diagnosis, and treatment are the same as in adults.

Fatty Liver is not rare in children. It is but rarely manifested clinically and is usually unrecognized until a postmortem examination. It is frequently a sequel of infectious or exhausting affections, such as diphtheria, scarlatina, chronic gastro-intestinal catarrh, tuberculosis, rachitis, etc., but is also due to abuse of spirituous liquors and to unsuitable feeding (overfeeding!).

In the TREATMENT of fatty liver the etiological factors must first be looked after in addition to the administration of Carlsbad mineral water and "sool" baths.

Affections of the Pancreas may originate from congenital syphilis (gummata), general amyloid degeneration, and secondarily to tuberculosis and tumors of the stomach, intestines, liver, and spleen. Primary sarcomas are very rare.

The DIAGNOSIS is almost never made until postmortem.

IX.

Disorders of Nutrition.

Pedatrophy is a disease claiming an unusually large number of victims among nurslings, especially up to 6 months of age. It occurs particularly among artificially fed children, but also in breast-fed, especially among those reared in poverty. Sometimes pedatrophy proper is preceded by digestive disturbances of a dyspeptic nature, and also by diarrhea. This, however, is not necessarily the case, for it often happens that these digestive disturbances are improved or cured when the pedatrophy sets in. It first manifests itself by arrest and early loss of body-weight of the child notwithstanding good feeding; also in those who are well cared for in institutions or hospitals. This diminution of weight continues, the children become gradually paler and thinner, and finally pass into a condition of complete atrophy presenting a terrible sight. Thus, deeply sunken cheeks and eyes; pointed nose and chin; sunken fontanelles; retracted abdomen; pitiful expression; senile folds and wrinkles in the face; the trunk and extremities are mere skin and bones; the breathing is superficial and short and the pulse bad. The child is apathetic, and only now and then whines pitifully.

The ETIOLOGY of this appalling wasting is still shrouded in mystery except in cases which naturally decline in nutrition as a result of acute and chronic gastro-enteritis, syphilis, tuberculosis, and inanition (*"Engelmacherinen,"* "baby farming"). In many cases faulty feeding seems to play a rôle. By dissection and researches upon metabolism Baginsky demonstrated that the power of assimilation of the intestines in these children is unusually diminished, and that some parts of the bowels present atrophic patches, which explain this disturbed assimilation and hence reveal the cause of pedatrophy. Others, again, attribute it to intestinal autointoxication. Czerny endeavored to show that in addition to other symptoms pedatrophy orig-

inates from acid intoxication, essentially of fats of the food consumed, and from increased excretion of ammonia. Finally, some attribute it to a micro-organism—an assumption which has but little foundation. Indeed, a number of children suffering from pedatrophy do succumb to complications of an infectious nature, namely: furunculosis, phlegmons, colicystitis, pyelonephritis, acute enteritis, otitis purulenta, and pneumonia. Death occurs, however, from this gradual wasting also without these complications. These complications are certainly secondary, but they do much to hasten death, which is otherwise (unexpectedly) a very slow process. The children usually die from exhaustion. This lethal condition, however, persists for a long time, and the patients vegetate sometimes for weeks and months until they are finally relieved by death. Some children recover even in the advanced stages of the disease, provided Nature is assisted by a radical change in the manner of living.

Good air, good food,—especially breast-milk, but also artificial feeding, if everything is most carefully looked after,—and, chiefly, removal of the patient from poverty will save many children. Various nurseries and foundling asylums are often a blessing in this direction. Henoch recommends Tokay wine (from 20 to 30 drops three or four times a day) and aromatic baths; chief reliance, however, must be placed upon nutrition and good nursing. It has already been mentioned that all these factors unfortunately fail in the majority of cases.

Athrepsia was considered by Parrot a distinct disease, but Henoch looks upon it as a form of pedatrophy. Owing to the young age and the miserable hygienic environment of his patients, Parrot observed particular rapidity of the process and various complications which have no connection with the atrophy itself.

Barlow's (Moeller's) Disease was formerly mistaken for scorbutus and rachitis ("acute rachitis"). It has recently been demonstrated, however, that, although it greatly resembles scorbutus and not rarely affects rachitic children, it is neither one nor the other, but a specific disease. Its etiology is as yet quite obscure. It affects children from 4 months to 3 years of age. Suddenly, or after several days of malaise or digestive disturbance, the patients object to being touched and scream

lustily, especially when the lower extremities are handled. Motion very soon ceases spontaneously in the lower extremities, and at the diaphysis of one or both femurs or, more rarely in the lower part of the leg or upper extremities, there appear spindle-shaped, colorless, smooth, nonfluctuating swellings surrounding the bone. These tumefactions are hematomas between the periosteum and bone. In old cases the periosteum at times produces new bone tissue. It is almost constantly associated with *fœtor ex ore;* spongy swelling of the gums, if teeth are present; and a tendency to bleed from the gums and also, though more rarely, from other organs, such as the nose, intestines, and kidneys. Sometimes there is bleeding also from beneath the periosteum of the frontal bone, within the eyelids, and into the retrobulbar tissue (protrusion of eye!). Sometimes there is also purpura, edema, albuminuria, and at times irregular fever (more rarely 104° F. and over), but it is quite regularly associated with severe anemia; at times marked disturbance of the general system, prostration, pronounced muscular debility, diarrhea, etc., are seen. Cases of bone fractures and separation of the epiphyses have been recorded.

Barlow's disease has often ended fatally. The prognosis is, nevertheless, generally good, provided suitable treatment is instituted early, and a complete cure, with the exception of an occasional hyperostosis, is quite certain to occur within a few months. Although Barlow's disease was in a few instances associated with infectious diseases (especially pertussis) it seems to be caused by faulty nutrition, such as prolonged use of sterilized milk and artificial foods.

Treatment.—Feeding demands chief and prompt attention. Feeding with mothers' milk or fresh cows' milk (or heated only from five to ten minutes). Fresh lemon- or orange- juice (a few spoonfuls daily), in older children beef-juice, soup, some potato *purée,* carrots, spinach, etc. Good air. Medicinally, fresh beer yeast has often proved effective (1 teaspoonful five or six times daily), probably owing to the nuclein—organic compound of phosphoric acid—it contains. Decoction of cinchona [ferrosomatose] may be tried.

Local treatment to remove the hematomas: rest, ice, and finally incision.

To improve the condition of the gums: washing with tincture of myrrh 1 to 10, or 1-per-cent. solution of silver nitrate, etc.

Scorbutus.—[**Scurvy** presents the following symptoms: General weakness and lassitude. The skin is dry, rough, and of a muddy pallor; the face pale and bloated. Swelling and sponginess of the gums with great tendency to bleed and an exceedingly offensive breath. Looseness of the teeth, hemorrhages from mucous surfaces, and extravasations of blood within and beneath the skin. The lips are pale, which is in striking contrast to the redness of the gums; the eyes are sunken and surrounded by dark-blue circles.

Hemorrhages occur from the stomach, mouth, bronchial tubes, intestinal canal, and vagina. The skin is dry and rough, resembling that of a plucked fowl. Edema of the face and ankles are not infrequent. Depression of the spirits is characteristic. Palpitation and dyspnea on exertion. The urine is high colored, speedily becoming fetid.

The patient usually longs for fresh vegetables and fruits. —SHEFFIELD.] The view at present held, that by scorbutus in children is understood Barlow's disease *(q.v.)* only, is decidedly incorrect. Typical scorbutus, which fully corresponds with the clinical picture observed in adults, occurs also in children, but is quite rare. It is caused by bad hygiene and food, and is associated also with infectious diseases.

[As to the TREATMENT of scorbutus, see "Barlow's Disease"].

Amyloid Degenerations are not rare in children. They are manifested by glandular suppurations and other ulcerative processes, similar to those of scrofula, tuberculosis, and syphilis. Some attribute this degenerative process to rachitis. Baginsky refers it merely to unfavorable hygienic conditions. Pathogenesis, etc., are the same as in adults. As a rule, the liver, kidneys, and spleen are simultaneously involved. The latter is generally affected first.

Treatment is usually ineffectual. In syphilis only some benefit is obtained from syrup of the iodid of iron.

Rachitis (The "English Disease," Rickets) is a very prevalent general affection of childhood with a predilection for the

bony framework. Owing to diminution of certain bone salts there is abnormal softening of the bones and incomplete ossification of the new osseous tissue which is in excess. The causation of the process is as yet doubtful, and very different theories are being promulgated concerning its origin. The theory that rachitis is due to insufficient consumption of calcium with the food, and that of Pommer, which attributes rachitis to abnormal metabolism influenced by the central nervous system (abnormal intermediate products of oxidation circulating in the blood), are obsolete.

Among the newer theories may be mentioned the infection theory of Hagenbach and that of Kassowitz. The latter theory attributes rachitis to an inflow of plasma resulting from abnormal vascularization, which impedes the formation of calcium. This inflammatory irritative process is produced by an agent circulating in the blood which is produced by bad air and localizes especially at the points of growth of the bones—points of transition of the epiphyses to the diaphyses. This theory has much in its favor. It is certain that the development of rachitis is influenced by defective hygienic conditions, whether in regard to the care of the skin, feeding (excess of amylacea, too long nursing at the breast or overfeeding), dwelling (damp, insufficiently lighted, moldy), or air.

According to Kassowitz, vitiated air is the dominant factor in the development of rachitis. His rachitis curves show the highest frequency of this disease toward the end of winter, after the children had during the cold weather almost continuously remained indoors and inhaled vitiated air, and the lowest at the end of summer.

Wachsmuth's theory, which is considered very plausible by Heubner, combines the respiratory and alimentary injurious influences. Proper secretion of calcium in the growing bones depends upon two conditions: 1. The presence of mature cartilage-cells, upon the activity of which the splitting up of calcium albuminates in the tissue fluids depends. 2. Absence of CO_2 in quantities sufficient to keep the lime salts soluble in the tissues. In badly ventilated rooms there is an excess of CO_2 in the air, causing overloading of the blood with CO_2. In dyspepsia there is also an accumulation of CO_2 in the blood, since the ex-

cessive quantity of lactic acid produced by abnormal fermentation is finally decomposed into CO_2 or is absorbed as such from the intestines. Overloading of the blood and tissues with CO_2 prevents the secretion of calcium at the zones of ossification; furthermore, the obnoxious substance circulating in the blood causes a contraction of the arteries, with consecutive hyperemia of the veins and capillaries; so that the cartilage-cells cannot develop to that extent upon which depends their chemical activity. Children even of the best of circles sometimes suffer from rachitis. Probably an hereditary disposition (syphilis!) and also climatic conditions play a rôle. Not infrequently rachitis develops in conjunction with chronic diseases, such as bronchial catarrh, chronic pneumonia, and diarrhea, probably as a result of infection by pathogenic micro-organisms, such as streptococci, bacterium coli, etc., which circulate in the blood and localize in the bone. Indeed, recently toxic influences have frequently been looked upon as etiological factors.

Rachitis is most frequently observed in children from 2 to 3 years of age. The first symptoms, however, are manifested much earlier. There is a *congenital* form of rachitis the first symptoms of which appear soon after birth. Even *fetal* cases of rickets are recorded, and in contrast to it also a variety known as *rachitis tarda,* in which the symptoms remain latent until the children are from 6 to 10 years of age. All these cases are very rare.

Symptomatology.—The skull is large in size, the forehead broad and very prominent in profile *(frons quadrata)* owing to excessive bony deposit at the frontal protuberances. The parietal bones project markedly. The fontanelles *(q.v.)* remain open for a long time, often up to the age of 2 or 3 years. There is also gaping of the sutures. The cartilaginous edges remain soft. The squamous portion of the occiput is extremely soft *(cranio-tabes)*, often so soft as to permit indentation, eliciting a crackling sound similar to that of parchment. The hair often disappears in this place, owing to rubbing of the parts back and forth on the pillow as a result of pain.

The lower jaw assumes a more polygonal shape. The incisors are therefore close to each other in a straight line, and the lateral portions of the jaw turn in a straight line and

diverge somewhat backward. The border of the lower jaw is directed somewhat outward, the alveolar edge more inward, while the whole jaw is turned on its frontal axis, causing a convergence of the teeth. The alteration in the upper jaw is less conspicuous. There are usually elongation of the longitudinal axis and often asymmetry of the upper jaw. The teeth appear late (often the first tooth does not appear until the second year!), at irregular intervals and in irregular order, and are deficient in enamel, so that the teeth soon become yellow, streaked, blackish, brittle, etc.

The thorax is very tender (patients cry when handled) and abnormally curved. There is acute angular infraction of the clavicles. Rachitis is also manifested by nodular swellings of several ribs at the junction of the osseous and cartilaginous portions on both sides of the thorax, producing a chain of swellings which runs from within upward and from without downward—"*rachitic rosary.*" In thin children these swellings are visible, otherwise only palpable. The sides of the thorax are flattened, the sternum is prominent, as in birds,—"*chicken breast*" ("*pectus carinatum*"), so that the internal space of the thorax (diameter from the right to the left smaller) is narrow and the lower border of the ribs sometimes bent outward; axis-rotations and infractions of the ribs and asymmetry of both halves of the thorax are also observed.

The extremities are greatly involved in rachitis. Pain usually marks the beginning. The patients learn to stand or walk with difficulty, or "forget" how to do so. There are nodular thickenings at the epiphyses of the radius and ulna. In severe cases the hand is separated as if by a furrow—"*double limbs.*" The diaphysis of these bones is curved convexly toward the extensor surface or angularly infracted, caused, as in the majority of the other bone deformities, by traction of the muscles upon the softer bones. There are also curvatures of the tibia and fibula at their diaphyses (bowlegs) and epiphyses (genu valgum and varum), as well as curvatures and infractions of the humerus and femur; also backwardness of longitudinal growth, great mobility of the joints, and tendency to infractions.

Rachitis of the vertebral column is manifested by dorsal, bow-shaped kyphosis and scoliosis (disappear on extension—*i.e.*,

when the patients are placed flat upon the abdomen and the legs are slightly raised), associated with compensatory lordosis of the lumbar region. The outlet and cavity of the rachitic pelvis are narrowed antero-posteriorly, owing to sinking of the sacral promontory and lordosis of the lumbar portion of the vertebral column.

All of these alterations are not observed in every case. In mild cases the changes are restricted to individual bones (rachitis of the cranium and ribs occurs earliest and most constantly) and often barely noticeable. For instance, the teeth may appear in time and remain intact; the extremities may be straight; abnormalities of the cranium absent, etc. The general health is sometimes undisturbed; there is often, however, anemia, emaciation, and flabbiness of the skin and muscles. According to Comby, the muscles of the legs particularly are weak—"*pseudoparaplegia*"; the difficulty in walking is probably also a result of this. Not infrequently glandular swellings are present. According to recent investigation, the latter symptom is due rather to other causes, such as tuberculosis, skin affections, and gastro-intestinal diseases. Such causes, therefore, must always be looked for, especially the possible presence of gastro-intestinal disturbance, as they may be very important factors in the mode of feeding. Among other symptoms of rachitis the following may be mentioned: Enlargement of the liver and spleen; hyperidrosis, particularly of the occiput; sometimes obstinate diarrhea; spherical enlargement of the abdomen as a result of meteorism; prolapsus recti; appalling shortness of breath (due to alterations of the thorax just described), and tendency to bronchial catarrhs, which are very obstinate, and often result in pneumonia, atelectases, and tuberculosis, and end fatally. With such complications fever is present; otherwise rachitis is free from fever. Several other diseases pursue a worse course in rachitis than in healthy children. Finally, not infrequently spasm of the glottis *(q.v.)* and eclampsia develop. Epstein observed cataleptic conditions.

With such complications the PROGNOSIS is always dubious; otherwise rachitis is not dangerous to life, although it runs a very chronic course. Spontaneous recovery is frequent. Children often outgrow the disease, and very pronounced curva-

tures of the extremities often partially or entirely disappear without treatment. Such deformities as "chicken breast," curvature of the spine, contracted pelvis, abnormally shaped cranium and jaws, etc., often remain and may persist throughout life.

TREATMENT.—In mild cases dietetic and hygienic measures often suffice. Good food, chiefly milk, bouillon, eggs, wine, and later meat; also artificial nutrient preparations, which are recommended in anemia *(q.v.)*; malt preparations, malt beer, etc.; good air; airy, sunny, dry, and spacious dwellings; outdoor life; mountains and country; still better, sea; care of the skin, etc. The children should not be allowed to stand or walk too early, except they themselves attempt to do so. Sleeping on hard mattress, sea-salt baths from two to three times a week, and malt (2 pounds) or "moor" baths (Mattonis's moor salt, $^1/_2$ pound) are of assistance. The extremities of the child should be strengthened by rubbing them with flannel rags while in the bath. Patients in comfortable circumstances should be sent to summer resorts. Internally, codliver-oil (especially in winter). In the beginning of rachitis iron is quite efficient, such as tincture of the chlorid of iron; lactate of iron, syrup of the iodid of iron; also artificial blood preparations, such as hemol [hemogallol], hematogen [ferrosomatose], etc. Kassowitz, among many others, including the author, saw good results from phosphorus *(q.v.)*, especially phosphorated codliver-oil, not only for the nervous symptoms, but for the rachitis itself. Recently (Heubner) thyroïdin [iodothyrin] as well as myelen have often been administered with success. For the curvatures, etc., recourse must be had to orthopedic and surgical procedures. Nothing energetic, however, should be undertaken in this direction up to the sixth year of life, as marked spontaneous improvements often occur during this period.

Osteomalacia is a morbid softening of the bone due to a marked diminution in the proportion of lime salts. It is endemic in certain localities. The majority of authorities deny that typical osteomalacia ever occurs in children. On the other hand, Rehn and von Recklinghausen believe it positively to be the case, and recently Siegert has observed a clear case, and besides found 3 more positive cases in literature. Of the 4

cases, 3 were girls; 3 previously suffered from rachitis, which was cured. This alone speaks against the assumption that rachitis tarda was dealt with, for relapses never occur in rachitis! All patients persisted in a totally infantile *habitus* and never menstruated. They died at the age of from 16 to 19 years. The disease began when they were, respectively, 10, 13 (2), and 15 years old, and ended fatally in three instances after three years and in one after six years. The spontaneous fractures in the lower extremities, which were present in all cases and began with severe pain, are responsible for the shortening of the length of the body. [The gait of the patient is either uncertain or tottering (hobbling) or characterized by short, painful steps. Osteomalacia differs from rachitis inasmuch as it does not produce swelling of the epiphyses or changes in the bones of the head and face. Phosphorus should be tried also in this condition.—SHEFFIELD.]

Adipositas, excessive in character, occurs also among children, even in the newborn [see "Buhl's Disease"]. (Case of Heubner, 1896: child at birth weighed 15 pounds; after eight months, 39 pounds).

TREATMENT.—Thyroid gland substance [iodothyrin] is at times effective. The nutrition is to be rationally regulated by early restriction of hydrocarbons and fats, especially in cases with an hereditary disposition. Systematic exercise, gymnastics, and massage.

The prognosis is moderately favorable in the infant. Adipositas usually reaches its acme in the first year of life and very rarely persists. Adipositas developing in children beyond that age is usually very obstinate in nature and may persist throughout life. Children with adipositas, especially if it is associated with anemia, succumb readily to intercurrent diseases, and the debility becomes very pronounced even in the absence of fatty degeneration of the heart. The latter, of course, often leads to death.

X.

Contagious and Infectious General Diseases.

Influenza.—[**La Grippe** is an acute, infectious, contagious, sporadic, and epidemic disease due to Pfeiffer's bacillus.] Influenza readily affects children of every age, and generally presents the same symptoms in them as in adults. Nervous, cerebral, and gastro-intestinal symptoms usually predominate, but catarrhal symptoms also are frequently observed, partly alone and partly in conjunction with the other manifestations just mentioned. Influenza does not appear quite as suddenly in children as in adults, but comparatively frequently it is preceded by prodromata, such as languor, anorexia, etc., accompanied by more or less sudden rise of temperature, often vomiting, and in small children sometimes also convulsions. The other symptoms then appear in more or less rapid succession. Frequently the gastro-intestinal symptoms are so severe as to suggest typhoid. In other cases the nervous symptoms are so predominating that the presence of meningitis is suspected. There are also mild cases which end in from twenty-four to forty-eight hours, and severe ones which last eight days and longer, with fever and grave symptoms. Sometimes influenza runs a very protracted course and persists for weeks or months. This is especially common in children. Generally children with strong constitutions and free from other diseases are less severely affected than weak, anemic, rachitic, or scrofulous children. The latter often succumb to influenza or suffer for a long time with the sequelæ, which consist especially of intense debility. Tuberculosis readily develops in such children. Indeed, lung complications form the chief danger in this disease. There may be capillary bronchitis, pneumonia, and pleurisy. Other complications are not rare in influenza, foremost of them being otitis media, encephalitis, meningitis, paralysis, neuralgias, neuritis [and cardiac disturbances]. Influenza has a special predilec-

tion for hemorrhagic processes; so that hemorrhage in various organs—*e.g.*, hemorrhagic encephalitis or pleuritis, hemorrhage from the ear, intestines, skin, etc.—is met either as complications or sequelæ.

Such accidents may occur even in perfectly healthy children during the course of an attack, and render the prognosis unfavorable, which is entirely good in uncomplicated cases. If such complications supervene in individuals with a dyscrasia, the influenza often manifests a fatal tendency, especially if immediate and energetic treatment is not instituted.

Influenza is by no means to be neglected. Even in mild attacks the children must be put to bed for a few days, and kept warm and on a light diet. Sweating is sometimes very effective. Later the treatment must be directed against individual symptoms: Thus, for the fever and nervous manifestations hydrotherapeutic procedures are instituted, and antipyrin, phenacetin, salophen, salipyrin, etc., administered. In coexistence of catarrhal or gastro-intestinal disturbances the author combines these remedies with Dover's powder. Complications, etc., are treated as they arise.

[Diagnosis.—The diagnosis of influenza is easy during an epidemic, but quite the reverse in its absence. "Colds" and gastro-intestinal disorders being of such ordinary occurrence among children that influenza is generally not thought of when such symptoms present themselves. Furthermore, the diagnosis is often obscured by complications. A diagnosis is usually readily arrived at by bearing in mind the following symptoms:—

1. The invariable presence of Pfeiffer's influenza bacillus in the expectoration.

2. The simultaneous development of respiratory, digestive, and, at times, nervous phenomena.

3. Early and pronounced prostration, not commensurate with the severity and duration of the attack.

Treatment. — When we realize that, aside from being transmitted through the air, influenza is also communicable from one person to another, the question of prophylaxis appeals to us, the most important and effective measure of which is early isolation. We are at a loss to understand why such signal

interest is now manifested by health authorities in the prevention of measles or even chicken-pox and no effort made to arrest the spread of influenza. It must be admitted that the complications and sequelæ of the latter far excel in severity and multiplicity those of the former, and, in view of the appalling mortality of influenza, there is every reason anxiously to adopt preventive measures which will stay its ravages!

It is, perhaps, needless to say that general hygiene must be insisted upon. Furthermore, as the maintenance of a high state of health is Nature's preventive, the appearance of respiratory or digestive disturbances during an epidemic of influenza must at once be remedied. Careless exposure to atmospheric changes and grippal surroundings must be avoided. The early prostration calls for wholesome, nutritious, and easily digested diet. Beef tea or the expressed juice of meat, milk, somatose, and farinaceous food must be given frequently and in small quantities. In cases of intolerance predigested foods must be resorted to, and, where vomiting is pronounced, nutrient enemata are indicated.

The active treatment is chiefly symptomatic. Of all remedies recommended in influenza, none meets the indications so well as sodium benzoate. The following combination is especially useful:—

℞ Sodium benzoate,
Aspirin,
Phenacetin .....aa 0.8 (gr. xij).
Caffein ..... 0.4 (gr. ij).
Ol. sacchar. menth. pip ..... 1.0 (gr. xv).

M. et ft. pulv. no. vj.

Sig.: One powder every three to six hours for a child 6 years of age.

If the pain is very severe a small dose of codein or dionin may be added. If the cough is very protracted, moderate doses of creosote carbonate will be found especially efficient.

Attention must be paid to the prevention of complications, whether grave or mild; and it must be remembered that attention to comparatively little things renders an attack of influenza devoid of danger. As in scarlatina, the naso-pharynx must receive special consideration.—SHEFFIELD.]

Morbilli [Rubeola, Measles] is an eminently contagious and infectious disease. The etiological factor is unknown, but the contagion is extremely short-lived. Transmission of the disease usually takes place by direct contact, but it also occurs through a second person, the air, and articles in use. The contagious matter is in the blood; lacrymal, nasal, and bronchial secretions; perhaps also in the contents of the vesicles, and squamæ. It is contagious in all stages; so that during an epidemic every nasal catarrh and cough are to be looked upon with suspicion.

Susceptibility to infection is greatest from the second to the sixth year of life and least during the first half-year. Sometimes, however, children are born with it. Almost every human being has one attack of measles as a child; but some have several attacks, aside from recurrent measles, which sometimes sets in soon after the first attack.

The incubation stage lasts from nine to eleven days (as a rule, ten), and is ordinarily free from any symptoms except toward the end, when anorexia, peevishness, coated tongue, disturbed sleep, ephemeral rise in temperature, and initial catarrhal symptoms occur.

The PRODROMIC STAGE usually lasts three, more rarely from four to six, days, and longer in sick and debilitated children. It begins with general malaise, sometimes with one or several attacks of chills; moderate catarrhal symptoms, such as conjunctivitis; blepharitis; rhinitis; bronchitis; anorexia; thirst; restlessness; fever (101° F.; sometimes from 102 $^1/_2$° to 104° F.). The temperature often drops the next day, and remains normal except for slight evening exacerbations; so that the patients feel quite well. The catarrhal symptoms continue, however. Sometimes pneumonia sets in even at this period; the prodromal stage is then usually of longer duration. It is often complicated also by angina tonsillaris and an eruption which usually appears at the end of the second day, first on the hard and soft palate. The eruption consists of diffuse (here and there darker) redness or red punctiform or stellate spots upon a pale mucous membrane. Sometimes small, pale-red papules, more rarely transient erythema, appear also upon the face or upon other portions of the body (thigh) and disappear in a few hours. All these symptoms, however, fail to indicate the ad-

vent of measles; on the other hand, Koplik's sign[1] is very characteristic of morbilli.

Eruptive Stage.—With the appearance of the exanthema the fever again rises (from 102 $^1/_2$° to 105° F.), remains so (usually from 101 $^1/_2$° to 104° F. in the morning, from 103° to 105° F. in the evening) for from one to two days, and again drops critically during the presence and even at the height of the development of the exanthema. Sometimes there is no fever (rarely *typus inversus*). As a rule, the exanthema lasts for from three to four days, begins with bright-red, pinhead- to lentil- sized dots, which rapidly enlarge to irregularly serrated (indented or radiate), pea- and bean- sized, sharply circumscribed, rounded or crescentic, slightly elevated red spots, which disappear on pressure. Beginning first on the face (chin, around the nose and mouth), the eruption spreads, sometimes within twelve to twenty-four hours, in crops over the whole body, and remains stationary for from one to three days. During this time the catarrhal symptoms are usually very pronounced. They consist of severe conjunctivitis and blepharitis, at times severe chemosis; intense nasal catarrh, sometimes epistaxis; severe laryngitis and bronchitis, often with harsh, barking, somewhat hoarse cough and voice. One case of general cutaneous emphysema is on record, resulting from laceration of the bronchial mucous membrane at the root of the lung. Often angina and, as a rule, total anorexia with excessive thirst are present. During the high temperature there is from time to time more or less drowsiness, delirium, etc. During this stage also there is often repeated vomiting and more frequently diarrhea, which is sometimes very profuse and dysenteric. Sometimes the gums and buccal mucous membrane are reddened. The peripheral and lymphatic glands are occasionally swollen

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[1] **Koplik's sign** is an exanthema of the buccal mucous membrane which is pathognomonic of measles. It occurs in about 95 per cent. of the cases. The exanthema is confined to the mucous membrane of the mouth and rarely of the lips. It appears on the first or second day of the prodromic stage [before the skin eruption] and lasts from three to four days. It is manifested by from six to twenty, rarely more, red spots on each side of the mouth, with a central, rounded, slightly elevated, bluish efflorescence. The spots never cause pain or ulcerate.

and painful, and the spleen is slightly enlarged. Mild cases, however, with total euphoria and hardly any noticeable catarrhal symptoms, are not rarely met.

The DESQUAMATIVE STAGE lasts about one week and generally begins on the face, as branlike scales immediately after abatement of the exanthema and the decline of all symptoms; so that the patient is usually in the convalescent stage on the fifth or sixth day after the beginning of the eruption and entirely well at the end of the fourth week after infection. Sometimes traces of the exanthema remain over the whole or only some portions of the body in the form of discrete or confluent bluish-red spots, which do not disappear on pressure with the finger. They are of no special significance. A number of other anomalies may here be mentioned. Thus, the exanthema is sometimes slight or in some places absent. Such rudimentary forms are usually met in debilitated children or in those suffering from chronic diseases. In other cases there is a tendency of the eruption to become confluent, but never as distinctly as in scarlatina. In measles there are always several places covered with smaller spots or entirely free from the exanthema. Sometimes there is a small papule, at times penetrated by a hair—in the center of the spots—*morbilli papulosa;* or the small spots are covered with vesicles—*morbilli miliares;* or small hemorrhages (usually of no prognostic importance) between the spots—*morbilli hæmorrhagica.* Very rarely there is no eruption —*morbilli sine exanthema.* Sometimes the fever does not break by crisis during the acme of the disease, but by lysis; so that there is an evening temperature rise for the next few days.

Very rarely the fever continues without discernible cause for a few days after disappearance of the exanthema. Whenever fever persists beyond the fourth day after the eruption it generally indicates the occurrence or near advent of complications. In this event the lungs particularly must be examined, since lung affection—broncho-pneumonia—is the most frequent and dangerous complication, particularly in young infants, and the cause of the highest mortality. Much rarer complications are fibrinous pneumonia, pleurisy (pleuritis fibrinosa is relatively most frequent), and very rarely pericarditis and endocarditis. Baginsky saw a case of suppurative pericarditis. The

laryngeal catarrh sometimes becomes very severe. The voice and cough become very hoarse; there is pain in the throat, especially on pressure and deglutition. These symptoms are always to be looked upon as grave, for they are apt to give rise to croup, sometimes even in spite of all preventive measures. In children with a predisposition pseudocroup may set in during the course of measles, usually in the second week, or announce the beginning of the disease.

Measles is occasionally complicated by true diphtheria, which sometimes first involves the conjunctiva. The prognosis of this condition is serious, as it is apt to spread to the larynx and bronchi. Angina tonsillaris, which appears in the beginning of morbilli, occasionally continues for a long time. It is often associated with purulent, grayish-yellow dots, which may give rise to the erroneous diagnosis of diphtheria. Not infrequently the following complications are observed: Otitis media, which sometimes begins with severe cerebral symptoms, but generally runs a milder course than in scarlatina, and is less prone to end in perforation. The prognosis is, however, always doubtful, for severe forms of otitis and exhaustion from protracted fever may occur. Severe stomatitis is not infrequent. Not rarely there is profuse diarrhea. Caution should therefore be exercised in administering cathartics in measles (avoid drastics).

Occasionally there are complications on the part of the nervous system. In small children there may be eclamptic attacks with the appearance of the eruption; in older children headache and more rarely maniacal attacks, psychical excitement, transitory mania, and paralysis. These diseased conditions may also form sequelæ. In malignant cases there are also somnolence, sopor, tremor, delirium, and sometimes typhoid symptoms, such as dry tongue, fuligo, and diarrhea. Hemorrhagic symptoms (especially in children with lowered vitality), such as bleeding from the skin, nose, gums, and gastro-intestinal tract, are occasionally observed. In these cases there is usually rapid loss of strength, and then death. Cases are met which run a septic course, owing to mixed streptococcic infection (entrance especially through the tonsils, although the external appearance of these parts seems normal), and rapid death

in the incipient stage of the measles. Occasionally this occurs before the actual appearance of the septic symptoms. The frequent association of measles with pertussis is also very fatal (rapid collapse), probably owing to the great tendency of both diseases to broncho-pneumonia.

Heart paralysis must also be apprehended (as in pneumonia) in all cases of measles in children who are affected by pre-existing exhausting diseases, such as chronic pneumonia, tuberculosis, and diarrhea. Such patients rarely survive. Measles is not infrequently associated with scarlatina (the prognosis is generally bad); typhoid, erysipelas, varicella, and acute pemphigus. The latter sometimes develops in the eruptive stage and renders the prognosis of measles very bad; even isolated vesicles (usually with bloody content) may prove fatal, owing to the development of deep inflammatory ulcers and collapse.

As sequelæ there appear also chronic pneumonia, in which termination in phthisis is always to be apprehended. Not infrequently, also, tubercular meningitis supervenes. There is also a tendency to intestinal catarrh; scrofula; eye and ear affections, with consecutive chronic conjunctivitis, keratitis, ulcer of the cornea, otitis, deafness, and deaf-mutism; likewise affections of the larynx, such as ulceration and even perforation of the cartilages, and of the skin,—furunculosis, more rarely abscesses, eczema,—particularly gangrene of the skin, cheeks (noma), pharynx, lungs, aural and nasal cartilages, gums, preputium, fingers, and toes. Gangrene occurs in measles more frequently than in scarlatina, and must be looked upon with gravity. Inflammations of the nails, osteomyelitis, purpura, and, finally, nephritis (time, mode of development, and symptomatology as in scarlatina; there is also a *nephritis morbillosa sine exanthema*) are not infrequently observed.

Some children remain delicate after an attack, and continue to be sickly. All these complications and sequelæ of measles, however, are rare. In general, the prognosis of measles is good. Aside from complications morbilli may prove dangerous, first of all, in children under one year, and in those who are delicate, tubercular, or with an hereditary diathesis, or finally in those who are subject to pre-existing diseases. Such children must especially be guarded against exposure to infection.

The TREATMENT of measles consists in keeping the patient in a large, airy room (62° F.); cleanliness; attention to the skin; fluid diet until abatement of the fever; attention to the bowels, and attention to the catarrh [naso-pharynx] and complications. Lukewarm baths (about 90° F.) twice a day, for fifteen minutes at a time, are to be recommended, especially in high fever and pulmonary and nerve symptoms. Eight days after disappearance of the fever the patient may be allowed to get out of bed, and after another week to get outdoors, provided no sequelæ are discernible.

Rubella (Rötheln [German Measles]) is the mildest of all acute exanthematous infectious diseases. Notwithstanding its resemblance to mild forms of measles or scarlatina it is certainly a disease *sui generis*. Its differential diagnosis from abortive or relapsing measles is often very difficult. This is particularly the case if both diseases simultaneously prevail in epidemic form. That rubella is a disease *sui generis* is proved by the fact that children often suffer from measles or scarlatina either before or after an attack of rubella. Rubella is observed especially in children from 2 to 8 years of age. It is usually conveyed from one person to another, but also through a third person, fomites, and the air. One attack usually confers immunity for life. The incubation period lasts from seventeen to twenty days [sometimes only from five to fourteen days]. It is generally free from prodromata. The patient sometimes suffers from sore throat, languor, and anorexia, but only for a few hours before appearance of the eruption. The exanthema usually appears suddenly, with, but often without, slight fever. It begins upon the face, rarely with itching, and spreads, within from twelve to twenty-four hours, over the whole body. Often, however, it is faded on the face by the time the extremities become involved. The eruption consists of very fine, rarely confluent, pale-red, slightly elevated, usually rounded, circumscribed spots up to the size of a lentil, which momentarily disappear on pressure, and are visible only for from two to three days. There is slight fever during the acme of the exanthema—rarely above 101° F. Sometimes fever is absent. The mucous membrane of the throat is almost constantly the seat of a fine, punctate, or

spotted redness. The glands, particularly those behind the ears and on the mastoid processes and more rarely those of the axillæ, groin, etc., are swollen. [In German measles there is usually more or less marked perspiration—a symptom that is usually never observed in true measles.—SHEFFIELD.] Very frequently mild catarrhal symptoms are observed in the eyes, nose, trachea, and bronchi.

Complications are rare. Pneumonia is relatively the most frequent complication, and renders serious the otherwise good prognosis.

TREATMENT is unnecessary except in severe complications. [Attention to the naso-pharynx.]

Scarlatina [Scarlet Fever] is contagious in all four of its stages *(stadium incubationis, prodromorum, eruptionis, and desquamativum)*. Contagion is conveyed from person to person; through a third person; articles, such as clothes, furniture, toys, letters, etc.; by food (*e.g.*, milk), and through the air. The nature of the poison is as yet unknown. It is undoubtedly enduring, since infection often occurs after many years through the agency of dwelling, articles, etc. Sometimes brief contact will produce infection. The disposition to this disease is not as general as in the case of measles. Children from 2 to 7 years of age are most susceptible, while nurslings are least so. Scarlatina has been observed, however, even in the newly born infant of a mother suffering from scarlatina. Fresh injuries predispose to scarlatina; this explains why this disease is often met after tracheotomy, circumcision, phimosis operation, etc. Some individuals possess an inherent, others a transient, immunity against the disease; there is undoubtedly also a family predisposition. One attack usually protects against a recurrence, but there are exceptions. Sometimes a relapse *(scarlatina recurrens)*, with the identical symptoms and course, takes place from two to six weeks after the first attack. It is not infrequently associated with other affections: morbilli, variola, varicella, typhoid, erysipelas, and herpes.

TYPICAL COURSE.—The *incubation period* lasts for from four to seven days, but also only for a few hours or from two to three weeks, and is, as a rule, free from symptoms. This period is sometimes marked by general malaise, anorexia, somnolence,

heaviness in the limbs, and an evening rise in temperature. The prodromic stage is usually brief, from twenty-four to forty-eight hours, rarely longer, and is followed by a very sudden onset. In the enjoyment of the best of health, fatigue, vomiting, fever, and sore throat suddenly set in. Sometimes it is preceded by a fainting spell, convulsions, a chill, or frequent shivering. The temperature ranges between 103° and 104° F.; the pulse is very much accelerated; the throat is deeply injected, and the tonsils sometimes present swelling of the follicles and occasionally also small, easily detached pus foci or small hemorrhages. The uvula, soft palate, and palatine arches are mottled red, and, finally, the submaxillary glands on both sides are swollen and painful to the touch. Occasionally there is repeated vomiting and sometimes transient erythema (prodromal exanthema).

The *eruptive stage* usually lasts for from four to seven days. The exanthema usually begins in the throat and upon the neck, sometimes with itching. It is least marked upon the face, where it is observed only on the forehead and cheeks, the chin, mouth, and nose remaining free—*i.e.*, appear pale. From a distance the exanthema looks like a diffuse redness; examined more closely, however, it is found to consist of very fine, small, rose-red to deep-red dots, separated by very minute, pale areas of healthy skin. It disappears momentarily on pressure. The skin is often edematous. With advent of the exanthema the inflammation of the throat and the fever become more intense, the temperature usually ranges between 104° and 105° F. and over, generally with a slight remission in the morning, and continues until the exanthema disappears.

During this period the pulse is usually very high (140 to 160). The appearance of the tongue is characteristic. At first it is coated and very gray; the edges and tip are bright; the papillæ fungiformes project through the coating as red nodules —"*strawberry tongue.*" After a few days the deposit is cast off. The entire tongue is swollen, red, and covered with warty papillæ. There is usually also salivation. Cases of considerable severity manifest in addition marked debility, more or less somnolence, delirium, headache, sometimes vomiting, febrile cardiac systolic murmurs, and slight enlargement of the spleen and liver.

The *desquamative stage* lasts about two weeks. There is a gradual, rarely a critical decline of the fever; fading of the exanthema, and subsequent desquamation. The latter is made up of small and large scales; in the extremities, hands, and feet large areas of skin are exfoliated; the auditory canal is sometimes filled with squamæ. Desquamation is followed by decline of the symptoms, and convalescence. During this time the pulse is often irregular (of no moment); the temperature sometimes rises in the evening to from 103° to 104° F. without complications.

Such a typical uncomplicated course is, however, very rare. An attack of scarlet fever is usually associated with anomalies, complications, etc. First, the exanthema is often atypical. For instance, in some places there are lentil- to pea- sized papules or wheals upon a reddened base, or small vesicles *(scarlatina miliaris, scarlet rash)*, and more rarely larger, pemphiguslike vesicles or cutaneous hemorrhages. All these varieties are of no prognostic significance. The exanthema, instead of developing in one day, sometimes evolves gradually, requiring several days. The diffuse redness sometimes occurs in spots, and alternates with larger portions of normal skin *(scarlatina variegata);* the prognosis in this form is considered bad. Desquamation is sometimes slight, sometimes it recurs at the same spot. Rarely, the nails and hair fall out. Occasionally there is no exanthema *(scarlatina sine exanthemate)*, but only angina or nephritis; such cases are nevertheless sometimes followed by desquamation. The diagnosis of these cases, which are also contagious, is possible only when other typical cases prevail. *Exanthema sine angina* also occurs.

The course of scarlatina is sometimes very mild, with fever of a few hours' duration, transient redness, slight dysphagia and desquamation, and rapid convalescence. Such cases often escape observation; hence the subsequent apparently sudden idiopathic nephritis, dropsy, etc. Very mild scarlatina is not rarely followed by severe sequelæ.

Sometimes the fever is low, not above 101° F., or absent throughout, even in severe cases; at other times *typus inversus* prevails, *i.e.*, evening remissions and morning exacerbations. On the other hand, the temperature is sometimes very high

(hyperpyretic scarlatina) from the beginning, and is associated with delirium and convulsions, and followed by death within a few hours from cardiac paralysis, even before the appearance of the exanthema.

Even without such high fever, scarlatina is not rarely malignant in character and runs an extremely rapid course with very threatening general symptoms (often without exanthema). Thus, vomiting, convulsions, sudden total collapse, rapid coma, and death within a few hours. Occasionally the course is more protracted and typhoid in character (dry tongue, fuligo, meteorism, diarrhea), presenting also signs of blood-dissolution (extensive hemorrhages from the skin, nose, gums, and stomach) and unusually rapid exhaustion: *septic hemorrhagic scarlatina.*

The appearance of complications is usually indicated by a new rise of temperature after defervescence of the eruptive stage. Among the complications, *scarlatinal diphtheria,* or rather necrotic inflammation of the throat, heads the list. It has nothing in common with true diphtheria, for it is caused by streptococcic infection; it never spreads to the larynx or causes paralysis. At times, however, it is associated with diphtheria; then, of course, there are, in addition to streptococci, also many Löffler bacilli. It is a very malignant affection, the prognosis often being very serious. It begins usually on the third or fourth day. The symptoms and course are similar to those of true diphtheria except that the deposit is more tenacious, yellow, or grayish white. Occasionally it develops from simple scarlatinal angina, and sometimes it is malignant from the start. It very often extends to the nose, which from the beginning is usually affected with a simple catarrh, with scanty, serous secretion or is stuffed and gives rise to a fetid, brownish-yellow discharge; not infrequently deep destructive processes and necrosis of the nasal bones occur. Scarlatinal diphtheria involving the throat occasionally terminates in gangrene, and gives rise to extreme prostration, deep local destruction, and involvement of large blood-vessels. Sometimes the erosions are more superficial, but occasionally deep parenchymatous inflammation of the tonsils, with abscess formation, is observed, under which circumstances severe dyspnea and suffocation may occur; gangrene may also occur spontaneously.

Heubner distinguishes two additional types: 1. The *"pestilential form,"* when the throat and nose are filled with mucopurulent, foul masses. The gangrenous process spreads uninterruptedly, even to the mucous membrane of the lips and cheeks, and produces hemorrhages, septico-pyemic symptoms, increasing collapse, and death within a week. 2. *"Lentescent scarlatinal diphtheroid,"* which sets in about the sixth to the eighth day by a sudden rise of temperature, severe constitutional symptoms, and intense swelling of the submaxillary glands. The throat presents nothing extraordinary, except, perhaps, deposits on various parts, which are devoid of any characteristic color, but very refractory to treatment. They are cast off, leaving behind a bleeding surface, with more or less extensive loss of substance and perforation of the palate, as in syphilis. In other cases there is only a sanguinolent secretion from the nose, the focus of necrosis itself being invisible. There is gradual recovery after several days, or stubborn persistence with new localization, suppuration of lymphatic glands, or septic inflammation of the lungs, serous membrane, etc., and death after some time.

Purulent otitis is very often a sequel of the throat affection, owing to extension of the inflammation through the Eustachian tube and tympanum. It is often bilateral.

It is manifested by rise of temperature, difficulty of hearing, pain, and buzzing in the ears; in small children also restlessness and violent crying. There is usually rapid perforation of the pus through the tympanum. These perforations are not always dangerous; a great number of them cicatrize without subsequent disturbances of hearing. The opposite, however, is often the case, and deaf-mutism, not rarely also dangerous diseases, such as caries of the petrous portion of the temporal bone (facial paralysis), involvement of the petrosal sinus, hemorrhage from the external auditory canal, sinus thrombosis, brain abscess, meningitis, etc., may follow. In addition to the throat affection—also without it—there is very frequently inflammation of the submaxillary lymph-glands and the surrounding cellular tissue of the neck (Ludwig's angina). In this event the submental region up to the mastoid process of the temporal bone is hard, swollen, hot, and painful. Suppuration and very

extensive gangrenous destruction are almost constant. The prognosis is very unfavorable. Aside from the extreme exhaustion there is also danger of the pus gravitating to the mediastinum, the pleura, and pericardium, and of implication of the large blood-vessels of the neck. Furthermore it may give rise to thrombosis, emboli, and septicemia. The inflammatory infiltration sometimes extends to the larynx and produces edema glottidis.

Among other frequent complications the following may be mentioned: *Nephritis (q.v.)* and *endocarditis* (relatively frequent). The majority of cases of valvular diseases in children [except those due to acute rheumatism] originate from the endocarditic scarlatinal complication. Not every systolic murmur, however, is due to the complication; it may, for example, be a fever symptom. On the other hand, the endocarditis may at first run a latent course, and finally end in sudden death as a result of hemiplegia, embolism of the pulmonary artery or cerebral arteries, etc. Frequently ulcerative endocarditis is observed, which usually gives rise to numerous emboli and metastases in the liver, spleen, and kidneys, and also to chills, delirium, sopor, and collapse. Not infrequently also pleuritis, pericarditis, or even peritonitis occur; the latter affection is usually purulent in character and unfavorable in its termination. A further complication of scarlatina is so-called *scarlatinal rheumatism* (rather, *synovitis scarlatinosa*), which occasionally occurs during the acme of the disease, but more frequently after termination of the scarlatina, rarely after the twentieth day. This form of rheumatism is sometimes manifested simply by pain, often also by swelling and redness of the joints, and, like acute articular rheumatism, involves especially the articulations of the fingers and toes. Anatomically it usually consists of a serous exudation, pursues a chronic course, and generally ends favorably. Sometimes several joints are affected by leaps. Sometimes there is also a purulent, often multiple, articular inflammation, which develops more rarely from a serous inflammation and more frequently from a septico-embolic process due, *e.g.*, to ichorous ulceration of the submaxillary cellular tissue, necrotic tonsillitis, etc. The latter event is associated with high temperature, prostration, and sopor, and

ends fatally, or possibly in recovery after resection of the affected joint. *Myositis* also is observed in scarlatina. More rare in occurrence are eye complications, such as conjunctivitis, iritis, keratitis, keratomalacia, choroiditis, neuroretinitis, retinitis albuminurica, sudden amaurosis (due to uremia?). [The translator observed total blindness of six days' duration in a girl 11 years old.—SHEFFIELD.] Laryngitis, bronchitis, and pneumonia form the complications of the *respiratory* organs. Occasionally also the *nervous* system is involved, causing meningitis, hemiplegia, aphasia, tetany, and psychoses. Finally, stomatitis ulcerosa and aphthosa, noma, gangrene and diphtheria of the genitalia, orchitis, gangrene of the skin and whole extremities, and venous thrombosis in the brain also occur.

As *sequelæ* may be mentioned: Marasmus, chronic purpura, chronic skin eruptions (furunculosis), chronic nephritis, deaf-mutism, tuberculosis, paralysis, chorea, etc. These complications and sequelæ occur often unexpectedly even after mild attacks of scarlatina. A favorable prognosis should therefore never be ventured.

Even in mild cases scarlatina is the most malignant and dangerous of all diseases of childhood. The patients are always in danger as long as there is slightest desquamation, rise of temperature, or the mildest complication. Sometimes very severe cases are unexpectedly met even in so-called mild epidemics. Generally the younger the patient, the worse the prognosis; this is especially the case in scrofulous and rachitic children.

The heart particularly often threatens danger (collapse). A frequent pulse is in itself not always a bad omen; it is the quality of the pulse that counts; if it is bad, the prognosis is doubtful. The scarlatinal poison often manifests a malignant character (septicemia) from the beginning. Every complication, particularly diphtheria, angina Ludovici, gangrene, pleuritis, or endocarditis, renders the prognosis more serious.

TREATMENT.—Strict isolation of the patient and nurse. The brothers and sisters should be kept from school. The patient should not be allowed outdoors before the fourth to the sixth week; he should receive several soap baths, and his clothing, etc., subjected to thorough disinfection before he is allowed

to go out; he should not be sent to school before the eighth week.

There are no specific remedies against scarlatina. Anti-streptococcic serum is highly lauded, but insufficiently tested. The temperature of the room should be kept at from 61° to 64° F., the patient lightly covered, and the room well ventilated. Rest in bed until the third week, and equally as long careful dieting. The latter should consist chiefly of milk, also fruit juices, gruel, squab and chicken soup, later eggs, and gradually other food. Attention to the bowels. Medicinally, diluted hydrochloric acid and a decoction of cinchona should be administered, alternating with potassium chlorate *(q.v.)* for the throat. The throat should be looked after from the beginning, and, in presence or absence of a deposit, the naso-pharynx should be cleansed regularly every two or three hours, by gargles or irrigation with salt-water or boric acid. Deposits should be gently wiped off by means of cotton swabs, followed by application of from 3- to 5-per-cent. carbolic acid.

In scarlatinal diphtheria irrigation with a 4-per-cent. boric acid, lime-water, or 5-per-cent. carbolic acid solution is to be practiced. Heubner recommends the injection of a 3-per-cent. carbolic acid solution in the tonsils at several points, once a day, 1 cubic centimeter at a time (by means of Pravaz's syringe with a tip 10 centimeters long). Internally also tincture of myrrh *(q.v.)*. To prevent otitis Comby applies to the throat several times a day a 10-per-cent. solution of resorcin or naphthol-camphor *(q.v.)*.

Baths at 95° F. for ten minutes at a time are very useful in scarlatina and should be given twice a day during the first week and once a day during the second. They are indicated especially in high fever, severe constitutional and nervous symptoms, etc.; here also cold showers. Cool packs are often very effective. With cold baths there is often danger of collapse, which must be guarded against; likewise, when antipyretics are administered; at most quinin and phenacetin. In malignant scarlatina stimulation is of primary importance. In very frequent and irregular pulse digitalis [caffein sodium benzoate] may be tried. During desquamation lukewarm baths and inunction of fat should be employed. Regular examination of urine, ears, pleura, heart, etc., is important.

Complications must be treated energetically. [In scarlatinal nephritis: diuretics, hydragogue cathartics, warm baths, etc. (see "Nephritis"). In uremic convulsions: morphin hypodermically, to be repeated if necessary every three to six hours. In scarlatinal diphtheria: diphtheria antitoxin. For restlessness bromid with small doses of chloral hydrate or trional several times a day.—SHEFFIELD.]

Diphtheria Bacilli were discovered by Klebs and Loeffler [in 1883] and have since been looked upon as the exciters of diphtheria. The correctness of this doctrine has recently been somewhat questioned, and there are several prominent authorities—Kassowitz, Hennig, Hanseman, etc., among others—who do not recognize the specificity of the diphtheria bacillus. The opponents, for instance, emphasize the fact that this bacillus cannot be found in all cases of diphtheria, and, on the other hand, that it is often present in the mouths of people who show no trace of diphtheria and are not affected by it later, although the diphtheria bacilli which they harbor are fully virulent in character. The diphtheria bacillus is a nonmotile, short, quite thick, slightly curved rod as long as the tubercle bacillus, but about twice as thick. It is usually club-shaped at one extremity and also fusiform. Both ends are rounded. The diphtheria bacilli are often characteristically arranged in groups (nests) either like logs of wood one over another in stockade form, or in radiate form. They stain, especially with Ziehl's aniline-oil-water-gentian-violet and Loeffler's solution (30 cubic centimeters of concentrated alcoholic methyl blue solution to 100 cubic centimeters of 0.01 per cent. caustic potash). For microscopical examination a heated and subsequently cooled platinum loop is passed over the diphtheritic membrane and the small particles adhering to the loop are spread on a cover-glass [or slide], then dried and stained. This is often sufficient for the diagnosis of diphtheria. In other cases, however, a culture is necessary to make the diagnosis certain. It is cultivated on solidified blood-serum, upon which, after twenty to twenty-four hours, gray, glistening, isolated dots about the size of a small pin-head are found which but slightly change the serum. There are, however, a few other bacilli which closely resemble the diphtheria bacillus *(pseudodiphtheria, xerosis bacilli)* and differ so

little from the latter as to require animal experimentation in order to settle the diagnosis. Such matters are hardly of any important moment for the practicing physician. He must be satisfied with the microscopical—nay, usually even with the clinical—diagnosis. At any rate, it is safer to declare an innocent case as one of diphtheria rather than the opposite. The bacilli are found in the mucus of the mouth, pharynx, and nose; membranes and expectorated material of diphtheritic patients; and also upon all articles which come in contact with the patient during his illness. Transmission of the disease usually takes place through personal communication (kissing, etc.), but sometimes through the agency of dishes, clothing, etc., and also through a third person. The diphtheria bacillus is very tenacious to life, and is sometimes found in the nose and mouth of convalescents for weeks. Sometimes children are infected in rooms previously occupied by diphtheria patients, after the rooms had previously been disinfected and remained empty for a long time.

Diphtheria.—It is now generally accepted that diphtheria is caused by the Klebs-Loeffler bacillus (see "Diphtheria Bacilli"), which localizes and multiplies on the primarily affected organ (usually the throat); secretes toxic metabolic products (toxins), which enter the tissues and lymphatics; and thus produces general infection. The diphtheria bacillus may subsequently be associated with other micro-organisms (especially the streptococcus), resulting in dangerous mixed infections. No age is exempt from diphtheria, although children under 2 years are not often attacked by it. As a rule, one attack of the disease confers immunity for life. There are, however, many exceptions to this rule. The incubation period varies greatly and usually lasts from five to seven days,—but also a longer or shorter time. The diphtheria bacillus usually settles first in the throat. This pharyngeal diphtheria runs so variable a course that it is hardly possible to present fixed clinical pictures. Nevertheless there are certain common types of the disease which permit their classification into mild, moderately severe, and grave cases.

Dipththeria often begins suddenly with fever, vomiting, headache, anorexia, sore throat, and difficult deglutition. A

slow onset, however, is not rare. The patients are languid for a few days, have no appetite, are pale, have some fever, coryza, etc. Indeed, during this period digestive and respiratory symptoms predominate; so that gastritis or bronchitis is usually thought of. Improvement alternates with aggravation until suddenly throat symptoms call the physician's attention to the latter organ, and suspicious symptoms are visible on examination, or, perhaps, a sudden croupy cough or the well-known wheezing sound during respiration indicates that the diphtheria bacillus has already begun to exert its pernicious activity in deeper parts. This latent form of diphtheria is usually secondary in nature, *i.e.*, it affects children who have previously been suffering from another disease or who are otherwise delicate or sickly.

In the incipient stage of diphtheria the uvula and tonsils are found swollen and reddened, sometimes covered by a thin mucous coating or by a dirty-white deposit in the form of spots or streaks. Sometimes only red streaks with dark dots—hemorrhages—are visible. Soon the specks coalesce into grayish-white, firmly adherent, sharply defined membranes which can be detached with difficulty from the underlying structures. The membranes become thicker and spread to the palatine arches and the posterior pharyngeal wall. In the first few days there is also fever (rarely above 102 $^1/_2$° F.; uncertain type) and the swelling of the cervical and submaxillary glands. From the third to the fifth day on, usually albumin, sometimes also some casts and leucocytes and rarely blood, are found in the urine, and the general infection becomes manifest by weakness, anorexia, sometimes dicrotic and irregular pulse, dry tongue, and diarrhea.

The local symptoms also become severe. The deposit spreads, the glands become more swollen, difficulty in deglutition is more pronounced, the patient speaks through the nose, is almost unable to swallow, has *fœtor ex ore* and quite frequently coryza with a sero-purulent discharge (showing that the diphtheria also invaded the nose—a condition easily to be diagnosed by the obstructed nasal breathing, snoring, accelerated respiration, and excoriation at the nostrils). In cases in which nasal diphtheria predominates the pharynx sometimes presents but

few significant symptoms. The nose may be affected primarily *(rhinitis fibrinosa and pseudomembranacea)* and later become associated with pharyngeal diphtheria. This, then, is the course of moderately severe cases of diphtheria which, if free from complications, gradually improve within from six to eight or ten days.

Again, there are mild cases of diphtheria in which the local and general symptoms are less intense and terminate within from four to six days. Indeed, in abortive cases, the membranes may disappear in one to three days and the disease terminate. Sometimes membrane formation may not occur at all, but the affection manifests itself by redness, slight swelling, eventually a mucous deposit, or by a typical angina lacunaris, and escape notice until examined for diphtheria bacilli. This examination should always be undertaken, not only because diphtheria may be spread by just such unrecognized mild cases, but also in order not to be taken by surprise, for even the mildest cases may later be followed by cardiac collapse, paralysis, etc., or unexpectedly assume a severe form.

These severe cases are at first characterized by extension of the disease downward, and by a tendency to spread from the larynx to the respiratory organs *(descending* diphtheria, in contradistinction to *ascending*, in which the diphtheria bacilli first settle in the larynx and trachea, etc., and by spreading gradually upward secondarily affect the pharynx and nose). This extension usually occurs on the fourth to seventh day, but also sooner or later, and gives rise to symptoms of laryngeal stenosis. The voice becomes husky, then hoarse, soundless, respiration is obstructed, and a wheezing sound and a rough, barking cough is audible. The symptoms gradually become more intense; there is retraction, cyanosis, very frequent pulse; the general condition is greatly altered, and death occurs as the result of an increase of carbonic acid and deficiency of oxygen in the lungs unless the membranes dissolve spontaneously and are coughed up,—which is not of rare occurrence since the use of diphtheria antitoxin,—or the air-passages are freed by an operation (intubation or tracheotomy).

A very severe and extremely fatal form is *septic diphtheria*, better designated as *diphtheria gravissima or maligna*. In diph-

theria the severity of the infection is not always based upon mixed infection with the streptococcus, but often upon a high degree of virulence of the diphtheria bacilli. In this form of diphtheria it is not the local symptoms alone that are distinguished by special intensity (the deposit is very extensive, discolored, gangrenous—therefore destruction of uvula and perforation of palate frequently occurs—the glands are enormously swollen; there is a strong *fœtor ex ore* and usually implication of the nose), but also the extremely violent constitutional symptoms indicate the gravity of the process. In such severe cases death is usually caused by heart-failure. The heart, however, is almost always more or less altered even in milder cases, and although heart-failure but rarely sets in at the height of the disease, this event must always be guarded against during the whole course and even during convalescence of diphtheria. Excitement, exertion, nay, sitting up in bed, may cause the altered heart to collapse even at a time when the patient is on the road to recovery. Death may occur as quick as lightning, even weeks after, when the blooming appearance of the convalescent no longer permits of such a presumption. Sometimes, however, the patients do not recuperate at all after an attack of diphtheria; do not gain in weight notwithstanding careful nursing; are pale; have diarrhea, no appetite, a small pulse; and suddenly collapse (not infrequently with the occurrence of apathy and somnolence).

Nephritis, which also is a frequent complication of diphtheria, is less dangerous and begins either at the height of the disease or more rarely toward its termination or during convalescence. It is seldom severe and usually runs a favorable course. It may, however, run a very protracted course, end in uremia and exitus. Less frequent complications are bronchitis, pneumonia,—which is not always caused by an extension of the diphtheria, but primary in nature,—pleuritis, peritonitis, suppuration of the lymphatic glands, articular inflammations, etc.

The most frequent sequel of diphtheria, which not rarely appears even after very mild cases, is *diphtheritic paralysis.* It generally develops about the third or fourth week after the beginning of the diphtheria and even still later, and affects chiefly the muscles of the palate. The child speaks through the

nose, swallows with difficulty, and regurgitates fluids through the nose. In combined esophageal and laryngeal paralysis there is also great difficulty in deglutition. Part of the food enters the air-passages and may give rise to aspiration-pneumonia and gangrene. The paralysis may affect the eye-muscles and cause strabismus, oculomotor paralysis, disturbance of accommodation, and total ophthalmoplegia. More rarely the muscles of the extremities (motor weakness amounting even to hemiplegia, symptoms of ataxia) are involved. As to the hemiplegias, which are rather rare, it seems that they are sometimes caused by underlying alterations in the brain, such as hemorrhage, or cardiac thrombosis with embolism of the arteria fossæ Sylvii. They often begin with a slight eclamptic attack or sudden loss of consciousness, and terminate with aphasia and often facial paralysis. The symptoms usually subside in a few weeks, but contractures of the limbs may be permanent. The other paralyses are generally due to alterations in the peripheral nerves and are usually recovered from, although at times very slowly. The occasional paralyses of the respiratory muscles (diaphragm) and the already mentioned *paralysis of the heart* are of serious moment. The latter may be announced by cerebral signs, such as lowered blood-pressure; marked acceleration of the pulse, without a corresponding high fever; small, irregular, intermittent pulse; and sometimes increased area of cardiac dullness.

A positive prognosis is utterly impossible, for, as already stated, cardiac paralysis very often sets in without prodromata and even in apparently very mild cases.

The PROGNOSIS of diphtheria is altogether a very delicate matter. It should always be put down as dubious, since mild cases may become severe and exhibit all sorts of complications and sequelæ. On the other hand, cases with very severe onset may not infrequently end favorably or even recover in a few days. It is important to bear in mind the strength of the patient, the gravity of the epidemic, etc. Severe glandular swellings, involvement of the nose and especially of the larynx, render the prognosis unfavorable. The quality of the pulse is of more importance than the fever. That septic diphtheria offers a bad prognosis has already been mentioned. Even here,

however, the prognosis has greatly improved since the advent of serum treatment, although the latter can influence only those cases caused by diphtheria bacilli alone. The other forms of diphtheria do better by far under the serum treatment, and the mortality of diphtheria which previously rarely went below 50, often even above 70 to 80 per cent. has now dropped to 20 or 15 per cent. and lower! There are still physicians who deny the favorable action of the serum and claim that the statistics are fraudulent. The therapeutic value of the serum is, however, generally recognized, and the physician should therefore employ the serum in every case of diphtheria, even in such cases which cannot be diagnosed bacteriologically (see "Diphtheria Bacilli"), but are recognized solely by the clinical symptoms. The serum has sometimes a most wonderful effect upon the course of the disease. The fever falls by crisis, the pulse becomes stronger, the general health better, and the membranes loosen and fall off easily and rapidly. After an injection of serum the disease is certainly less prone to extend to the nose and larynx, and, if such an event does occur, surgical interference is at least obviated. If an operation is necessary the termination is now by far more favorable than it formerly was under other methods of treatment. While almost 80 per cent. of tracheotomized children died before the introduction of serum therapy, a successful issue is now far from rare. The sooner the serum is injected, the better the prognosis. In those cases treated with serum in the first or second day the mortality is exceptionally low; the latter increases with each day, but if injected even on the fifth or sixth day the serum may still prove beneficial. Notwithstanding all that was said, it is not advisable to depend upon the serum alone. Local and general treatment should also be employed. The first consists of application of an ice-collar and swallowing of small pieces of ice. If possible, gargles of hydrogen peroxid (5 per cent.), potassium chlorate (3 to 4 per cent.), aqua calcis (pure or diluted), potassium permanganate (strong enough to turn the solution red), lysol (1 per cent.), tincture of myrrh (solution clouded white), etc. The nose and, in small children who cannot gargle, the mouth may also be sprayed with these solutions. In fetid diphtheria Escherich recommends insufflations of iodoform [aristol] or airol

(with equal parts of sugar). Others praise insufflations of sodium sozoiodol *(q.v.)*. Soltmann directs spraying with solution of bichlorid (1 to 5000) once or twice daily. Others paint the diphtheritic spots. Thus, Baginsky with:—

℞ Ichthyol ..... 5.0 [3iss].
Hydrargyri chloridi corrosivi ..... 0.1 [gr. iss].
Aquæ destillatæ ..... 100.0 [℥iij].

Loeffler with:—

℞ Alcohol. absol. ..... 10.0 [3iiss].
Toluol. ..... 36.0 [3ix].
Liquoris ferri sesquichloratis ..... 4.0 [3j].
Mentholis ..... 10.0 [3iiss].

Also internal medication is recommended: frequently hydrargyri cyanatis *(q.v.)* or liquor ferri sesquichloratis [tinctura ferri chloridi]:—

℞ Liquoris ferri sesquichloratis ..... 2.0 [3ss].
Glycerini ..... 25.0 [3vj].
Aquæ destillatæ .....ad 100.0 [℥iij].

M. Sig.: One teaspoonful to dessert-spoonful every one or two hours.

The author saw good results from tincture of myrrh *(q.v.)*, and is now ordering it, in accord with Ströll, in conjunction with antitoxin. Also lemon-juice is deserving of recommendation. Henoch prescribes aqua chlori with decoctum cinchonæ:—

℞ Decocti corticis cinchonæ.....5-10 to 80 [3i-ij to ℥iiss].
Aquæ chlori..... 10 to 20 [3iiss to 3v].

As a roborant the author also administers early a decoction of quinin in conjunction with tincture of myrrh (alternating). The diet must be strengthening and stimulating from the first,—milk, beef-juice, cocoa [somatose], beef-extract, beef-tea, and good wines or cognac,—and, if there is difficulty of swallowing, nutritive enemas or an esophageal sound must be resorted to. The heart must always be watched, and in the event of weakness remedied by heart-stimulants. Complications and sequelæ, which are not preventable by serum treatment, as well as diphtheria establishing itself elsewhere (eyes, genitals, wounds,—*e.g.*, navel,—etc.), must be attended to. The latter complica-

tions also yield best to antitoxin. It is self-evident that further infection must, in the strictest manner, be prevented by isolation of the patient during the disease, and, if possible, for some time after, for virulent bacilli are found in the mouth of the patient for a long time afterward. Everything that came in contact with the patient must be disinfected [formalin disinfecting apparatus of Schering]. Regarding protective inoculation, see "Diphtheria Antitoxin."

Intubation.—For intubation as now performed the world is indebted to the late Joseph O'Dwyer [of New York]. Intubation is employed in the treatment of acute laryngostenosis, whether of diphtheritic or other nature. It consists in the introduction of a tube into the larynx, the size of the tube varying with the age of the child. The tube is somewhat bulbous in the center and wider at the upper extremity. Each tube is supplied with a thread which is attached to the cheek by means of plasters or fastened around the neck after successful introduction of the tube. After passing the index finger laterally into the mouth and lifting the epiglottis, the tube is introduced gently into the larynx by means of a special instrument (intubator). The latter is then rapidly removed. If there is no further obstruction below the larynx, the stenosis is instantly relieved and remains so as long as the tube is kept in place. If its removal is not indicated beforehand, as in obstruction by membranes and the like, and has not spontaneously been dislodged through fits of coughing, it is removed after some time (see farther), either by means of the thread, if used and left in place, or, if this has not previously been pulled out by unruly children, by an "extubator." The tube may be reintroduced in case the stenosis has not entirely disappeared, or tracheotomy may be performed.

Intubation was designed as a substitute for tracheotomy, owing to its simplicity, bloodlessness, and little necessity for assistance in its performance. Indeed, it would be much more often employed were it not for the defects which still cling to it. It must be, however, admitted that these drawbacks are gradually being removed through the improvement in the technique and in the instruments, etc. For instance, the tube is often expelled immediately or sometimes later by the act of

coughing or choking. This occurrence is often preventable by large doses of bromids. It often has to be removed owing to obstruction by membranes. Feeding is usually so impeded as to demand administration of nourishment by an esophageal tube or per rectum. Sometimes decubital ulcers develop, occasionally with the formation of scars and strictures. For this reason Widerhofer, Escherich, and others generally extubate on the fourth or fifth day and then tracheotomize. The latter operation ought rather be done as early as the second or third day. Finally, extubation is not easy, and the inexperienced are apt to push the tube down into the larynx, etc.

As intubation calls for skillful manifestation and constant medical supervision [?] it is improbable that it will ever become popular; moreover, clinicians are not as yet agreed as to its value. Some practitioners, however, have obtained very good results with it especially in cases of diphtheria treated with antitoxin where the stenoses are far milder in nature.

Intubation is contra-indicated in ulcerative processes of the throat, in septic diphtheria, edema glottidis, extensive deposit of membranes, and in very debilitated children. On the other hand, intubation is to be preferred to tracheotomy in cases where expectoration is strong and the stenosis of not too long duration. As these conditions are not always present, it is doubtful whether intubation ever will displace tracheotomy. The latter procedure is often unconditionally preferable to intubation and must very often be performed secondarily. Bókai first intubates until the patient recuperates, and the air-passage becomes free, then follows it up immediately by tracheotomy. In certain cases, however, intubation is often very useful and applicable.

[Since the introduction of antitoxin in the treatment of diphtheria the number of cases requiring intubation as well as tracheotomy has greatly diminished. Indeed, were the medical profession to concede to diphtheria antitoxin the high position as a curative agent it so well deserves and administer antitoxin in every case of diphtheria in its earliest stage, there would be few, if any, occasions to employ either intubation or tracheotomy.

The time for intubation depends, of course, upon the condition of the patient. It is always safer to intubate early than

late. Whenever dyspnea is steadily increasing and the temperature rising, it is time to intubate, and it is dangerous to defer the operation until the development of general cyanosis.

A set of intubation instruments (O'Dwyer's) suitable for children up to the age of puberty consists of six tubes, an introducer, an extractor, a mouth-gag, and a scale of sizes. O'Dwyer's latest tubes are made of hard rubber and lined with gold-plated metal. Each tube is supplied with a separate obturator, one end of which screws on the introducer. The tube is selected according to the age of the patient by means of the scale or by observing the following rule: "The smallest size is suitable for the first year of life, the second for the second year, and the third size for from two to four years, and the others for two years each." It must be remembered that the tube must fit the larynx, and the larynx not made to fit the tube.

Method of Operating.—A tube of proper size for the age is first selected, and strong silk or linen thread passed through the eyelet intended for this purpose. In case the tube is placed in the esophagus instead of the larynx, it quickly passes into the stomach, drawing the string with it, unless the latter be held. Therefore, to guard against this accident, the thread should be left long enough to reach the stomach and still protrude from the mouth.

The obturator is then screwed tightly to the introducer and passed into the tube, when it is ready for use. The antero-posterior, or long, diameter of the tube should then be in a line with the handle of the introducer.

It is always advisable to push the tube off once or twice before inserting it, to be certain that it works easily. The person who holds the child should be seated on a solid chair with low back, and the patient placed on the lap with its head resting on the left shoulder of the nurse, to avoid interference with the gag. The hands may either be held or secured at the sides by passing a towel or napkin around the body, and retained in that position until the tube is inserted and the string removed.

The gag should be inserted in the left angle of the mouth, well back, between or behind the teeth if practicable, and opened as widely as possible without using too much force.

An assistant, standing behind, holds the head firmly by placing one hand on either side. The operator—either standing or sitting in front of the patient, the former position being preferable—holds the introducer lightly between the thumb and fingers of the right hand, with the thumb resting just behind the button that serves to detach the tube, and the index finger in front of the trigger support underneath. Held in this position, it is impossible to use force enough to make a false passage, while if firmly grasped in the hand the beginner is very liable to lacerate the tissues. The index finger of the left hand is now quickly passed well down in the pharynx, or beginning of the esophagus, and then brought forward in the median line, raising and fixing the epiglottis, while the tube is guided beside the finger into the larynx.

If any difficulty be experienced in feeling the epiglottis, it is better to seek the cavity of the larynx, a *cul-de-sac* into which the tip of the finger readily enters, and which cannot be mistaken for anything else. Once in this cavity, the epiglottis must be in front of the finger, and the latter is then raised and carried to the patient's right in order to leave room for the tube to pass beside it. As the larynx contracts when touched, thereby diminishing its aperture, it is necessary to keep the distal extremity of the tube close to the finger, or even to direct it a little obliquely to the right in order to get inside the left ary-epiglottic fold. This is particularly important in very young children, in whom the tip of the finger completely covers the larynx.

In the beginning of the operation the handle of the introducer is held close to the patient's chest, and rapidly raised as the lower end of the tube passes behind the epiglottis; otherwise it slips over the larynx into the esophagus.

When the tube is inserted, it is slipped off by pressing forward the button on the upper surface of the handle with the thumb, while counter-pressure is made by the index finger underneath. In removing the obturator the tube must be held down by placing the finger either on the side or posterior portion of the shoulder. The tube should be carried well down before being detached, otherwise it is liable to become occluded with false membrane when subsequently pushed home with the

finger. When the tube is in place the gag is removed, but the string is allowed to remain for about ten minutes, or until it is ascertained with certainty that the dyspnea is relieved and that no loose membrane is present in the lower portion of the trachea. In removing the thread the finger must be reinserted to hold the tube down, but the reinsertion of the gag is rarely necessary for this purpose.

After-treatment.—The patient should be kept in a recumbent or upright posture, but not allowed to lie upon the face or upon the nurse's shoulder, face downward. Nursing infants may continue to nurse at the breast. Older children are fed with semisolid substances, such as custards, matzoon, wine jelly, scrambled eggs, ice-cream, etc., or by the method suggested by W. E. Casselberry, of Chicago, which consists in feeding while the patient's head is lower than the body. No food or medicine should be given for from two to three hours after intubation, unless the presence of the tube fails to excite sufficient cough to get rid of accumulated secretions. It is principally by the act of coughing that the tube is kept clear. The presence of a tube in the larynx does not contra-indicate the use of an emetic, which is sometimes necessary when the bronchi are loaded with secretions.

Accidents and Dangers of Intubation. — The most serious of the avoidable accidents attending this operation is asphyxia, from holding the finger too long in the throat. It should be remembered that when intubation is called for the patient is getting very little air, and can afford to dispense with this little only for a very short time without danger to life. After the insertion of the gag an expert can, as a rule, place a tube in the larynx in five seconds or less, and without any shock worth considering. The novice, on the contrary, having so many other things to occupy his attention, is very liable to forget how long his finger has been in the throat, and that during this time respiration is practically suspended.

There is seldom any danger from repeated failure to intubate, provided the finger be not retained in the pharynx longer than ten seconds at a time, and the child be given a chance to get its breath between the attempts.

The existence of loose membrane below the tube, that is, in the lower portion of the trachea, usually gives rise to the following signs: A flapping sound with the respiratory movements, a hoarse or croupy character of the cough, and obstructed aspiration, especially when forced, as in the act of coughing. In some cases there is no difficulty while the breathing is quiet, but the egress of air is completely cut off with the first attempt at coughing. The *vis a tergo* thus developed is often sufficient to cause the expulsion of both tube and pseudomembrane, but this does not always occur, and precautions should be taken to avoid the danger of sudden death from this cause.

The safest plan is to leave a string attached, by which any one who is present can remove the tube in case of threatened asphyxia. Should this not be practicable, owing to the age or from other causes, a smaller tube than that indicated by the scale for years should be used, which would be more likely to be coughed out in the event of its sudden occlusion. Either of these methods should be resorted to if the symptoms of loose membrane in the lower part of the trachea, absent at the time of operation, subsequently show themselves.

When and How the Tube should be Removed.—Since the use of antitoxin the period for which the tube is required is, according to the statistics of Rosenthal, of Philadelphia, about five days, and in many cases much shorter. The older the child, the sooner it can be dispensed with. In very young children, when progressing favorably or if the patient be not within easy reach, it is better to leave it in position for seven or eight days.

The extraction of the tube is much the most difficult operation, and at the same time the most dangerous as far as injury to the larynx is concerned. The patient is held in the same position as for insertion, and the extractor is guided along beside the finger, which is first brought in contact with the head of the tube, and then carried to the right in order to uncover the aperture and leave room for the instrument to enter beside it.

Before inserting the extractor it should be ascertained with certainty that the tube is still in the larynx. This can be de-

termined by the tubal character of the cough, which is characteristic; the difficulty of swallowing; and, last, by the sense of touch, if necessary.

Retained Intubation Tubes (Prolonged Intubation).—Occasionally cases are met in which every effort to dispense with the tube seems fruitless and asphyxia is threatened unless the tube is replaced. This is sometimes remedied by the use of sedatives internally and a spray of cocain locally to relieve the spasmodic condition, if present. If this fails, John Rogers's method should be resorted to, which consists in the gradual introduction of larger and larger intubation tubes, anointed possibly with gelatin or some antiphlogistic remedy.

The Advantages over Tracheotomy.—"The advantages claimed by O'Dwyer for this operation over tracheotomy are conceded by most of those who have had any considerable experience in the operation, viz.: (1) it is quicker, simpler, and adds no danger to the original disease; (2) there is no shock or hemorrhage; (3) no anesthetic is required; (4) no fresh wound is made which may prove an avenue of infection; (5) it gives an opportunity for a better expulsive cough, which is of great value in dislodging false membrane and mucus; (6) there are usually no objections on the part of the parents to be overcome—a point of great importance; (7) the air is warmed and moistened as it is normally, by passing over the nasal and buccal mucous membranes; (8) no skilled after-treatment is required (as the largest proportion of the cases of diphtheria are among the very poor, living under conditions in which the careful after-treatment required in tracheotomy is difficult or impossible to obtain, this is an important point); (9) in infancy, all who have had experience with both operations admit the great superiority of intubation; (10) the intubation tube can be dispensed with earlier than the tracheal cannula, and also with much less difficulty; (11) if tracheotomy is subsequently required, the operation may be done upon the tube as a guide.

"The only objection of much force urged against intubation is that asphyxia may be produced by crowding down loose membrane into the larynx. This is a very infrequent accident; should it happen, and the asphyxia not be relieved by coughing up the membrane, tracheotomy may be performed.

"Experience has clearly proved that intubation relieves the dyspnea due to laryngeal stenosis promptly, efficiently, and certainly; it does this without many of the dangers and objectionable features of tracheotomy, while at the same time it does not deprive the patient of any essential advantage which tracheotomy affords."—SHEFFIELD.]

Tracheotomy. — Tracheotomy is a life-saving operation, and, in cases requiring it, is to be performed at once, even by the general practitioner. The incision in the trachea is made to permit entrance of air whenever the larynx is obstructed by foreign bodies, edema glottidis, tumors (*e.g.*, multiple papillomas in the larynx itself, or tumors from the outside pressing upon these organs, as in struma), cicatricial strictures, croupous or diphtheritic membranes, etc. It is customary to distinguish *superior* (above the isthmus of the thyroid gland), *middle* (division of the thyroid), and *inferior* (below the isthmus) tracheotomy.

Inferior tracheotomy is employed by some physicians in children under 6 years of age for the reason that here there is no interference on the part of the gland, and there is ample space for the operation. This operation, however, has some disadvantages and is often performable only under great difficulties. Thus, the trachea below the gland is covered by numerous veins, which are greatly distended owing to the dyspnea of the patient. Besides, a small, centrally located artery is sometimes met which arises from the aortic arch and terminates in the isthmus. Finally, — and this is most important, — the arteria anonyma occasionally runs an abnormal course; so that severe hemorrhages may occur. Instead of being on the right side and branching deeply below into the right subclavian and right carotid arteries, the arteria anonyma sometimes runs perpendicularly upward to the isthmus and here divides into the two branches. Notwithstanding the disadvantages this route must sometimes be selected for the operation, for example, in cases in which foreign bodies are impacted in the upper portion of the trachea.

Median tracheotomy is very rarely performed, owing to the very variable and often very considerable size of the isthmus; so that its division is sometimes followed by severe hemorrhage.

Most frequently *superior tracheotomy* is performed, even in young children, in whom the thyroid gland is an impediment to be reckoned with, but can readily be set aside. Some clinicians prefer to divide also the cricoid cartilage and to perform "crico-tracheotomy." Superior tracheotomy is sometimes done under narcosis, which is generally unnecessary, as the patients are almost insensible when the operation is required. Nowadays Schleich's local anesthesia is used. The incision in the *skin* begins at the lower border of the thyroid cartilage, is about five centimeters long, and is made exactly in the middle line across the cricoid cartilage and the upper part of the trachea. The interstitium between both sterno-hyoid muscles is looked for by proceeding with the blunt edge of the knife. The thin connective tissue is then split over a grooved director. After separating the muscles with a dull hook, the crico-thyroid ligament—the connecting fascia which extends from the upper border of the thyroid gland to the cricoid cartilage—is reached. This is best divided right at the cricoid cartilage, whereupon the thyroid gland may readily be pulled downward. Care must here be taken not to injure the sheath of the thyroid gland. If a middle cornu has previously been encountered it is simply pushed aside to the left, where it usually originates. The lower surface of the cricoid cartilage is now caught by means of a small, pointed hook; the larynx is pulled forward; the *trachea is opened below* [*the cricoid cartilage*] with a scalpel, and the incision enlarged upward so that two to three tracheal rings are divided (sometimes also the cricoid cartilage). All is done exactly in the middle line. In the gaping wound just made the cannula is introduced and fastened with a small string. The wound is covered with iodoform gauze, and the after-treatment depends upon the underlying diseased condition. The cannulæ are of different sizes, according to the age of the child—about five millimeters for a child 2 years old, eight millimeters from 6 to 8 years old, twelve millimeters for older children. Nowadays double cannulæ, after Lüer, are generally employed, which have the advantage that the external cannula may be left in place while the internal one is removed and cleansed.

Tracheotomy is sometimes a very easy operation; occasionally, however, it is associated with great difficulties. With

careful and correct operating the hemorrhage is usually the least danger. After introduction of the cannula, blood, with mucus and air, is sometimes expelled with the first few acts of coughing, and the inexperienced operator fears that a blood-vessel has been injured. It is usually a question of a slight hemorrhage from the divided mucous membrane, which soon ceases spontaneously. Also the apnea which sometimes follows the introduction of a cannula may be innocent in nature and soon disappear. Occasionally, however, the apnea instead of improving grows worse and threatens suffocation, showing that something wrong was done either through inexperience or accidentally. It occurs, for instance, when the cannula is introduced into the tissues instead of the trachea; or when the cartilages were cut through and the mucous membrane left intact, thus allowing the cannula to slip in between the cartilages and the mucous membrane; or when through careless incision the posterior walls of the trachea and esophagus were opened and the cannula introduced into the latter. Finally, croupous membranes may accumulate in front of the tube or may be pushed downward against the bifurcation of the trachea and in this manner occlude both bronchi. One who knows all about these mishaps will quickly determine what occurred and rapidly remove the danger, by, *e.g.*, a second incision through the mucous membrane, removal of the membrane with an elastic catheter (which must always be on hand), or aspiration, etc. Membranes may also later obstruct the tube (remedied by cleansing).

The length of time the cannula is to be left in the trachea depends upon the underlying disease. In foreign bodies it can be dispensed with after a day or two, when the wound rapidly heals. Tumors must first be extirpated before removal of the tube can be thought of; indeed, at times it must be retained for life. In diphtheria it depends upon the progress the patient is making and upon the condition of the disease. It is always advisable first to temporarily remove the tube from time to time in order to determine if the child can obtain a sufficient supply of air through the larynx. The cannula should not be left in too long, as there is danger of its giving rise to decubital ulcers, which lead sometimes to fatal hemorrhages and stenoses. This is especially apt to recur if the cannula is too long. It may

also lead to granulomas on the edges of the wound, which may produce asphyxia by aspiration of the growths in the trachea after removal of the tube. There are some other dangers that may follow tracheotomy. If, for example, the tracheal wound is too large and the cutaneous wound too small, emphysema of the connective tissue ensues; there is also danger of diphtheria and erysipelas of the wound, and of diphtheritic ulceration of the tracheal wall and secondary tracheal fistulæ, cicatricial stenosis, etc. All these dangers, however, are fortunately of rare occurrence. Tracheotomy is generally one of the most gratifying operations even in diphtheria, particularly since the advent of the antitoxin treatment. Its laurels have been somewhat cut since the introduction of intubation, which is a bloodless operation and can be performed earlier (the results obtained are, therefore, better, etc.). Intubation, however, can never entirely replace tracheotomy in private practice, because the after-treatment is very difficult [?] and always [?] demands the presence of the physician. After tracheotomy, on the other hand, the patient can be intrusted to the care of an experienced nurse. [See "Intubation."]

Varicella [Chicken-pox] is a contagious disease of children. The infectious agent is as yet unknown. It is very short lived. Transmission takes place from person to person, through an intermediate person, fomites, and through the air. The susceptibility to varicella is greatest between the second and tenth years of life, but infants only a few days old may occasionally contract the disease; it rarely affects larger children and almost never adults. It is essentially distinct from small-pox. This is proved by: 1. Varicella sometimes affects children a few weeks after recovery from variola, and, *vice versa,* varicella appears soon after successful vaccination. 2. Vaccination is often successful after an attack of varicella. [3. The uniform failure of attempts to produce variola by inoculating varicella or *vice versa.*—SHEFFIELD.] The incubation period is from thirteen to sixteen days, rarely longer or shorter. Generally there are no prodromata; sometimes, however, there are headache, vomiting, anorexia, and difficulty in swallowing owing to angina; also conjunctivitis, transient ecthyma, and in small children convulsions.

The eruption occurs simultaneously upon several portions of the body without any distinct grouping, and is sometimes associated with fever (usually 101° to 102° F.), of one or two days' duration. At first there are round, red spots the size of a lentil with central pinhead-sized vesicles, filled with light fluid, which attain the size of a lentil or a pea within from one to two hours. Sometimes the spots are larger, pemphigoid, and more rarely umbilicated. Within from one to two days their contents turn turbid and sometimes purulent. On the third day the vesicles usually collapse and desiccate, and on the fourth or fifth day the brownish-black crusts generally fall off, leaving red spots, which soon disappear. Scars are rarely formed; the latter usually develop in a purulent exanthema or as a result of scratching. The eruption varies greatly from a few to a great number; occasionally they are especially abundant on the chest and back. Sometimes repeated crops occur during several days; this explains the coexistence of different stages of the eruption (spots, vesicles, and crusts). The eruption is not infrequently seen upon mucous membranes, particularly upon the lips, tongue, palate, and pharynx; the vesicles burst rapidly, giving rise to erosions, or ulcerations with red margins. The exanthema is located also in the larynx, especially upon the vocal cords, in the form of small ulcerations, occasionally giving rise to dyspnea and attacks of laryngospasm, with bad prognosis (sometimes fatal termination in spite of tracheotomy); also upon the nasal mucous membrane, conjunctiva, vulva, and preputium (painful micturition). The general health is usually unaffected; more rarely there are anorexia, itching, occasionally angina, and enlargement of the submaxillary and cervical glands. Varicella is sometimes associated with diphtheria or morbilli.

The duration of the disease is usually from eight to fourteen days, but may also be weeks; the prognosis is, however, quite favorable.

Sequelæ.—Varicella very frequently gives rise to multiple ulcerative and gangrenous processes of the skin. Some authorities distinguish a special variety of chicken-pox — namely, *varicella gangrænosa*—in which the vesicles very rapidly terminate in deep, cadaverous smelling ulcers and extensive gangrene

of the skin. Nephritis is also a very frequent sequel. This *nephritis varicellosa* may occur between the third and tenth or twentieth day. It runs either a latent or a violent course. The prognosis in such cases is doubtful and not infrequently fatal. Occasionally pleuritis, pneumonia [quite frequently], multiple articular inflammations, pyemia (staphylococcic infection), pemphigus, urticaria, and sometimes marasmus without explicable cause are observed.

TREATMENT.—Rest in bed for from one to three days and confinement to the house for eight days. Careful diet. During desiccation of the vesicles baths (at 95° F.) are very useful. To allay violent itching: "Cooling ointment" *(q.v.)* [Dobell's solution]. Attention to complications. Regular examination of the urine up to the third week.

Variola and Varioloid [Small-pox].—Variola in children who are as yet immune against this disease through vaccination is extremely rare. [Congenital variola is on record.—SHEFFIELD.] More frequently they are attacked by *varioloid*—that form of small-pox which is characterized by brief duration, mild intensity of the symptoms, slight eruption, deficient suppuration (hence no secondary fever), absence of complications and sequelæ, and favorable termination. In children under 1 year the mortality is from 8 to 10 per cent.; in older children 0 to 5 per cent. The course is the same as in adults, except that the initial stage is accompanied by high fever and severe nervous symptoms. Still more is this the case with *variola vera*, the course of which in older children otherwise resembles that in adults, except that the secondary fever often acquires a typhoid or septic character. In sucklings this affection is usually fatal even before the appearance of the characteristic exanthema. Thus (1) prostration, faintness, high fever, nervous symptoms, refusal of food, and death; or (2) after two days, appearance of a papular exanthema on the buccal and pharyngeal mucous membranes, inability to take food, and in consequence death from exhaustion; or (3), rarely, development of the typical exanthema continues, but death occurs before the suppurative stage. In older children up to 3 years of age the onset is sudden, with fever, violent convulsions, delirium, sometimes vomiting and diarrhea, rapid collapse, and coma; then appearance

of papules in the mouth and throat, puffiness of the face, nodules on the skin, gradually increasing prostration, and death within a few days. But very few children under 3 years of age survive.

[*Typical eruption:* during the *third* day the characteristic eruption makes its appearance, first on the forehead and lips, consisting of coarse, red spots. With the appearance of the eruption all the marked symptoms, including the fever, abate, the patient feeling quite comfortable. On the *fifth* day of the disease the spots become papules; on the *sixth* day they are transformed into vesicles, which soon become umbilicated; on the *eighth* day the vesicles change to pustules; on the *ninth* day the pustules are purulent, and each surrounded with a broad, red band—the *halo,* or areola; the face becomes swollen, and the features distorted; on the *eleventh* day pus oozes from the pustules and, drying, forms the scab, or crust, which on the *seventeenth* to *twenty-first* day, drops off, leaving a red, glistening depression or pit, soon changing into a white cicatrix.—SHEFFIELD.]

COMPLICATIONS AND SEQUELÆ.—Severe inflammation of the larynx, bronchi, lungs and serous membranes, stomatitis, noma, severe inflammations of the eyes (even phthisis bulbi), otitis media, gastro-intestinal affections, and nephritis.

The DIFFERENTIAL DIAGNOSIS between variola and meningitis in infants and variola (stadium maculosum) and morbilli in older children is sometimes somewhat difficult in the initial stage.

TREATMENT.—In high temperature and severe constitutional symptoms cool baths and packs followed by stimulants; otherwise prolonged warm baths. Disinfection of the mouth, nose, and eyes with solutions of potassium permanganate. Rectal alimentation. In deep extension of the exanthema, thymol [ichthyol or carbolic acid ointment]. Later roborants. [To prevent pitting keep the patient in a dark (red light?), well-ventilated room. Masks of some unctuous material to exclude the air. Cold-water compresses, with antiseptic solutions, especially to the face and hands.—SHEFFIELD.]

Vaccination.—Prophylactic vaccination against small-pox is one of the most beneficent prophylactic measures, as it has

reduced to a minimum the number of true cases of small-pox. The full protection against this disease begins on the tenth day and generally continues for from eight to ten years, sometimes for a much longer and sometimes a shorter period, depending upon the number of the developed inoculation pustules, the disposition of the individual, etc. According to the law of the State, all children—except those who are very delicate, markedly rachitic, syphilitic, and scrofulous, suffering from extensive skin eruptions or severe acute diseases, etc., in whom vaccination may indefinitely be postponed—must be vaccinated once during the second year and a second time (revaccination) during the twelfth year of life. Public vaccination usually takes place in May and July [in this country preferably in May and October], and the private physician also should select this time, when neither excessive heat nor cold prevails.

Children under three months should not be vaccinated unless special circumstances (a case of small-pox in the city) demand it. It is best to vaccinate children between the fourth to the sixth month, when they are not as yet afraid, not apt to scratch, and not teething. According to the regulation [in Germany], four inoculations are to be made [in this country only one inoculation is usually made at the insertion of the deltoid muscle—SHEFFIELD], one centimeter long and one and one-half centimeters apart. The right arm is chosen for the first vaccination and the left for revaccination. In the first two days the inoculations appear as simple red streaks. On the third or fourth day they are somewhat elevated and the surrounding parts slightly reddened; on the fifth day a small vesicle with serous contents usually appears on each inoculation mark, then enlarges, becomes pustular, and reaches its full development (centrally umbilicated pustules) about the eighth to the ninth day. Simultaneously with this process the surrounding skin gradually becomes more inflamed, infiltrated, deep red, and hot. The pustules persist a few days, dry up or break, and by the eleventh to the thirteenth day are covered with a scab. The inflammation of the surrounding parts gradually subsides, but the scab remains stationary for some time and does not fall off until two to three weeks afterward, when it lays bare scars, which are at first red, but gradually become

white and glistening in appearance. They usually remain visible throughout life.

Vaccination is also followed by a constitutional reaction. From the fourth to the fifth day after vaccination the children become restless, indisposed, somewhat feverish, and sleep badly. The fever increases up to the tenth or twelfth day, and then drops. This is the normal, the most frequent, course of vaccination; the children are temporarily not entirely normal; but they cannot be considered sick and are not in any manner harmed by the procedure.

Unfortunately, however, disturbances are occasionally met during the course of vaccination, partly with and partly without the fault of the physician. Indeed, these disturbances can, and at present usually are, prevented; the inevitable ones are so rare that the antivaccinationists are entirely in the wrong to utilize them as weapons for the suppression of the extraordinarily beneficent little operation. In olden times, when humanized lymph was employed, cases occurred in which syphilis, tuberculosis, etc., were transmitted from one child to many others; and as asepsis was not as perfected as it is at the present time, wound infections, such as erysipelas, phlegmons, etc., were not infrequent. At present, however, with the employment of animal lymph and observance of strictest cleanliness, such occurrences are hardly ever observed.

Manifold disturbances or deviations from the normal still occur after vaccination, but they are generally harmless in nature. Thus, the pustules may develop earlier, particularly in midsummer, or later than normal, during cold weather. Furthermore, some children react very strongly to vaccination; so that the local as well as the constitutional symptoms are unusually intense. The pustules may become very large; the redness in the vicinity very marked and extensive; the axillary glands very much swollen and painful; the whole arm strongly infiltrated; the fever very high, up to 104° F.; and convulsions, bronchitis, and intestinal catarrh may develop. Sometimes these symptoms are a direct result of faulty vaccination. The inoculations may be too large, the lymph too old, or the asepsis defective. Under such conditions suppuration of the glands, phlegmonous processes, and erysipelas may set in on the second

or third day after vaccination, or later during the stage of desiccation, at which time it is surely due to secondary infection. It sometimes happens that the inoculation wounds do not cicatrize after the scab has formed and that new scabs appear on the surface of the wound, so that the healing process is very much retarded. Also ulcerations which are very refractory to treatment are sometimes observed.

Occasionally the contents of the pustule become bloody. It is an innocent local process and entirely distinct from *purpura vaccinatoria*, which is manifested by the appearance a few days after vaccination of cutaneous hemorrhages all over the body (also innocent in nature). A mixed infection with impetigo contagiosa may take place during vaccination. Other skin eruptions, such as erythema, lichen, psoriasis, and eczema not rarely develop after vaccination. Disturbances not infrequently arise as a result of scratching of the pustules. The ulcers previously spoken of are probably produced in the same manner. Also auto-inoculation may occur. The children scratch themselves and carry the virus to the eyes, so that a *vaccine ophthalmia* develops; frequently only a blepharitis with a favorable prognosis, or sometimes a keratitis, iritis, etc., with a doubtful prognosis, is observed. Or they transfer the virus to some diseased parts of the skin (eczema, acne, etc.), and produce new inoculation-pustules, so that so-called *general vaccinia* is the result. The latter may develop also from within independently of any external influences. This is especially the case with children predisposed to skin diseases. As eczema forces children to scratch, it is always best not to vaccinate those suffering from eczema. Vaccinia may by inoculation also be transmitted to other children or adults, *e.g.*, by means of bedsheets, bath-water, sponges, beds, etc. Inoculation pustules have been observed even on the tongue from sucking of the fingers infected by vaccine.

Albuminuria is one of the constitutional disturbances which occasionally complicates vaccination. It is usually mild and transient, but true nephritis is sometimes met. It must finally be mentioned that vaccination is as yet occasionally followed by scrofula, tuberculosis, and syphilis, notwithstanding the use of animal vaccine. In these cases, however, it is not a

question of a new infection, but of latent diseases which become active through vaccination.

The symptoms accompanying normal cases of vaccination require no treatment. The children should be kept clean (it is best to interrupt bathing from the sixth to the ninth day), and the inoculated spot protected against infection and mechanical injuries; the hands of the child should be washed several times a day and the nails kept short. Also a protective bandage, *e.g.*, the useful Fürst shield [all vaccine shields should be discarded; nothing is better than a clean, sterilized piece of linen kept in place by sewing to the sleeve of the shirt—SHEFFIELD]. If itching or inflammatory symptoms are very severe, cold compresses of lead-water, aluminium acetico-tartrate, boric acid solution, or boric acid ointment on a piece of gauze may be applied. Other local complications, such as ulcers (1-per-cent. silver nitrate), erysipelas, skin eruptions, etc., should be treated symptomatically.

Revaccination usually runs a milder course than first vaccination. As a rule, little vesicles and nodules appear instead of pustules. Legally [in Germany] the development of a nodule is looked upon as a successful revaccination, while in first vaccination the presence of at least two fully formed pustules is required; otherwise the child must be revaccinated the following year or even a third time. If there is but one pustule, the child may be auto-inoculated from this pustule on the seventh or eighth day. The general symptoms, fever, etc., are usually very mild in revaccination, but the complications may be identical with those of first vaccination.

Epidemic Cerebro-spinal Meningitis is an epidemic and sporadic infectious disease that attacks preferably young individuals. Sucklings are rarely affected. The cause is as yet not precisely known, but is probably a variety of the pneumococcus, —the diplococcus intracellularis (meningococcus),—which is at times found in the cerebro-spinal fluid (see "Lumbar Puncture"). The portal of entry is probably the nose or ear. It is certainly contagious, but not to a great extent. The contagion is carried by means of articles in use and even corpses.

The onset is usually sudden and unaccompanied by prodromata; or it is preceded by a few days' depression, anorexia,

restless sleep, and the like, with fever, chills, severe headache, convulsions, epistaxis, and vomiting; the last three symptoms may recur during the course of the affection. To these symptoms are soon added severe nervous manifestations, such as restlessness, jactitations, insomnia, extremely severe headache, pain in the neck and whole vertebral column,—the latter is also very painful on pressure and motion,—stiffness of the neck and back up to opisthotonos, marked hyperesthesia, photophobia, tinnitus, complete anorexia, emaciation, acceleration of the pulse, contraction of the pupils; often, also, arthralgia, vague pain in various localities, conjunctivitis, herpes facialis, transient erythema, petechiæ, constipation, retracted abdomen, and enlargement of the spleen. At the end of the first week there is a gradual transition into somnolence, even coma, deep respiration, sighing; sometimes grinding of the teeth, occasional shrieking, convulsions, and more or less severe delirium. The fever, except in the beginning, is irregular and not very high. There is often diarrhea and at times albuminuria. The pulse is either slow or rapid and irregular. The pupils are dilated and unequal. Sometimes aggravation alternates with improvement. The intense headache continues also during somnolence, and is indicated by the child's grasping the head. There are also contractures, especially flexion contractures at the knee. Kernig's [1] and Leichtenstern's [2] signs are usually present, and not infrequently also unilateral or bilateral paralysis, especially of the ocular muscles, the facialis, trigeminus, and the extremities. In severe cases there are deafness and blindness as a result of extension of the inflammation to the optic nerve or labyrinth; also keratitis, cyclitis, panophthalmitis, or otitides. Meningitis is not rarely complicated by croupous pneumonia.

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[1] **Kernig's sign** is often observed in epidemic and sporadic cerebro-spinal meningitis [and typhoid ; it is not pathognomonic—SHEFFIELD]. In this cond tion it is impossible to extend the legs when the body is rectangularly flexed at the hip. Extension in the horizontal position is possible.

[2] **Leichtenstern's symptom** consists of lighting-like contraction of the whole body on striking any part of the bony framework with the percussion-hammer. It is often observed in epidemic cerebro-spinal meningitis.

In favorable cases the symptoms gradually diminish except, perhaps, the headache and anorexia, which sometimes persist very stubbornly; and convalescence occurs about the end of the second or the beginning of the third week. Recovery is rare. Much more frequently meningitis is followed by deafness, blindness, hydrocephalus, imbecility, paralysis, contractures, and epilepsy. Sometimes the course is protracted; aggravation alternates with amelioration for weeks (sometimes regularly intermittent, as in malaria), until either recovery or death takes place. Death is usually a result of exhaustion or complications. Sometimes, again, the course of the disease is very rapid, and death occurs in less than a week with coma, convulsions, failure of the heart or respiration, preceded by extremely severe symptoms, high fever, etc. Indeed, the course may be hyperacute *(meningitis siderans)*; so that death supervenes after hours or within from one to two days.

There are also abortive forms of meningitis in which all symptoms are very mild and disappear after one week; so that the patient is often able to walk about.

The prognosis, however, is always doubtful, and even after an abortive course severe symptoms may appear. Death or severe sequelæ occur in about 50 per cent. of the cases. The younger the patient, the more violent the symptoms and the worse the prognosis.

Treatment.—Isolation of the patient in a dark, quiet room. In the beginning, brisk cleansing of the intestines by calomel, senna, etc.; inunction of mercury ointment (0.5 to 1.0 [gr. viii-xv]) [unguentum Credé] or iodoform ointment (from 5 to 10 per cent.) every three hours. Icebag to the head (hair clipped). Chapman's icebag to the neck, and in strong children leeches behind the ear (in small children, two or three; in larger ones, from five to eight). Nutritious, nonirritating food by mouth or rectal feeding. In severe nervous symptoms prolonged warm baths with cold showers. At the present day warm baths (from 86° to 90° F.) are lauded in meningitis. Narcotics —morphin hypodermically or [sulphonal] chloral 0.5 to 1.0 [gr. viii-xv] by enema—and phenacetin or antipyrin may also be tried. Attention to the bladder [catheterization]. In collapse, large doses of alcohol and other stimulants. At the acme of the dis-

case corrosive sublimate subcutaneously sometimes proves effective and should be administered, first daily, later every two days (0.005 to 0.01 [gr. $^1/_{12}$ to $^1/_6$] according to age) and also, occasionally, lumbar puncture *(q.v.)*. In protracted cases potassium iodid. In convalescence avoidance of psychical irritation. The child is to be kept from school for months. Residence in the country (not seashore) and tonics.

Pertussis (Tussis Convulsiva [Whooping-cough]) is a contagious (through the sputum) and often epidemic disease of childhood. It occurs usually once in a lifetime and generally between the second and fifth year, but also in sucklings and adults. The exciter of pertussis is as yet unknown, although several investigators claim to have discovered it. Pertussis is characterized by a peculiar paroxysmal cough. There are three stages of the disease, which are sometimes easily distinguishable from one another and other times merge unnoticeably together.

Stadium catarrhale is manifested by simple catarrh of the upper air-passages without characteristic signs, and lasts from eight to twelve days. It not infrequently begins with coryza, mild conjunctivitis, pharyngitis, and laryngitis, and, in children with a predisposition, with pseudocroup. Sometimes mild general symptoms, such as anorexia, languor, restless sleep, and slight fever, mark the beginning of an attack.

The usually dry cough gradually increases in intensity and changes into typical attacks, which are characteristic of the second stage. This stage *stadium convulsivum*, lasts, as a rule, from four to six weeks and sometimes longer. The paroxysms are sometimes preceded by an aura, by vomiting, sneezing, etc., and older children usually feel the approach of a paroxysm. Each paroxysm consists of a number of short, barking, dull, expiratory, successive acts of coughing, interrupted from time to time by deep whistling or stridulous inspiration, and is concluded with the expulsion of a glassy, tenacious mucus and often also vomiting of food residue. During the paroxysms, particularly when they gradually grow worse, as is usually the case, there is considerable venous stasis. The face is at first red, then blue and puffed, particularly at the eyelids; the veins of the neck swell; there is bleeding from the nose, in the skin, conjunctiva, and throat (sputum tinged with blood), more rarely

from the ear from rupture of the drum-membrane (usually heals without sequelæ), in the meninges, etc. If the paroxysms are very frequent the puffiness is permanent. In small and particularly in rachitic children general convulsions and involuntary defecation and urination are sometimes observed. Not infrequently prolapsus, hernias, etc., develop. Each paroxysm lasts for from one to five minutes, and recurs ten to twenty and even fifty or sixty times in twenty-four hours. The paroxysms are excited by eating, particularly if the food is dry and brittle; sudden change of temperature; screaming; crying; laughing; pressure against the larynx, and examination of the throat (a valuable aid in cases difficult of diagnosis). Very often one fit of coughing is followed by another milder one and still more rarely by a third one. During this stage, as a result of friction of the sublingual parts against the teeth during the paroxysms, a lentil- to pea- sized ulcer develops either under the tongue at the frenulum or more rarely upon the tongue at the tip or near the frenulum. Between the paroxysms there is often complete euphoria or a simple cough (bronchitis) with no objective symptoms. Sometimes, however, the patients are quite sick. In intense attacks they are usually very pale and thin.

Gradually the attacks become milder and less frequent—transition into the third stage, *stadium decrementi*, takes place, during which the paroxysms lose their typical character and a simple catarrhal cough, with a more yellow and purulent expectoration, returns and lasts for from two to three weeks.

The affection usually lasts for from eight to ten weeks, but may persist for many months, particularly in small, delicate children and in those living under bad hygienic conditions. Relapses as well as complications and sequelæ may occur, as a result of colds or excitement. The complications consist chiefly of lung affections, such as capillary bronchitis and bronchopneumonia, which have a tendency to become chronic and very dangerous, especially in rachitic and scrofulous children; and also, but not as frequently, of pulmonary emphysema and pneumothorax. Emphysema of the skin also occurs, owing to rupture of some alveoli. Nephritis, otitis media, paralyses of the larynx, and not rarely complications or sequelæ of the nervous system, particularly of the brain, such as soporous conditions,

convulsions, hemiplegia, either transient or permanent, are observed. Hemorrhagic meningitis, encephalitis, softening of the brain (Jarke), also mental diseases (imbecility, idiocy, ecstatic conditions, hallucinations, insanity); furthermore, affections of the organs of special sense, such as the eyes (amblyopia, amaurosis) and ears (difficult hearing, deafness) may occur. More rarely the spinal cord becomes affected (myelitis, acute poliomyelitis, hemorrhages, hemorrhagic inflammation, and polyneuritis). Very frequent sequelæ are: Chronic bronchial catarrh, pulmonary emphysema, phthisis; more rarely acute miliary tuberculosis as a result of caseation of the bronchial glands, tuberculous meningitis, and bronchiectasis. Henoch saw also deformity of the thorax, resembling rachitic "chicken breast." [Very mild cases also are encountered which, in the absence of an epidemic, may escape observation. As children suffering from such mild attacks are liable to infect other children, they should as much as possible be kept apart.—SHEFFIELD.]

The PROGNOSIS is quite good in older and strong children free from constitutional diseases and living under good hygienic conditions. On the other hand, in younger, delicate, and particularly in rachitic, scrofulous, and tuberculous children, who live in poor environment, the prognosis is bad in view of the extreme frequency and intensity of the paroxysms and the great tendency to complications. The prognosis is also less favorable in cases preceded or accompanied by measles. Death during a paroxysm is very rare. Children frequently remain anemic and delicate, and recuperate with difficulty or not at all (tuberculosis of the bronchial glands).

TREATMENT.—Fresh air is of primary importance. Except in the presence of complications the patient should remain the greater part of the day outdoors. The rooms must he frequently aired. It is best alternately to use several ventilated rooms. All exciting causes should as much as possible be avoided. The food should first of all be bland and strengthening and be partaken in small amounts at frequent intervals—if possible, after a paroxysm. Medicinally, quinin [aristochin has recently been highly recommended] and antipyrin [creosote carbonate (creosotal)]. Of older remedies successfully used are

potassium bromid, belladonna, sodium salicylate, phenacetin, and coccionella. Of newer remedies the following are deserving of trial: Bromoform, tussol, pertussin, antispasmin, and peronin [all these remedies should be employed with caution —SHEFFIELD]. Alkaline waters, such as Emser and Gleichenberger, are also administered (to younger children, a few tablespoonfuls three to four times a day, and to older ones up to 1 cupful). Also inhalations of [tricresol] carbolic acid (linen cloths dipped in a 5- to 10-per cent. solution and hung over the bed). Change of residence (country, mountains, or seashore) should at most be recommended in the third stage. When the paroxysms are very frequent or intense, narcotics, such as chloral hydrate [sulphonal] or morphin (dionin) must be resorted to. [Paroxysms of whooping-cough may frequently be controlled by pulling the lower jaw downward and forward. This manipulation is harmless and painless. Its application is contra-indicated only when food is present in the mouth or esophagus.—SHEFFIELD.]

Parotitis Epidemica (Mumps) is a contagious (carried also by means of utensils), not rarely epidemic, affection which is frequently met in childhood and, as a rule, but once in a lifetime. It rarely occurs in children under 1 or 2 years of age. The incubation period lasts from ten to eighteen days. In the last few days there are usually a feeling of indisposition, pain in the ear region and throat, and difficult deglutition. This is soon followed by a gradually increasing swelling below and in front of the ear, which continues beyond the angle of the jaw and under the mastoid process, and ends in a rounded protuberance. Usually the other side is also soon affected. In severe cases there is confluence of the bilateral tumor, so that the whole submaxillary portion presents a sausagelike swelling. In some cases the swelling reaches to the external end of the clavicle. The disease reaches its acme on the third or fourth day. On the first day there is often fever (up to 102° F.); later none. As a rule, there is no constitutional disturbance and only exceptionally are there high temperature (103° or 104° F.), severe headache, vomiting, etc. Pain is always present on turning the head and opening the mouth, chewing, etc.,

and sometimes there is also involvement of the eyes, such as acute conjunctivitis, photophobia, edema of the lids, and chemotic swelling of the conjunctiva; more rarely tonsillar angina, and sometimes albuminuria, especially during the acme of the disease (second or third day), occur. In this stage the parotid swelling is diffuse and tense, rarely hard. The skin is colorless; more rarely it is red, glossy, and painful. Occasionally there is also swelling of the other salivary glands and likewise of a few lymph-glands, and not infrequently involvement of the lacrymal glands. The condition remains stationary for a few days; it then begins to diminish and gradually disappears in from five to six days; less frequently in fourteen days.

The DIAGNOSIS is usually easy. Parotitis may, however, be mistaken for swellings in the same region, due to stomatitis, alveolar periostitis, retropharyngeal abscess, or dentition (usually first, rarely second). The swelling in these conditions, however, appears as a doughy, normally colored, later reddened, fluctuating mass; is usually unilateral, and later ends in suppuration (connective-tissue abscess, starting from the lymph-glands).

As a rule, the PROGNOSIS of parotitis is favorable and usually free from complications and sequelæ. Orchitis is rare in children and usually occurs only at puberty. It generally ends in recovery. It may rarely give rise to atrophy of the organ. Still more infrequent complications are swelling of the mammæ, ovaries, and labia. Parotitis also frequently gives rise to nephritis, paralyses, and encephalitis, as well as diverse ear affections, which terminate in deafness, and deaf-mutism, particularly exudation in the organs which perceive the sound. The prognosis in such cases depends upon the extent of the destruction of the parts. In bilateral deafness it is usually bad. Eichhorst saw a case of ptyalism which persisted for three months and was finally cured by atropin. The swelling is usually distributed and very rarely results in an abscess. Parotitis is sometimes followed by obstinate anemia.

TREATMENT.—Expectant. The first day rest in bed, then confinement indoors. The swelling should be anointed with oil or vaselin and covered with cotton. Fluid diet.

[℞ Plumbi iodidi ..... 3.0 (gr. xlv).
Ichthyol..... 4.0 (3j).
Ammonii chloridi..... 2.0 (3ss).
Lanolini..... 24.0 (3vj).

SHEFFIELD.]

Typhoid Fever is quite frequent in children, particularly between the fifth and twelfth years. It is rare in children from 1 to 2 years of age. [Cases of fetal typhoid are on record.—SHEFFIELD.] The morbid anatomical condition in the intestinal canal is milder than in adults; ulcers are rare, and, if present, are small, superficial, and isolated. Hemorrhages and intestinal perforations in the course of typhoid in children are therefore quite rare. The convalescent stage is brief, the marasmus soon disappears, and the patient recuperates quickly without leaving behind any cicatrices in the intestines or any tendency to contraction of cicatricial stenoses. This is due to the fact that the course of typhoid in children is, as already mentioned, milder in adults.

The contagiousness of typhoid is very slight. Children sleeping next to typhoid patients almost never contract the disease. Strict isolation is therefore unnecessary, and the brothers and sisters of the patient may be permitted to go to school, if they are not allowed to come in too close contact with the patient.

The SYMPTOMATOLOGY of typhoid fever in larger children is identical with that in adults, except that the attacks are milder and of shorter duration. In smaller children it not rarely deviates considerably from that in adults. As a rule, the younger the child, the greater the deviation of the clinical picture. The onset is more protracted, more complex, and indistinct. It begins usually with ill humor, anorexia, bad sleep, thirst, and sometimes diarrhea, vomiting, and fever. Sometimes the onset is very sudden, not at all like that of typhoid. The individual stages are shorter, ill defined, diarrhea is often absent, and the stools are sometimes bloody or greenish, resembling a mixture of milk and coffee. Sometimes there is constipation and often total loss of appetite throughout the whole course of the disease. In severe cases vomiting is sometimes very pronounced; so that everything is ejected (this is not

necessarily a bad omen). The spleen is palpable, but is usually not as large as in the adult. It can rarely be percussed, owing to abdominal distension by gases and restlessness of the child. The roseolar eruption is either entirely absent or scanty. The pulse is sometimes very frequent (160 to 180) in small children, but is without any special significance. It is rarely dicrotic. The fever is frequently atypical, but sometimes so characteristic [(1) initial period, (2) fastigium, (3) ambiguous stage, (4) defervescence; morning remissions and evening exacerbations—SHEFFIELD] that it settles the diagnosis in the absence of any other signs. In young children the fever is sometimes remarkably low, but may also be very high, lasts from two to two and one-half weeks, and ends not rarely by crisis. The younger the child, the less pronounced are, as a rule, the nervous symptoms. Severe nervous manifestations are usually met only in older children. Some young children are often playful during the entire course of the disease; some are apathetic; others, again, are restless, shriek and rave, but are not delirious; finally, some children are somnolent or hard of hearing, suffer from hyperesthesia, insomnia, dizziness, slight delirium, and, very rarely, from convulsions. Children almost never present the *status typhosus*. Of course, severe delirium is occasionally observed, and sometimes the patients lie in deep sopor, grind their teeth, etc. Aphasia is a very frequent symptom, but it usually does not develop until after defervescence (duration, eight to ten days, rarely longer). Paralyses are rare, and are chiefly caused by neuritis, which develops in typhoid more rarely than in diphtheria.

The DIAGNOSIS is not difficult in older children, but typhoid in young children, especially in the beginning, is often apt to be mistaken for gastro-intestinal catarrh—diazo reaction[1] absent; influenza—is usually epidemic; pneumonia—more sud-

[1] **Diazo reaction** of the urine (Ehrlich) is obtained in the following manner: A fresh mixture of 50 cubic centimeters of sulphanilic acid solution (sulphanilic acid, 5; hydrochloric acid, 50; distilled water, 1000) with 1 cubic centimeter of sodium nitrite solution (0.5 to 100.0 distilled water) is shaken with an equal quantity of urine and one-sixth of its bulk of ammonia until the foam or the whole mixture turns red. This very often occurs, but not in all cases, in typhoid fever, and serves, in

den onset; acute miliary tuberculosis—sometimes differentiation very difficult; acute hydrocephalus, tuberculous meningitis—here the temperature is not so high, while the pulse is slow and irregular [for malaria—presence of the malarial plasmodium in the blood; greatly influenced by quinin—SHEFFIELD]. Typhoid sometimes begins with pain in the occiput, neck, and back, and with opisthotonos, sensitiveness of the vertebral processes and skin, grinding of the teeth, and shrieking without motive. Such cases usually end fatally, while postmortem dissection of the brain proves negative. [Vidal's blood-test is the most valuable sign of typhoid fever. It is usually obtained about the seventh day of the disease, but sometimes not until convalescence. In doubtful cases the examination of the stools and urine for the typhoid bacillus will often clear up the diagnosis.—SHEFFIELD.]

The following are frequent SEQUELÆ and COMPLICATIONS of typhoid in children: Bronchial catarrh (is almost never absent!). To detect rhonchi the patient must be induced to take a long breath. Superficial breathing, which is usual in such condition, owing to atony of the respiratory muscles, fails to reveal abnormal respiratory sounds, and only weak vesicular breathing is heard. Broncho-pneumonia frequently develops during the acme of the disease, and is almost always bilateral and localized in the posterior lower portions of the lung. There are often inflammations of the oral cavity and of the larynx, parotitis (renders the diagnosis bad), thromboses, embolism, decubitus, cutaneous abscesses, furunculosis, erysipelas, and noma. More rarely there are paralyses, periostitis, pericarditis, endocarditis, diphtheria and gangrene of the genitalia, otitis, chorea, aphasia, dementia, maniacal and melancholy conditions. Sometimes the nervous alterations consist merely of irritability, sensitiveness, disposition to cry, capriciousness, and surliness.

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doubtful, *e.g.*, soporous, cases as a very good method for differential diagnosis from cerebro-spinal meningitis. According to recent researches, the diazo reaction occurs also in erysipelas and measles [also tuberculosis]. In these cases the reaction is of some prognostic value. The more intense the reaction, the more violent are these affections. The reaction was occasionally also found in other febrile affections, *e.g.*, pneumonia, but not nearly so often as in typhoid fever.

Such children usually do not succeed in school, notwithstanding that their intellect is not impaired. Sometimes there is delayed power of association of ideas, defective collection of thought, forgetfulness, and dreamlike conditions. In the absence of an hereditary disposition the prognosis of these mental alterations is usually favorable. The child must, however, be spared overexertion in school. Adynamic conditions of the heart are less to be apprehended in children than in adults, but they may occur, particularly in children who refuse food for a long time. Pulmonary tuberculosis is apt to follow typhoid in children with a predisposition, but it occurs less often than after measles or whooping-cough. Generally, children recuperate very quickly, even after severe attacks, although emaciation is often very pronounced. During and after an attack of typhoid there is frequently marked longitudinal growth of the bones, especially of the long tubular bones of the lower extremities; so that the skin over these bones is often transversely torn. These tears appear first red, and gradually change into white scars.

The PROGNOSIS is, as already mentioned, more favorable in children than in adults, but naturally cases with a bad prognosis are also met with. Relapses are quite frequent, usually in the third to the fifth week, after an afebrile interval of from three to twelve days. The duration of the relapse is from six to fourteen days, its course being usually shorter and milder than in the first attack. Typhoid is sometimes associated with pertussis, morbilli, or scarlatina. Weil and Comby emphasize the very frequent occurrence of a post-typhoidal desquamation, which is probably due to sudamina, and is generally slight during defervescence. It may also be very intense, all over the body, except the extremities.

TREATMENT.—In the beginning of the disease a few doses of calomel are given (0.02 to 0.05 [gr. $^1/_4$ to $^3/_4$] every hour or two) and, later, if no other indications are present, only hydrochloric acid or acidum Halleri [also urotropin at the close of the attack]. Fluid, but strengthening, food. Small, but frequent, meals consisting of milk, bouillon, egg, gruel [somatose], and infant-foods, *e.g.*, Reed & Carnrick's, Nestlé's, etc. Abundance of water, lemonade, and in high fever wines [whisky]. In continued fever hydropathic procedures are indicated, but

must be employed with care [cool packs are best in very young infants]. Cold baths are contra-indicated. The temperature of the baths should be about 90° F., gradually cooled down to from 86° to 82° F., followed by cold douches [and friction]. Two or three baths of from five to ten minutes' duration are to be given daily. The patient is to be carefully watched while in the bath. Before and after the bath the patient should receive a few mouthfuls of wine. Careful attention must be paid to the mouth [and naso-pharynx]. If the temperature is high, antipyrin (0.25 to 0.5 [gr. iv-viij]) [phenacetin, gr. iii-vj (0.2 to 0.4)], or quinin [preferably euquinin]. Quinin may also be given *per clysma*. In very severe nervous symptoms also chloral hydrate [or trional]. In profuse diarrhea, thin rice, barley, or oatmeal-gruel; red wine or cognac with water; and, medicinally, tannigen, tannalbin, or bismuth subnitrate. In obstinate constipation enemas, calomel, or castor-oil. In intestinal hemorrhages, iced milk, plumbi acetas, liquor ferri sesquichloratis [stypticin, spirit of turpentine, morphin hypodermically, and an ice coil to the abdomen—SHEFFIELD]. In pulmonary symptoms, liquor ammonii anisatus, acidum benzoicum, tinctura opii benzoica. In cardiac debility, analeptics. A fluid diet is to be kept up for [at least] a week after defervescence; then gradual transition to other food, such as milk [lactosomatose], rice, cocoa, calf's brain [calf's-foot jelly], deer or squab meat, finally vegetables, etc.; but great care should be exercised not to overfeed the patient, whose appetite is usually very good at this time. Rest in bed is to be insisted on for at least two weeks after defervescence. In general debility, decoctum cinchonæ [strychnin sulphate, hemogallol, etc.]. [Both the urine and feces of the little typhoid patients should be disinfected for a few hours before they are thrown into the water-closet. All wash coming in contact with the patient should also be thoroughly disinfected and boiled, and toys, etc., should be destroyed.—SHEFFIELD.]

Cholera Nostras s. Infantum (Gastro-enteritis, Diarrhea and Vomiting, Summer Diarrhea) affects children of any age, particularly young babies, and, of these, most frequently the bottle-fed and those just weaned, although breast-fed babies do not always escape. Furthermore, it affects notably such children

who are exposed to bad hygienic conditions (overheated, non-ventilated rooms!). Among such children the disease rages fearfully, generally in epidemic form in the summer (it is sporadic during the rest of the year), and carries off multitudes of them. Breast-fed children in favorable conditions of life are more apt to recover from it.

The disease is caused by an extremely acute and deleterious action of parasitic bacteria, which undoubtedly enter the intestines with the food [particularly milk]. The specific germ of this disease has not as yet been isolated, but among the numerous bacteria found in the stools the bacterium coli commune predominates. [The bacillus recently described by Drs. Duval and Bassett, which seems to be identical with the bacillus of Shiga, found in dysentery, seems to be closely connected with this affection, if, indeed, it is not the sole etiological factor.—SHEFFIELD.] It is especially the absorption of poisonous products of chemical decomposition in the intestinal tract (toxalbumins and still further disorganized bodies up to ammonia) which causes cholera infantum, although it is certain that the transit of intestinal bacteria directly into the blood and several organs through the lymph channels is also responsible for the clinical picture which resembles an intoxication. In favor of an auto-intoxication speaks also the frequent occurrence of toxic nephritis.

Rarely, cholera nostras is preceded by dyspeptic and slight gastro-intestinal symptoms. As a rule, it develops quite suddenly and acutely, at times with high temperature, which is often absent in the beginning as well as later. It manifests itself by very frequent evacuations (ten to twenty daily) from the bowels. The abdomen is neither distended nor painful to the touch. The stools, at first fecal in character, soon become serous, watery, light yellow (or greenish) in color, and then always more colorless and offensive. Besides, there are more or less frequent vomiting (it is occasionally absent and sometimes the chief symptom), thirst, oliguria,—the urine often containing albumin, even in the first twenty-four to forty-eight hours, —or even anuria, rapid emaciation, exhaustion, very soon pronounced collapse, and death, frequently preceded by convulsions. Death takes place within a few hours or more frequently

a few days after the attack, earlier in younger than in older children. It is sometimes preceded by the development of so-called cholera-typhoid (high fever, albuminuria, sopor, etc.) or hydrocephaloid *(q.v.)*, and still more rarely by sclerema adiposum *(q.v.)*.

Even if the patients survive the attack they may eventually succumb to complications, such as nephritis, pneumonia, cerebral sinus-thrombosis, or remain permanently injured (xerosis corneæ, with ulceration and eventual panophthalmia). Convalescence is very tedious even without these complications.

The PROGNOSIS is therefore always very dubious. This is especially the case with artificially fed babies, of whom but few survive.

TREATMENT.—In the beginning of the attack calomel and hydrochloric acid and, if ineffective, creosote *(q.v.)*. Immediate attention to warming up and revival of the patient; warm baths (96° F.), with chamomile or mustard, one to three times a day; warm bottles, etc. A light infusion of black tea with a little cognac, which acts at times splendidly by quenching thirst, counteracting fermentation, and at times quickly arresting vomiting, is to be given every hour. These measures are to be employed, of course, more energetically in incipient collapse, when heavy wines, camphor, ether, and eventually salt-water injections (hypodermoclysis [*q.v.*]) are indicated as well. As a food, small quantities of rice- or barley- water, eventually iced milk in teaspoonful doses, are resorted to. For the diarrhea amylum enemas, combined with a few drops of tincture of opium, may be tried a few times a day. The latter, if not contra-indicated by the collapse, may also be given with hydrochloric acid. Internal antidiarrheal mixtures are often futile. The author, nevertheless, saw good results from the administration of large doses of bismuth [orphol]; also the newer preparations (tannigen, tannalbin, tannopin, etc.) are being recommended. Complications must be watched for, and, if possible, prevented. Xerosis corneæ may be prevented by frequent instillation of aqua chlori, 1 to 10 of distilled water.

Prophylaxis of cholera nostras: strictest cleanliness in feeding (milk, dishes, drinking utensils, etc.), avoidance of weaning during hot months, and attention to every gastric disturbance in the summer.

[Empty the stomach and bowels by stomach washing and intestinal irrigation. Stop all food, particularly milk. Thirst is to be allayed by cooled boiled water, with or without the addition of a little cognac, iced champagne, and small quantities of barley-, rice-, or albumin- water. After vomiting ceases small quantities of malted or farinaceous infant foods (*e.g.*, Reed & Carnrick's), beef-tea, beef-juice, somatose preparations, broth or bouillon made of veal or chicken, may be tried at first. Feeding with milk in small and gradually increased quantities is to be resumed only after all symptoms have disappeared. It is always best to send the child to the country and to keep it there until fully recovered. To neutralize the effect of the poison upon the heart and nervous system, Holt recommends the hypodermic use of morphin and atropin. The initial dose for a child 1 year old should not exceed $^1/_{50}$ grain of morphin and $^1/_{600}$ grain of atropin. It may be repeated in an hour if necessary. Collapse is a contra-indication for any opium preparation. (See also "Enteritis.")—SHEFFIELD.]

Dysentery [Ileo-colitis] is a contagious, sometimes epidemic affection of the large intestine (especially in midsummer and early fall). It particularly attacks young children. The cause of the disease is as yet unknown [?],—bacterium coli [Duvall's bacillus],—but it is surely present in the dejecta. Dysentery sometimes begins suddenly with high fever and in small children with convulsions. The characteristic symptoms will be spoken of later. It usually begins with simple diarrhea, noncharacteristic stools, and fairly good general health. Twenty-four to forty-eight hours later it is followed by a rise of temperature and ten to twenty or even sixty genuine dysenteric stools daily, *i.e.*, small quantities of brownish, tenacious, blood-streaked, hyaline, odorless or stale-smelling (or cadaverous—in diphtheritic decomposition of the mucous membrane) mucus mixed with fecal masses. Sometimes the dejecta consist of pure blood, and in intestinal ulceration they may contain dirty-gray or grayish-red, ragged shreds. There are usually severe tenesmus, colicky pain, tenderness and distension of the abdomen, anorexia, excessive thirst, and sometimes vomiting. If the latter is frequently repeated, it is suggestive of peritonitis. In a few days the patient becomes greatly emaciated, very feeble

and anemic, and the face denotes great suffering. Not rarely cardiac debility and collapse supervene. An attack usually lasts from six to eight or ten days. The stools then become less frequent and more feculent in character, the appetite improves, etc. Sometimes after temporary improvement a relapse of the old condition occurs, the fever rises now and then, the patient gradually becomes weaker and more emaciated, and the condition finally develops into chronic dysentery. Dysentery running even a normal course is often followed by prolonged and pronounced anemia. The course of dysentery is sometimes very severe, and death takes place in a few days.

Complications such as peritonitis, noma, abscess of the liver, as well as all those complications which usually accompany other serious diseases are quite rare. The same may be said of sequelæ. An attack of dysentery is occasionally followed by intestinal cicatrices, stenosis, paralysis of the sphincters, or paresis of the extremities (once acute ataxia with aphasia). Henoch also observed muco-membranous and often blood-streaked, at times "worm-shaped," masses — which float in water as fine, bloody shreds—persist for one or two weeks after an attack of dysentery. The stools are otherwise normal and passed several times daily without pain or tenesmus. The general condition is undisturbed. The symptoms sometimes return after a long remission (weeks or months). Dysentery may continue thus for years, but spontaneous recovery is still possible. Medication is futile even under such circumstances.

The symptoms are very probably due to residues of circumscribed inflammatory processes in the mucosa of the colon, which heal from time to time and are re-excited under the influence of irritation (fecal retention).

In the differential diagnosis it is to be remembered that an acute infectious catarrh of the large bowel, which very closely resembles dysentery, may occur, especially in children from 1 to 2 years of age. Moreover, mucus, small quantities of blood, and tenesmus may be found in any infantile diarrhea. The unusual frequency of the stools, their almost exclusive content of blood and mucus, and the severe disturbance of the general health alone indicate the presence of true dysentery. As foreign bodies in the bowels may give rise to tenesmus, souplike,

bloody stool, and necrosis of the mucous membrane, it is important always to examine the rectum.

Aside from those severe cases which often end fatally, the prognosis of dysentery is always doubtful. The more protracted the course, the more intense the exhaustion, the richer the blood content, and the younger the child, the worse the prognosis, especially if the child was previously affected with gastro-intestinal disease.

TREATMENT. — *Prophylaxis.* — Disinfection of the dejecta and everything coming in contact with them. Isolation of the patient. In the beginning always thoroughly cleanse the bowels by means of castor-oil or a dose of calomel (0.05 or 0.1 to 0.3 [gr. $^3/_4$ or iss to v]). The latter is then to be continued in smaller doses for a few days (0.02 to 0.05 [gr. $^1/_3$ to $^3/_4$] three or four times daily). When the stools become more feculent, opium is indicated (tinctura thebaica or pulvis Doveri) with or without bismuth subnitrate [or orphol] or the latter alone; also an infusion of ipecacuanha with opium. Others recommend silver nitrate, liquor aluminii acetatis; recently eudoxin, tannalbin, and tannigen. Also hydropathic applications to the abdomen, or, if the latter is very much distended and sensitive, icebags; baths at a temperature of 82° to 95° F., depending upon the height of the fever. Strict diet (fluid), cool milk; in breast-fed babies, continuation of mothers' milk. Oatmeal soup, albumin- or rice- water [ferrosomatose]; later veal or squab soup and eggs. For the thirst small quantities of tea with a few drops of cognac are very useful to combat the diarrhea and collapse. For the tenesmus, lukewarm salt-water (1 per cent.) injections [or 3 ounces of starch solution with a few drops of laudanum—SHEFFIELD] serve best (Baginsky). If these fail, small pieces of ice or suppositories of extract of belladonna or cocain *(q.v.)* may be introduced into the rectum. In collapse, red wine, cognac (with tea), and analeptics. In stubborn cases local irrigations with solutions of alum (1 to 2 per cent.), tannin (1 to 2 per cent.), liquor aluminii acetatis (1 per cent.), or plumbi acetatis ($^1/_2$ per cent.), and silver nitrate (0.05 to 100 [gr. $^3/_4$ to ℥iij]) once or twice daily, always preceded by irrigation of the bowels with a solution of salicylic acid (1 to 1000) or boric acid (2 per cent.). During convales-

cence care in dieting is still demanded, and strengthening, but bland, food should be continued for months thereafter. Quinin with iron [hemogallol] is to be administered internally.

Typhus Exanthematicus [Typhus Fever] is not particularly rare in children. It runs the same course as in adults, except that the prognosis is better than in the latter. The mortality is high only in children who are very young, ill nourished, or run down in health previous to this disease.

Weil's Disease.—This rare, probably infectious disease occurs almost exclusively in adults. It seems occasionally to attack children. Baginsky observed it in a child 2 years old. It is manifested by high fever, frequent pulse, attacks of dizziness, headache, delirium, pain in different muscles, etc., but chiefly by icterus, albuminuria, enlargement of the liver and spleen, diarrhea, and nervous symptoms. While adults usually improve in from one to two weeks, children have a very poor chance for recovery. In the beginning an attempt must be made to remedy the disease by calomel, rest in bed, and strict diet, as in catarrhal icterus.

Cholera Asiatica readily attacks children during an epidemic, at which time the diagnosis is easier (bacteriological examination is always imperative!) than otherwise, as the clinical picture is distinguishable with difficulty from severe cholera nostras.

The SYMPTOMS and TREATMENT are the same as in adults.

The PROGNOSIS in children under 10 years of age is very bad. Sucklings affected by it invariably die.

Glandular Fever has only recently become more known (E. Pfeiffer, 1889). It is an infectious disease which sometimes occurs in epidemics, most frequently among children from 2 to 8 years of age. The etiological factor is as yet unknown. The portals of entry are the mouth and pharynx. Simultaneously with a rapid rise in temperature (102 $^1/_2$° to 104° F.) there appear painful swellings of the submaxillary and cervical glands—which usually interfere with the movements of the head—sometimes slight redness of the throat, also headache, vomiting, diarrhea, and enlargement of the spleen and liver. The latter symptoms are not always present. The general health usually remains unaffected. The fever and glandular swelling usually

disappear within a few days, at times even in one or two days,—"one-day fever,"—and the disease is at an end. It is occasionally followed by nephritis. Sometimes the disease continues for a longer period—for weeks; the fever runs an intermittent course, the glandular swelling persists, or spreads to other glands, *e.g.*, bronchial (cough), esophageal (difficult deglutition), and retroperitoneal (pain in the abdomen, especially on pressure).

The PROGNOSIS is favorable.

TREATMENT.—Calomel, also with phenacetin, hydropathic applications, iodin ointment. In protracted cases roborants; iodid of iron [ichthalbin].

[Relapsing Fever, Febris Recurrens, "is an acute infectious, contagious, self-limited, epidemic disease characterized by a febrile paroxysm lasting about six days, succeeded by an intermission of the same duration, which is in turn followed by a relapse similar to the first seizure. It is associated with alterations in the viscera, such as enlargement of liver and spleen, and by the presence in the blood of a specific micro-organism—the *spirillum of Obermeyer.*"—SHEFFIELD.] It occurs also in children and presents nothing extraordinary except, perhaps, that the initial chill is rarer than in adults. The PROGNOSIS is almost always favorable.

The TREATMENT is symptomatic.

Tuberculosis. — MILIARY TUBERCULOSIS. — Acute miliary tuberculosis often complicates phthisis pulmonalis, and hastens the fatal termination of the latter. It may also suddenly attack children who present only glandular enlargement, chronic osteomyelitis, etc., or even such who are apparently healthy and free from tuberculous diathesis. The symptomatology is the same as in the adult. The onset is always violent and often attended by irregular fever and exacerbations. The fever is not very high and may occur intermittently with afebrile intervals. The apparently inexplicable violent attacks of fever which continue for days, although interrupted by afebrile periods of several weeks' duration, point to miliary tuberculosis, even though examination of the lungs reveals only exaggerated breathing or catarrhal sounds. The diagnosis becomes more certain if the characteristic hectic fever is accompanied also by rapid emacia-

tion, loss of strength, enlargement of lymphatic glands, and diarrhea. The clinical picture of such subacute cases is, however, very obscure. Aside from the symptoms just mentioned there are also very frequent superficial breathing, sharp respiratory sounds, and extensive fine crepitant râles; later also enlargement of the spleen, cerebral symptoms, roseola, etc. (so that miliary tuberculosis is apt to be mistaken for typhoid, scarlatina, or meningitis), very bad general condition, rapid exhaustion and increased cyanosis, followed by fatal issue usually within a few days.

Tuberculous Meningitis (Basilar) is one of the most frequent and hopeless diseases of childhood. It is always secondary and frequently the final stage of miliary tuberculosis (terminal form of tuberculosis). It is caused by invasion of tubercle bacilli into the meninges. The most susceptible age is from 2 to 6 years. It is more rarely observed in older than in younger children and may occur even in infants a few months or weeks old. The primary focus is usually found in tuberculous bronchial glands, but hyperplasia of the mesenteric glands is also a favorable soil for the bacillary infection. Caseous processes in the peripheral lymph-glands or bones, tuberculosis of the lungs and intestines, eczema, and affections of the nose—the lymph-spaces of which communicate with those of the meninges through the cribriform plate—also give rise to it. Trauma and mental overexertion are said to be etiological factors, but the primary underlying disease is probably always present. Chronic catarrh after pertussis, morbilli, etc.; chronic diarrheas, etc.; and sometimes hereditary tendency predispose to it. Tuberculous meningitis very often attacks apparently healthy, well-nourished children either suddenly or after very indefinite prodromic symptoms lasting weeks and months. Thus, emaciation, languor, with otherwise undisturbed general health, or anorexia, fatigue, irregular attacks of fever, headache, vomiting, and slight cough (sometimes resembling pertussis).

Sometimes there is a change in the demeanor of the patients. They are quiet, isolate themselves, hide in some obscure place, or become whimsical and keep their eyes fixed on vacancy, etc. Sometimes photophobia, hyperesthesia, sensitiveness to noises, twitching of the muscles, especially of the face,

twitching of the eyelids and restless sleep with bad dreams are observed. The real clinical picture now following is very changeable also, and very difficult of differentiation [1] (now somewhat easier by lumbar puncture [*q.v.*]). Tuberculous meningitis usually begins with severe headache, particularly frontal. Small children cry, grasp the head, and rub it to and fro against the pillow. In the first few days there is often frequent vomiting, which presents no characteristic peculiarities and may be entirely absent. The vomiting is sometimes very severe and continues for days, in conjunction with other insignificant symptoms. Apathy, anorexia, coated tongue, constipation, rarely diarrhea, and irregular rise of temperature are also observed. These manifestations, as well as pulling at the lips and boring in the nose, which are frequently observed, are usually not characteristic, and, therefore, not rarely mistaken for symptoms of gastro-intestinal catarrh, incipient typhoid, or cholera nostras.

Usually the more positive symptoms do not set in until after a few days or one week at the latest. They consist of repeated deep sighing and change in the pulse, which becomes slow, irregular, unequal in strength, and variable in frequency, sometimes from 120 to 72 in the course of one day. This symptom, however, may occur also in gastric affections, from reflex irritation of the vagus, and during convalescence from acute diseases, such as pneumonia, typhoid, and dysentery, and is therefore unreliable. Moreover, retardation of the pulse is sometimes absent. Gradually, however, the symptoms just mentioned increase in severity. Intense headache (the patient sometimes complains only of pain in the ear, throat, and abdomen), and occasionally dizziness (the patient believes he falls) soon follow. Apathy increases; the patient ceases to resist

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[1] **Choroidal tubercles** are grayish-white nodules and maculæ in the fundus of the eye. They sometimes form an important criterion in the diagnosis of tuberculous meningitis and acute miliary tuberculosis. Moreover, they are at times visible in the prodromic stage of the former disease when the diagnosis is as yet entirely obscure, *i.e.*, before the appearance of serious cerebral symptoms. Unfortunately, this symptom is not of constant occurrence, so that a negative result by no means precludes the presence of tuberculous meningitis.

medical examination, etc. (always a bad sign; the same may be said of enuresis); the sopor is disturbed by shrieking and delirium. This condition lasts only a few days.

About the middle of the second week or sooner, the pulse becomes more regular and frequent. Symptoms referable to the cerebral nerves, such as strabismus convergens, grinding of the teeth, movement of mastication, trismus, and change of complexion of the face, often occur. These are soon followed by gradual sopor up to complete loss of consciousness; from time to time deep sighing and piercing shrieks—"*Cri hydrocéphalique.*" The latter may sometimes continue day and night and later be suddenly interrupted by sopor. Dilatation of the pupils, sometimes one more than the other; loss or delay of reaction; later a fascicular vascular injection of the conjunctiva bulbi; presence of mucous shreds and opacities in the eyes; loss of cutaneous reaction; automatic movements of the hands toward the head; pendular swinging of the extremities; rigid contraction of the neck and muscles of mastication, and often rigidity and paralysis of half of the body supervene. Instead of constipation there are often involuntary, thin evacuations; trough-shaped contraction of the abdomen (also meteorism); retention of urine, and increased frequency of pulse—from 180 to 200. The latter is not always the case; indeed, the pulse may sometimes range between 72 and 90 until death. Notwithstanding its frequency the pulse is usually regular, but extremely small; respiration is very slow—down to 7 or 5. Later Cheyne-Stokes phenomenon and cyanosis of the face occur.

Toward the end the face sometimes turns deep red and is covered by profuse perspiration. The pupils are sometimes staring and greatly dilated; the fever is very fluctuating, usually somewhat higher in the evening, but rarely very high, almost never above 102° F. The temperature is sometimes even normal for days—rarely so all the time. In the last few days (twenty-four to forty-eight hours) the temperature is often very high (104° to 107° F.), or, more rarely, subnormal (86° to 96° F.), and associated with epileptiform convulsions, either of the whole muscular system or one side, or only the face and contractures of the extremities, back, and neck. Sometimes tremor is present. The agony is generally of long duration

(often a few days) and is sometimes associated with apparent improvement. Thus, the patient opens the eyes, takes nourishment, and recognizes those present. Death sets in with convulsions or deep sopor in from fourteen days to three weeks after the first acts of vomiting. In children previously sick (phthisis; tuberculosis of the brain substance) the course is very acute; it begins with convulsions, and is followed by all other symptoms in rapid succession.

Treatment is generally futile. In the beginning leeches (from 3 to 4 behind the ear), icecap, calomel, or inunctions of mercury ointment [or unguentum Credé] should always be tried. Later the treatment is symptomatic. For example, for the convulsions chloral hydrate [trional], etc. Large doses of potassium iodid or lumbar puncture *(q.v.)* may be tried. The latter procedure is sometimes accompanied by considerable [temporary] improvement.

Tuberculosis of the Brain is not rare in children and occurs even in very small infants. The patients usually also manifest other signs of tuberculosis or at least give a history of having previously suffered from it or that other members of the same family are or were affected with some form of this disease. These points are of diagnostic importance, for the clinical symptoms alone are very confusing and frequently present little that is characteristic until after a long period of time. Tuberculosis of the brain generally begins with a sudden epileptiform attack, which recurs at varying intervals (often of several months' duration). Much attention should be paid to the general condition during the attacks and to the concomitant cerebral symptoms, for at this time it may be possible to ascertain whether the convulsions were innocent in nature or an expression of a latent tuberculosis of the brain. For instance, the seizures are sometimes accompanied by headache with or without vomiting. Sometimes strabismus also is present—as a rule, of one eye. The situation becomes clear if, after the convulsions (but also without them), paralysis of one limb or hemiplegia develops with or without involvement of the facial (as a rule, several branches are affected) and orbital nerves. These paralyses may disappear after days or weeks, but they usually recur and terminate fatally.

The appearance of hemiplegia does not always indicate that only a single (solitary) tubercle exists or that only one-half of the brain is involved. On the contrary, both halves of the brain may be affected by tuberculosis, the symptoms for the time being indicating involvement of one side only. Indeed, tuberculosis of the brain may exist for months and years without manifesting the slightest symptoms, and sometimes its presence is revealed only at the necropsy. This is true especially in the more frequent form in which the tubercles are multiple. In this variety the pea- to hazel- nut sized (may be as large as a hen's egg), grayish-yellow, cheesy, rounded or uneven nodules are diffusely distributed, but produce no clinical symptoms. The tubercles are situated chiefly in the gray matter,—in the large ganglia, pons Varolii, and in the cerebellum, —but at times are also located in the white substance. It is often very difficult to locate the seat of the tubercles during life with any degree of certainty. At best their seat in the pons and corpora quadrigemina can be determined only to a certain extent, inasmuch as several of the nerves originating in that region are affected simultaneously or in succession, and in addition to ataxic gait, hemiplegia, etc., paralysis of the facial, abducens, oculomotor, and other nerves is also present. Finally, tuberculosis of the brain sometimes begins with progressive unilateral paresis, which is often later accompanied by tremor or contractures of one or both extremities, or with strabismus, partial contractures of the extremities or muscles of the neck, aphasia, hallucinations of hearing, and from time to time dullness of perception, headache, with or without vomiting, etc.

The duration of the disease varies greatly. Often the child lives several months or years after the appearance of the first symptoms. Sometimes, on the other hand, it dies quite suddenly after a prolonged latent course of the disease as a result of a rapidly progressive attack of tuberculous meningitis. Not infrequently a gradual enlargement in volume of the skull and forcible separation of the sutures and fontanelles are observed during the course of tuberculosis of the brain. These phenomena indicate the development of chronic hydrocephalus—a symptom which is observed especially in tuberculosis of the intermediate space of the cerebellum or between this and the

tentorium cerebelli. The hydrocephalus is due to pressure upon the vena Galeni magna and its branches, resulting in a passive congestion and transudation into the ventricles.

The prognosis of this affection is very bad. Temporary improvement should not be misinterpreted.

Natural recovery does, however, now and then take place, especially in cases of "solitary" tubercle, owing to encapsulation and calcification. The physician should therefore never assume a passive attitude, but endeavor to assist nature by roborants and tonics. The case may be considered hopeless only when signs of tuberculous meningitis supervene. However, as it is never positively known whether or not such symptoms are caused by sudden hyperemia or circumscribed encephalitis in the vicinity of the tubercles, it is even in such cases advisable not to delay the application of therapeutic measures (ice, purgatives, topical depletion, etc.).

Laryngeal Tuberculosis is quite rare in childhood, but has been observed even in sucklings. It is manifested by catarrhal symptoms, ulceration, miliary tubercles, etc. Its usual location is upon the arytenoid cartilages and the internal arytenoid folds.

Tuberculosis of the Bronchial Glands is quite common in children who have a great tendency to hyperplasia and caseation of the glands. This affection is especially apt to follow bronchial catarrh, measles, or pertussis, and is manifested by hyperplasia (this is also encountered in syphilis and leukemia) and later by caseous degeneration, whereby the central portion is first filled with softened *detritus*. Such glandular cavities, after forming adhesions with the pleura pulmonalis or bronchi, may eventually rupture into a bronchus, the lungs, or a branch of the pulmonary artery, and in this manner suddenly produce putrid bronchitis, and if not relieved in time by tracheotomy, fatal suffocation by the entrance of caseous pieces into the upper air-passages or fatal hemoptysis. It may rupture even into the pericardium and cause fatal pericarditis. Larger glandular masses at the root of the lungs may compress the blood-vessels and nerves, particularly the pulmonary artery and vein and their branches, the superior vena cava and jugular communicans, the vagus and recurrens nerves, and after form-

ing adhesions with them (even the aorta) markedly displace, erode, and perforate these parts. Rupture into vital organs generally discloses too late the original disease. The danger is usually not recognized earlier, for the reason that characteristic symptoms, such as are due to the compression of those parts, are rarely present. Those symptoms which are enumerated by some authors [spasmodic cough with paroxysmal dyspnea and edema or congestion of the face—SHEFFIELD], even the dullness over the thorax, are usually absent, and if present are not characteristic. Altogether tuberculosis of the bronchial glands almost always runs a latent course and its existence can only be surmised, *e.g.*, in phthisis, where it is rarely absent. If recognized in time it is sometimes curable by means of soft soap inunctions, and, according to Fronz, mercury inunctions, also in nonsyphilitic hyperplasia [creosote carbonate, etc., codliver-oil, and Russell's fat emulsion should be given a fair trial in conjunction with plenty of fresh air and sunshine—SHEFFIELD].

TUBERCULOSIS OF THE LUNGS.—*Phthisis pulmonum* is not a rare disease of childhood. In children from 5 years of age upward the symptomatology and course resemble those observed in older persons. In younger children, however, different peculiarities are observed. As a rule, the younger the child, the less positive the local symptoms and the more pronounced the disturbances of general nutrition, which correspond with the clinical picture of atrophy. This is due to the fact that in small children the tuberculous affection usually involves several organs simultaneously (lymph-glands, spleen, serous membranes, liver, kidneys, etc.); indeed, often no organ remains uninvolved. However, the tuberculous process of all those organs frequently pursues a latent course, only the atrophy indicating what is going on. Occasionally it is associated with multiple glandular swellings, multiple abscesses, eczema, suppurations of the bones and joints, and inflammation of the eye and ear.

A certain diagnosis is furnished only by a thorough examination of the thorax. This is by no means easy, but must always be undertaken, even though cough, dyspnea, etc., are absent. While indicanuria occurs very often in tuberculosis of children, it is nevertheless not pathognomonic. Not infrequently nothing is found except rough respiratory sounds or

catarrhal râles, *i.e.*, a chronic bronchitis. This phenomenon must be regarded with suspicion in the presence of hereditary disposition, glandular swelling, etc. Sometimes extensive foci are found associated with symptoms of consolidation, which confirm the diagnosis. The distribution is not at all typical in children; often, for example, the lower lobes are affected first. In addition to those symptoms there are usually irregular febrile attacks, with morning remissions and evening exacerbations. On the other hand, phthisis in small children not infrequently pursues an afebrile course. Dyspeptic symptoms and diarrhea are rarely absent; indeed, the latter often diverts attention from the respiratory organs and misleads the physician. In small children, in whom the sputum is obtainable only with great difficulty, the demonstration of tubercle bacilli is almost impossible. According to Epstein, this is sometimes possible by the introduction of a Nélaton catheter to the base of the tongue. During an attack of coughing some sputum may be thrown into the fenestra of the sound. Grayish-yellow, fetid sputum is sometimes expectorated and occasionally small quantities of blood. Copious hemoptysis is extremely rare in children. As a rule, pulmonary phthisis is also complicated by tuberculosis of the bronchial glands, and the latter may appear as the predominating disease.

Pulmonary phthisis usually runs quite an acute course in small children, and death sets in, as a rule, after months or from one to two years at the latest, most frequently from tuberculous meningitis, pleuritis, and acute miliary tuberculosis. It sometimes occurs in very young children, even in the newly born, and it is not rarely directly inherited. Usually only the predisposition is inherited, and infection takes place later from environment. Scrofulous children are particularly susceptible to tuberculosis. Morbilli and pertussis also often end in phthisis. Capillary, bronchial, and chronic pneumonia also offer a favorable soil for the growth of tubercle bacilli. On the other hand, these affections are often expressions of phthisis.

The *treatment* of a more or less advanced case is a very unpromising undertaking. At best the symptoms only can be alleviated and death postponed by hygienic and dietetic measures (see further). In incipient phthisis, however, therapeutic

success is by no means impossible. A healthy, sunny dwelling; outdoor life (in the summer "sool" and iodin baths, woods, mountains, and sea; in the winter, residence in the South); attention to the skin (also sea-salt baths and massage); strengthening food (much fat, codliver-oil, milk and kephir, eggs, malt preparations, somatose, nutrose, puro, etc.); tonics (syrup of the iodid of iron, arsenic); blood preparations (hematogen, hemogallol, sanguinal) sometimes do very well. With medicinal treatment, also (creosote, creosotal, guaiacol, duotal, sirolin, ichthyol, ichthalbin), good results are now and then obtained in incipient tuberculosis. Symptomatic treatment is often called for, and expectorants, narcotics, and stomachics (especially orexin tannate) may be ordered.

Prophylactic measures are to be observed to guard against infection, especially in hereditarily predisposed children. They must be kept away from phthisical patients, particularly from tuberculous nurses. They should not receive milk of cows suffering from murrain, etc. Their systems must be strengthened by early hardening, tonics, outdoor life, breathing exercise, etc.

Tuberculosis of the Abdominal Organs. — Tubercles are very often found in the serous covering of the spleen and liver, the diaphragm, intestinal canal, kidneys, great omentum, and in the peritoneum. It is observed even in the female genitalia. The tubercles are sometimes very numerous, either very small, barely visible with the naked eye, or as large as a pea or larger. Enlargement of the mesenteric and other abdominal glands is usually an early symptom. All these symptoms, however, are observed only at the autopsy. During life, at most, tuberculosis of the peritoneum (see "Peritonitis") and, perhaps, also that of the glands and intestine is actually diagnosticated. Enlargement of the mesenteric glands is generally tuberculous in nature, and secondary to tuberculosis of the peritoneum or intestinal mucous membrane. It, however, is observed also in otherwise healthy children who suffer or have previously suffered from chronic or recurrent intestinal catarrh and under unfavorable conditions may advance to cascation. The swelling and induration are usually slight and cannot be detected by palpation. Even larger tuberculous nodules frequently escape observation, owing to meteorism or ordinary

tension of the abdomen, and, even if palpable, often no certain diagnosis can be made (may be mistaken for scybala). Although the detection of tubercle bacilli in the feces is by no means easy and requires experience, the diagnosis is less difficult in tuberculosis of the intestines, since here the stubborn diarrhea, which often resists all methods of treatment and returns again and again, presents a quite characteristic clinical picture. Tuberculosis of the intestine is generally closely connected with tuberculosis of other organs, particularly with tuberculous peritonitis; but it occurs also primarily as the result of direct infection, *e.g.*, drinking the milk of cows suffering from "murrain." Isolated ulcerations are generally observed, but occasionally the intestine is studded with annular ulcers, which not infrequently occlude the intestinal lumen. Sometimes there are adhesions and communication between the intestinal loops, resulting in perforation with consecutive peritonitis; frequently sacculated peritoneal abscesses and involvement of the mesenteric glands [*tabes mesenterica*] are observed.

The *symptomatology* resembles that of the adult. Fever is sometimes absent or hectic in character. In isolated ulcers diarrhea is either absent or slight; so that the symptomatology consists merely of emaciation, exhaustion, and intermittent fever, as often prevails in simple intestinal catarrh with follicular ulceration. The diagnosis of intestinal tuberculosis is therefore frequently not made unless it is associated with tuberculosis of other organs.

Treatment.—The diarrhea may be treated by all remedies employed in ordinary diarrhea; success is, however, generally only temporary. Also all the newer antidiarrheal remedies (tannigen, tannalbin, tannon, tannopin, eudoxin, xeroform) have been tested, and, judging by the numerous reports, with success.

Tuberculous Peritonitis usually attacks children of from 3 to 8 years of age or younger and pursues a very insidious course. Sometimes it also runs a rapid, even typhoidal, course like acute peritonitis, which also rarely complicates chronic peritonitis. The classical form of tubercular peritonitis, however, is the chronic variety, which is manifested by the following symptoms: Gradual increase in volume of the abdomen, which

is at first little noticed, but appears considerably arched (hemispherical) after a few months. The abdominal walls are greatly distended (even glistening); the epigastric veins are often visible as transparent blue cords. The umbilicus is either effaced or protuberant. There are total anorexia, languor, and emaciation. The emaciated extremities contrast characteristically with the large abdomen. Also early colicky pain and sensitiveness to pressure are sometimes, but not always, present. Often there is marked ascites, and not infrequently only a small amount of fluid in the abdominal cavity, the enlargement of the abdomen depending upon intestinal gases. Some portions of the abdomen may be flat; other portions again are tympanitic on percussion, without being influenced by the position of the body (encapsulation of the fluid by adhesions). Occasionally hard, cordlike masses and thickened omentum or adherent intestinal loops are observed; and more rarely larger tumors (encapsulated peritoneal abscesses) are found. Enlargement of the abdomen occasionally persists until death, which occurs, *e.g.*, from tuberculous meningitis. In the latter event the abdomen is more frequently tray-shaped. Rarely the abdomen is sunken or even flat throughout the whole course of the peritonitis,—if there is neither ascites nor a large quantity of gases. Frequently there is tuberculosis of the peritoneum and of other abdominal organs, exclusively, with possible involvement of the glands, while the other organs remain entirely intact (see "Tuberculosis of the Abdominal Organs"). In these cases, aside from abdominal enlargement, anorexia, emaciation, etc., there are no other symptoms during the entire course, which may extend for a year or longer. In doubtful cases examination of the urine may, perhaps, be of diagnostic value, inasmuch as indican is almost constantly and persistently found in tuberculosis. Sometimes there is also irregular elevation of temperature (normal in the morning and 103° F. or over in the evening), and if the intestines are involved also diarrhea (see "Intestinal Tuberculosis"). Abdominal swelling of the inguinal glands is also observed. The latter, however, is not characteristic, as it is otherwise often found in children and is not infrequently absent in tuberculous peritonitis. Sometimes (usually very late) perforation of the exudate

takes place through the umbilicus and more rarely through the rectum. If not preceded by intercurrent complications, death may result from exhaustion. Toward the end there is often edema due to increasing cardiac debility.

Treatment.—Punctures. These should be preceded by very careful percussion in order positively to ascertain the free mobility of the water and to avoid entering adhesions or the intestine. Gentle percussion is best, and must elicit a flat sound at the point of puncture. This method of treatment is only of temporary benefit (decrease of dyspnea, etc.). Radical cures have often been obtained by laparotomy, the *modus operandi* of which is as yet obscure. According to Tillman, the curative factor consists of a hyperemia of the peritoneum produced by the operation in a manner similar to that employed by Bier to cure tuberculosis of the extremities by artificial passive hyperemia. The operation is contra-indicated in cases in which tuberculosis of other organs exists or in progressive cachexia. Fever forms no contra-indication. Until the operation, or, if this is refused, the abdomen should be painted carefully with tincture of iodin or iodoform collodion. The abdomen is divided into four quadrants, and only one of them is painted every day. In addition, rest, diet, and opium. Other medication is generally useless.

Syphilis.—Syphilis in children is rarely a primarily acquired (see further) disease. It is usually inherited from parents *(syphilis hereditaria)*. The latter condition, therefore, will occupy our chief attention.

Children of syphilitic parents either present signs of the disease at birth or not until the first few months of life. They do not necessarily look ill nourished or pale, but, on the contrary, often show a very healthy color and favorable conditions of nutrition. This is particularly the case with breast-fed children. Infants fed artificially are often atrophic; very pale; sometimes present a peculiar brownish color; and diffuse, reddened skin, which is here and there covered with large, yellowish lamellæ. Aside from pemphigus, with which congenitally syphilitic children are so often born, *coryza* is usually the first and also the most constant symptom of syphilis. The coryza usually precedes or at least almost always accompanies all the

other manifestations, and is rarely absent. The children "snuffle" in a peculiar manner during breathing, but particularly while nursing, which is accomplished with difficulty. Locally this "cold in the head" usually manifests itself by swelling of the nasal mucous membrane, occlusion of the nares by yellowish or brownish scabs, and sero-mucous discharge (sometimes with admixture of blood). Occasionally the nose is also swollen externally. Very soon the skin also appears affected.

In the beginning there appear — particularly about the folds of the eyes, nose, and chin; at the anus; and on the hands and feet—isolated, red- or brownish- copper colored, round or irregularly shaped spots *(roseola syphilitica)* the size of a five-cent piece, which are either covered with small or large scales or appear glossy, as though varnished. On other places red, moist excoriations (as a result of maceration by secretions, as on the chin, at the anus, etc.), surrounded by an intertrigolike eruption, are observed. The spots gradually extend over a large part of the body, become larger, and coalesce into a large, brownish-yellow or red, partly desquamated, partly excoriated, scabby, etc., surface. In some places, *e.g.*, at the angles of the mouth and eyes, at the anus, vulva, etc., syphilis leads to early bleeding fissures and cracks *(rhagades)*. The palms of the hands and soles of the feet are usually diffusely reddened and covered by large scales and cast-off epidermic shreds *(psoriasis syphilitica)*. There is often falling of the hair, particularly of the eyebrows and eyelashes, and the nails likewise present distinct alterations, such as thickening, clawlike deformities, suppurations, and also exfoliation of the nail *(paronychia syphilitica)*. These skin affections are not always so marked, sometimes they are only partially developed and at other times barely indicated, or other changes present themselves, such as a papular exanthema (lichen, strophulus) or psoriasislike eruption, or remains of bullæ *(pemphigus neonatorum)*, in the form of red spots surrounded by a ring of dry epidermis or excoriations. Sometimes a fresh bullous exanthema is observed, consisting of flabby, purulent vesicles, particularly of the soles of the feet or palms of the hands,—usually offering a bad prognosis. More rarely the eruption is purely eczematous. Frequently deep ulcers develop from the excoriations around the anus, scrotum,

and eyebrows. Also mucous patches are here and there met in hereditary syphilis (usually not until later or in recurrences), *e.g.*, at the angle of the mouth, on the tongue and scrotum, in the inguinal folds, at the anus, on the surface of the internal portion of the thigh, etc. They look exactly like those in adults, have a great tendency to macerate, and become fissured ulcers.

Of the hereditary syphilitic affections of the mucous membranes coryza, as already mentioned, is most frequent; more rarely the larynx is affected, also *plaques muqueuses*, papillomatous growths, ulcers, caries (of the thyroid cartilages), and perichondritis may occur and cause hoarseness, even aphonia, dyspeptic symptoms, and fatal termination, owing to edema of the glottis. Sometimes condylomatous gummatous processes and ulcerations are found on the dorsum of the tongue and occasionally also on the tonsils. Occasionally also purulent conjunctivitis (never iritis) and very seldom intestinal syphilis *(q.v.)* are observed. Henoch never saw the latter condition. It manifests itself by gummatous, partly ring-shaped indurations of the muscles and mucous membrane, which surround the small intestines and constrict their lumen. They usually resemble Peyer's patches. There may also be condylomatous proliferations and ulcerations of the intestinal muscles and mucous membrane. The lymphatic glands are often enlarged; and small, movable swellings are usually detected in several regions and usually persist very stubbornly.

The bony system also is almost constantly affected. Some children are born with fractures which occurred within the uterus, owing to fragility of the bony structures. Of more frequent occurrence are ostitis and periostitis, which are prone to establish themselves at the epiphysis of the tubular bones and produce swellings. If such conditions develop within the first few months of life they are usually syphilitic in nature; later they may be due to rachitis. Not infrequently the latter may be combined with the former. The epiphyseal swelling is unilateral in syphilis, while it is almost always bilateral in rachitis. The swelling may affect also, *e.g.*, the phalanges of the fingers (never the toes),—*dactylitis syphilitica*,—and produce a condition closely resembling spina ventosa scrofulosa. Wegner al-

most constantly observed very distinct changes in the tubular bones of the newly born and older infants—namely, a small yellowish or orange-colored serrated line at the points of transition between the diaphyseal and epiphyseal cartilages. This sign has, according to recent observations, proved to be a gummatous process caused by excessive cellular new formation, resulting in necrosis of the intermediate tissue and simultaneous separation of the epiphysis from the diaphysis, owing to compression of the vessels. This process sometimes causes a direct separation of the limb (abnormal motility, looseness, and also crepitation), but usually only pain, swelling, etc., and sometimes no clinical signs. The question as to whether the impeded motion of a limb, as frequently observed in syphilitic children *(syphilitic pseudoparalysis)* is related to this or any other alteration of the bone, or whether it is of central origin or caused by peripheral neuritis, as yet awaits elucidation. Experience teaches, however, that, if the bone enlargement eventually disappears under syphilitic treatment, there is also an abatement of the paralysis. On the other hand, pareses also occur without alteration in the bones, and they sometimes are surely central in origin.

Although hereditary syphilis rarely affects the nervous system, cerebral symptoms, such as paralyses, contractures, mental disturbances, etc., are at times observed. Chronic meningitis and hydrocephalus are sometimes due to syphilis; likewise epilepsy, dementia paralytica, spinal disseminated sclerosis, and, finally, not rarely also neurasthenia and hysteria. Arteritic and periarteritic processes occur here as elsewhere (Heubner) and at times cause hemorrhages (brain, skin, etc.). Syphilitic arteriosclerosis was also observed.

Other organs, particularly the testicles and the liver, are more frequently affected in hereditary syphilis than the brain. Thus, the testicles are not rarely enlarged, hard, solid, uneven, and nodular. This interstitial orchitis (also with epidymitis), however, is capable of retrogression under early specific treatment, but usually persists if neglected *(fibroid neoplasm)*. The liver also is often enlarged (sometimes enormously!), hard, or knobby. Here it is chiefly a question of interstitial inflammation with or without the formation of gummata. Hochsinger

found also diffuse growth of young granulation-tissue with participation of the blood-vessels. The hepatitis only rarely produces icterus and ascites. If the latter occurs they always indicate that the condition is far advanced and not very benign in nature; but this condition is not always fatal and may be influenced by treatment, particularly if the hepatitis does not set in until the second month of life. It is often found in conjunction with enlargement of the spleen (hyperplasia, induration, perisplenitis), and anemia pseudoleukemica infantum is not rarely caused by syphilis. Sometimes the kidneys are involved (nephritis). Also paroxysmal hemoglobinuria of syphilitic origin occurs. Likewise involvement of the suprarenals, pancreas, exceptionally the heart and lungs, and the thyroid (struma) and thymus glands (abscesses).

As a rule, one or more of the changes just enumerated are present in so pronounced a form that a diagnosis can usually be arrived at. The question now to be decided is, whether or not hereditary syphilis is dealt with. In such cases the diagnosis is greatly facilitated by bearing in mind the history regarding infection by the parents. The child is more frequently infected by the father through the semen, but not quite rarely also by the mother[1] through the ovule or through the blood, —after having become infected during pregnancy,—inasmuch as the placenta sometimes transmits the syphilitic virus. If examination of the parents reveals nothing, and if no syphilitic history can be obtained *(omnis syphiliticus mendax!)*, it is important then to inquire into the previous births. As is well known, syphilitic mothers very frequently abort, particularly in the first few years of married life, or at least they bear premature nonviable children; while later, if treated during the intervals, or if the syphilitic virus has spontaneously weakened, entirely healthy children may be born. Sometimes healthy and diseased children alternate, in view of the intermittent recurrence of the syphilitic manifestations in the parents. Some-

[1] **Choc en retour** is defined as a postconceptional (also ovular) infection of the mother by the *ex patre* syphilitic (also through the infected sperma) semen, whereby the mother presents secondary (even tertiary) symptoms in early pregnancy. Of course, this is not of constant occurrence.

times syphilitic children are born after long intervals (Biedert's case after fourteen years, Henoch's even after twenty years). All this must, of course, be taken into consideration. The age at which the child begins to show the initial symptoms of syphilis is also of diagnostic importance. It has been mentioned that some children are born with syphilitic manifestations. More frequently they remain free from them in the first four to six weeks.

If syphilis (coryza, skin eruptions) manifests itself during the first two months of life it is generally considered congenital. More rarely the syphilitic signs begin after the third month, and here the serious questions arise: Whether it is a recurrent attack (the first eruption might have been so very mild as to escape notice!), acquired syphilis, or, finally, a case of *syphilis hereditaria tarda* is dealt with. Indeed, the first signs of syphilis congenita sometimes do not set in until much later, even as late as the period of puberty and still later inasmuch as the syphilitic virus has, to some extent, remained dormant until then. Some deny the existence of syphilis hereditaria tarda (Henoch claims never to have seen it) and believe that such cases are always either recurrences of secondary or else acquired syphilis. On the other hand, there are cases on record which have been observed from birth and seem to prove that congenital syphilis undoubtedly existed. This form of syphilis may present a very variable symptom-complex, but generally the manifestations of the so-called tertiary period prevail. The bony system appears particularly affected either in the form of simple periostitis (thickening, *e.g.*, of the anterior surface of the tibiæ, of the skull, etc.) or of soft (gummatous) ostitis, which leads to perforations, *e.g.*, of the hard palate, and may give rise to the so-called "saddle-nose." In these cases the joints also are frequently involved (quite rare in the first few months!), and often symmetrically (simple osteoarthropathy, serous and purulent exudations, etc.). Ozena, ulcers of the larynx, skin exanthemata, and other manifestations are frequently observed.

The so-called "*Hutchinson's triad*" was, for a long time, considered of great diagnostic value. It consists of: 1. An affection of the eyes in the form of interstitial keratitis; according to Silex, also in the form of a peculiar choroiditis alveolaris,

atrophic foci and pigmentary deposit in the choroidea. 2. Affection of the internal ear (deafness or deaf-mutism). 3. Deformity of both upper inner incisors. They appear smaller than normal, taper from the base to the edge [screwdriver teeth], and are whitish to greenish gray in color; moreover, they have a semilunar notch in the center of the edge, with loss of enamel. At present these symptoms, although frequently observed singly or as a group, are no longer considered characteristic, since it has been found that some of them (*e.g.*, the Hutchinson teeth) have also been observed in other affections [even in healthy children].

It not rarely occurs that children innocently acquire syphilis. It is as yet uncertain whether infection may take place *intra partum* through syphilis of the maternal genitalia or whether syphilitic wet-nurses with healthy nipples may transmit the disease through the milk. According to Profeta's law [1] an apparently healthy child usually escapes infection from the syphilitic mother, as it usually becomes immune against syphilis *intra graviditatem*. That syphilis is transmitted by servants (aside from *stuprum*), through fondling, *e.g.*, kissing, sleeping in one bed, use of the same sponges, rags, etc., is absolutely certain. Henoch never saw syphilis transmitted by vaccination, and it is certainly possible that the disease might remain latent until then and break out after vaccination, as is apt to occur also after any other injury. Syphilis may be transmitted by circumcision and also by the use of dirty instruments employed for diagnostic and therapeutic purposes. *Acquired syphilis* produces the identical symptoms in children as in adults, but in the former the disease often runs a more rapid and violent course, with preponderance of condylomata.

In the TREATMENT of syphilis in children particular attention must be paid to nutrition, for it is certain that breast-fed children are much less affected and much more rapidly react to specific treatment than artificially fed infants. Nutrition must be looked after particularly in children who are delicate and atrophic from birth, who even with the best of care often

[1] **Profeta's law** says: Children of syphilitic parents remain in later years immune against syphilis. As a matter of fact, it is not a law, since exceptions are frequently observed.

succumb to syphilis in great numbers or become subject to the so-called *parasyphilitic symptoms* (see further). Therefore, whenever possible, breast-feeding should always be resorted to in hereditary syphilis. Syphilitic mothers can nurse their children with impunity, while healthy mothers should do so only if the children's lips and mouths are entirely free from symptoms, for *Colles's law*,[1] that the mother is rendered immune to syphilis in gravidity through her syphilitic child, is not fully established. Often a wet-nurse is found willing to nurse the child, although fully aware of the possible dangers of infection. She must always be informed of this danger, although Henoch never saw a wet-nurse infected if she kept her nipples very clean.

Medicinally mercury is the chief and only certain remedy. Calomel, hydrargyri nitras, or hydrargyri iodidum flavum (protiodid of mercury) is given three times a day in doses of 0.005 [gr. $^1/_{12}$] for a child under 8 weeks; 0.0075 [gr. $^1/_9$], 3 to 6 months; 0.01 [gr. $^1/_6$], 6 to 12 months; and 0.015 [gr. $^1/_4$], 2 years old. In order to avoid intestinal disturbances, the mercury should be combined with tannic acid preparations, and in delicate children also with ferri carbonas saccharatus, 0.1 to 0.2 [gr. iss-ij]. Iodid of iron also often acts very well, particularly after disappearance of the main symptoms under mercury. The mercury may also be incorporated in the form of baths (0.5 to 1.0 [gr. viiss-xv] corrosive sublimate is added to the bath), which, while not certain in action, are useful adjuncts to the internal treatment; or administered in the form of hypodermic injections ($^1/_2$ gram [*m*viij] of corrosive sublimate solution [0.2 to 1000] is injected twice a day). Mercury in inunction is an ideal method of treatment (daily from 1 to 2 grams [grs. xv-xxx] of unguentum cinereum). Such a mercury treatment usually renders the treatment of local lesions superfluous, but condylomatous vegetations may be dusted with calomel. Ulcers, the nasal mucous membrane, etc., are daily painted with silver nitrate

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[1] **Colles's law** maintains that a syphilitic fetus from the father's side renders its pregnant mother immune against later syphilitic infection; so that, for example, putting the child to the breast does not jeopard the health of the mother. This law, however, is not entirely correct, for there are frequent exceptions. Hence, the child should not be put to the mother's breast, but should be fed artificially.

(0.5 to 15.0 [3 per cent.]); *plaques*, condylomas, and rhagades are touched every few days with a 10-per-cent. chromic acid solution or 10-per-cent. sublimate. In syphilis hereditaria tarda potassium iodid is often most effective; also baths (in watering places) may be used. The mercury treatment acts particularly well in breast-fed infants and especially in cases in which the syphilitic manifestations have appeared early.

The PROGNOSIS in such cases is very favorable even if the symptoms are severe in nature. The later the appearance of the symptoms, the more dubious generally is the prognosis. Even in cases which run a very good course there is never any guarantee of nonrecurrence. Indeed, relapses are sometimes very frequent, particularly in the first and second years, but sometimes even later. Furthermore, not all (especially artificially fed) cases run such a favorable course.

Even with disappearance of the organic alterations under treatment the children are exposed to danger, owing to the so-called *parasyphilitic symptoms*, which may set in with the beginning of the disease, or form the only symptom of syphilis and manifest themselves, for example, by anemia and syphilitic cachexia, sometimes of very intense nature. The children are atrophic and backward in growth. They also present a hypersensitiveness of the mucous membranes, and suffer from very obstinate intestinal and bronchial catarrhs, etc., which resist all remedies and often end fatally. Syphilis undoubtedly also furnishes a disposition to rachitis, cretinism, and idiocy. Children who are or have been syphilitic sometimes die very suddenly, and lack power of resistance to diseases, even to such which affect other children but little. Hence the high mortality among them. This is especially the case in syphilitic children who were delicate and atrophic from birth and are fed by artificial means. Still, no case of infantile syphilis should be given up, in view of the fact that even here wonderful results are often obtained by energetic treatment, roborants, careful attention to the skin, etc.

Intermittent Fever (Malaria) occurs quite often in children and not infrequently even in infants. Cases are on record where mothers suffering from intermittent fever during pregnancy have given birth to children with splenic enlargement

who passed through further typical attacks. The symptomatology in older children is identical with that in adults, but usually deviates in children under 2 years of age. As a rule, gastro-intestinal disturbances appear for a shorter or longer period before the onset of the typical attacks. The quotidian type predominates in the majority of cases. The *chilly stage* is often absent. Sometimes the hands and feet are cool and slightly cyanotic, and the child appears in collapse. This stage is usually of short duration, but lasts also an hour or longer; so that upon first observation the condition seems quite alarming. On the other hand, the chill may be replaced by nervous symptoms (restlessness, dizziness, etc.), or a true convulsive attack. At times the initial attack resembles eclampsia in every way and only the later paroxysms reveal the exact condition. In the *second stage,* which lasts from two to four hours, but may be shorter,—*e.g.*, one-half hour,—the temperature rises often quite high, the pulse is accelerated, and the patient appears flushed, turgescent, restless, and cries. Convulsions sometimes occur at this time. The *sweating stage* is, as a rule, not well marked. Sweating is slight or absent. Some children are entirely well between the attacks; others remain restless, have little appetite, bad digestion, etc. Children also suffer from atypical and latent forms. Thus, nervous (fainting spells, delirium, spasms, neuralgias), respiratory (attacks of pseudocroup, pneumonia, etc.), gastro-intestinal (diarrhea, vomiting), or other phenomena (*e.g.*, urticaria) may appear at regular intervals, partly with and partly without fever. Such attacks lead to grave diagnostic errors. They can, however, easily be recognized by examination for splenic enlargement and the plasmodium malariæ and by the administration of quinin. The physician is often prone to think rather of pyemia, tuberculous meningitis, etc. Even in daily (not sufficiently pronounced) typical attacks—with absence of chill and sweat—one is apt to think rather of remittent fever. Intermittent fever is also quite frequently mistaken for chronic pneumonia, which is so often associated with a remittent or intermittent fever. The intermittent fever accompanying acute pneumonia, however, is not always malarial in nature, although it is more frequently the case in "wandering" pneumonia.

The PROGNOSIS of intermittent fever in young children is not very favorable. The older the child, the more favorable the prognosis, provided the diagnosis is made in time and treatment instituted early. In children, especially with long persistence of the disease, intermittent fever very rapidly (at times after one to two weeks) gives rise to great debility, anemia, and cachexia. To arrest the attacks quinin is the best remedy also in children. It is best to follow the method of Henoch, who recommends the administration of quinin a few hours before the expected attacks, beginning first with large doses (quinin muriate, 0.3 to 0.5 [gr. v-viij] in $^1/_2$ wineglassful of sweetened lemonade) and continuing with small doses for some time after subsidence of the attacks.

Some children cannot and will not take quinin even in this form. In such cases quinin must be administered *per anum*, or, still better, euquinin—which is tasteless, easily tolerated, and as prompt in its effects as ordinary quinin—should be ordered. In more or less irregular attacks or atypical forms quinin is exhibited two or three times a day. If quinin proves ineffectual, as is very rarely the case, methylene blue (0.005 [gr. $^1/_{12}$] per year three or four times daily), or tincture of eucalyptus globulus (3 to 10 drops several times a day) may be tried, and sometimes with good results. In chronic cases and in malarial cachexia arsenic (Fowler's solution) is best. [Children tolerate relatively much larger doses of quinin than adults. An infant of 2 years with a severe attack requires about 15 to 30 grains (1.0 to 2.0) a day. If there is very marked gastric irritability, it is sometimes of advantage to resort to hypodermic administration of quinin. For this purpose bimuriate of quinin and urea, the hydrochlorosulphate, the hydrobromate, or the bisulphate may be used. Ugly sloughing is, however, apt to follow at the site of the injection. This method of treatment should therefore be employed as a last resort and repeated as rarely as possible. If quinin is to be used by rectum, it is best to dissolve the bisulphate in the white of an egg and to add a little common salt; in this manner the quinin is more quickly absorbed and less apt to irritate the rectum. In chronic cases iron (hemogallol) and arsenic are useful additions to the quinin. Mosquito netting is the best prophylactic measure.—SHEFFIELD.]

Rheumatism.—Acute Articular Rheumatism [probably due to a micro-organism] is not a rare disease of childhood. It affects particularly children from 9 to 13 years of age. It is also observed in younger children and even in infants. It is often unrecognized in the latter, in whom it frequently begins with cerebral symptoms (convulsions, vomiting, etc.), and pursues a rather atypical course. The symptoms of rheumatism in children are generally identical with those observed in adults, except that the course, on the whole, is somewhat milder than in the latter, not only in regard to the fever and general symptoms, but also in regard to the local symptoms, which are not very pronounced. The duration of the disease is usually brief, provided the inflammation does not "jump" from one joint to another (it sometimes returns to the diseased joint) and the course does not become chronic in consequence of these relapses. The latter are usually milder than the first attack. The tendency to recurrences is as great in children as in adults. Some children have such attacks for several years in succession. These attacks are sometimes complicated by recurrent attacks of chorea (which prevailed during the previous rheumatic attack) and severe cardiac symptoms as a result of an old valvular lesion. Endocarditis and pericarditis are especially frequent complications of even mild attacks of rheumatism. It is well, therefore, always to be prepared to find something in the heart and to carefully look for it, particularly since endocarditis is prone to give rise to but slightly marked symptoms and to even remain latent. Pleuritis and pneumonia are more rare than the complications spoken of, and peritonitis is still rarer. Children sometimes complain of abdominal pain in the course of rheumatism, and the abdomen is not infrequently sensitive. These phenomena, however, do not always indicate the existence of peritonitis. Rheumatism is sometimes followed or preceded by an attack of angina.

The *prognosis* of acute articular rheumatism in children is quite favorable, and is rendered unfavorable only by involvement of the heart and the tendency to recurrences.

Chronic Rheumatism is not frequent in children. The exquisite forms—notably, such as arthritis deformans—are only exceptionally observed.

There is, however, a special form of chronic rheumatism, namely, *rheumatism nodosus,* which is specific of childhood, although not very frequent. It is manifested by the appearance, in conjunction with ordinary rheumatism, of a few nodules, which are at first soft and subsequently gradually become as large as a pigeon's egg, round, more painful, and hard (sometimes as firm as bone). After some time they flatten until they gradually disappear. These nodules, which usually appear in the neighborhood of the joints (often symmetrically), are inflammatory products, connective-tissue new formations in aponeuroses and tendons (more rarely in periosteum and perichondrium), closely related to the rheumatism. They subsequently undergo regressive (fatty) metamorphosis and absorption. On the other hand, they may undergo calcareous degeneration and acquire a bony consistency.

Such rheumatic fibromas and osteomas are different from that form of ossification of muscles, tendons, etc., which is known as "*myositis ossificans.*"

Rheumatism of children may also affect the muscles, particularly those of the throat and neck—many cases of *caput obstipum* are of rheumatic origin—and other groups. This *muscular rheumatism* occurs even in very small children, who suddenly cease to use the limb and perceive pain on motion or on pressure and often present slight edema. It may easily be mistaken for other diseases (coxitis!). Muscular rheumatism also may "jump" from one group of muscles to the other, and be complicated by chorea.

The symptoms of muscular rheumatism usually rapidly disappear on rest in bed, enveloping the parts in cotton, and the internal administration of salicylates or potassium iodid.

Sometimes thickening of the bones occurs, due to rheumatism of the periosteum. The latter becomes quite sensitive; so that a beginning osteomyelitis may be suspected. Rapid subsidence of the symptoms usually occurs, however, on administration of potassium iodid.

The *treatment* of the other forms of rheumatism corresponds with that occurring in adults. [Rest in bed and milk diet; flannel underwear during the entire year. Salicylate of soda, salophen, sodium benzoate, or aspirin in moderate and

frequently repeated doses until the attack is arrested. Externally, an ointment of ichthyol (5 per cent.) and iodin, or the recently introduced mesotan (methyloxymethylester of salicylic acid) is very useful. Attention to the heart. Subacute and chronic cases are best remedied by salicylates and iodids in conjunction with hot baths and massage, hematinics (hemogallol), and tonics, especially codliver-oil.—SHEFFIELD.]

XI.

Diseases of the Respiratory System.

Respiration, Auscultation, Percussion, etc. (see pages 22, 24, and 25).

Bronchitis and Broncho-pneumonia.—Bronchitis is an exceptionally common affection of childhood, especially during first dentition. The reason for this is probably the frequency of rachitis at this time, which surely predisposes to bronchitis. Furthermore teething is not rarely a cause of bronchitis. Very young infants up to a few months old are frequently affected by a peculiar kind of bronchitis, probably due to "catching cold" soon after birth, either as a result of being taken outdoors too soon or of cold bathing and the like. It is manifested by a frequent "moaning" cough, more or less loud, rattling, dry stertor ("choked up"), "rattling on the chest" which usually diminishes or disappears entirely on coughing. The large vesicular râles and snoring, audible especially between the scapulæ, clear up almost entirely in like manner and give way to simple, rough breathing. Although the catarrh remains very obstinate, often continues for months, and often comes and goes with the eruption of every group of teeth, there is, nevertheless, complete euphoria, good appetite, etc.

In the treatment of the condition protection against new colds and eventually small doses of stibium sulphuratum aurantiacum are sufficient. Henoch lauds repeated mild vesication over the manubrium sterni. Here, however, as well as in every bronchitis of little children, the physician must watch for the development of broncho-pneumonia, for at this age there is a very great tendency of the bronchitis to spread rapidly into the smallest bronchi *(capillary bronchitis)* and from there into the lung-tissue. Therefore every bronchitis in small children is to be watched carefully. Furthermore the patients are not to be taken outdoors in bad weather.

Cough is the most important symptom of bronchitis. As a rule, it is frequent, short, dry, and increased or produced by crying. Children who cry for some time without coughing are surely free from bronchitis (Henoch). In severe cases the cough may resemble that of pertussis (children almost never expectorate!). Next in importance is increased frequency of respiration. The deeper the extension of the inflammation into the bronchioles, the more rapid the respiration. Forty to fifty respirations in young children are insignificant, and indicate an ordinary affection of the large and middle bronchi. It is only when the respirations reach 60 to 80 or more per minute that participation of the finer branches is evident. The more rapid the respirations, the shorter and more superficial they become. The auxiliary respiratory muscles become active, inspiratory retraction becomes visible, and every expiration is accompanied by moaning—all symptoms of severe disease.

Aside from the sounds which are often heard from a distance, auscultation almost always reveals irregularly distributed whistling, wheezing, or moist râles. The latter sometimes are entirely absent or nearly so, notwithstanding the severe dyspnea and harsh, accentuated respiratory sounds. Sibilant rhonchi are heard, instead, all over the chest even until death. It is, of course, less a question of the extent than of the character of the sounds—*e.g.*, bronchitis with diffuse sonorous râles over the whole thorax may be harmless, because the smaller bronchi are free, while small or even large vesicular râles of comparatively limited distribution may prove serious in nature. Percussion is at first negative. The fever oscillates and is not characteristic in bronchitis. It may be remittent or irregular. A sudden rise in temperature after a pause indicates extension of the inflammation to other parts. In small and especially in delicate children the temperature is rarely high, and may be absent for days; it may even be subnormal. The frequency of the pulse (120 to 180) is less important than its quality, which is normal in mild cases. In severe cases there is, of course, also an alteration in the general condition, appetite, etc. Nurslings are often prevented from suckling by the dyspnea.

The symptoms thus far enumerated refer to bronchitis. The possible simultaneous presence of broncho-pneumonia is

often not apparent from the clinical picture, for the reason that the transition from the finest bronchioles to the pulmonary alveoli is very gradual, and very small broncho-pneumonic foci may develop, especially in the lower lobes, and not be detected by physical examination. Its presence must, however, be surmised in every case of severe bronchitis of little children. The active processes may cease then and there and gradual recovery set in. On the other hand, the small broncho-pneumonic foci may gradually multiply, become larger and more confluent, and coalesce in extensive masses, under which circumstances a diagnosis of broncho-pneumonia is readily made by the physical signs. The lesions usually extend upward in wedge-shaped form, from the bases of both lower lobes, but they are often enough found in the upper lobes, and, finally, whole lobes or, indeed, the whole organ, may become involved in this manner.

Physical signs of *broncho-pneumonia:* Dullness on percussion; bronchial breathing; small, vesicular, crepitant râles; and bronchophony. The two latter signs may exist without dullness on percussion. Indeed, the percussion sounds may be normal or tympanitic, in that there is always enough of air-containing parenchyma left intact at the periphery of the lungs (but not sufficient to interfere with the auscultatory signs). Light percussion is therefore to be practiced, or the existing slight dullness is apt to be obscured by the predominating sound of the air-containing layers! The physical signs are usually detected first on both sides of the spinal column from the base of the lungs up to the spine of the scapulæ, and not infrequently, also, over the apices of the lung in the lingula of the upper lobe. Henoch was frequently able to hear fine, sonorous râles more distinctly over the cardiac region than elsewhere. The deeper the extension of the inflammation into the bronchioles, the more disturbed is the breathing and the oxidation of the blood. As a result of this the respirations, which are superficial and sometimes irregular, gradually become more and more frequent. Intense stasis develops gradually and leads to cyanosis and edema. The heart's action grows weaker, the pulse smaller, and the temperature falls. The power to cough diminishes, and cough ceases notwithstanding the continuance of the diffuse, crepitant râles—always a bad omen! Somnolence sets in and

leads to death. Very quick lethal course is very rare! Even in diffuse bronchitis and broncho-pneumonia recovery is possible. In mild cases recovery takes place after two to four weeks. It begins with decrease in frequency and increase in depth of the respiration. In cases running a tedious course and in those of medium severity there is often a tendency for the disease to become subacute or chronic and to end fatally even after an afebrile pause with apparent euphoria. Persistence of increased respiration and fine crepitant râles during such pauses, especially if associated with emaciation, are always suspicious!

In the etiology of bronchitis, "catching cold" and infectious diseases play a very important rôle, particularly measles, influenza [chicken-pox], pertussis, less often typhoid fever, diphtheria, occasionally scarlatina and small-pox, and severe exhausting disease, such as rachitis, scrofula, atrophy, intestinal diseases, meningitis, noma, etc. Bronchitis is also caused by spreading of an inflammation from other parts (nose, larynx); by foreign bodies, particularly swallowing of food while the patient is in a soporous condition (aspiration pneumonia). In some children—*e.g.*, the rachitic and scrofulous—there exists a marked predisposition to bronchitis; so that the disease occurs several times a year.

Treatment. — In mild catarrh, mere rest in the [thoroughly ventilated] room, and for the dry and tenacious cough demulcent remedies, such as "pectoral tea," radix ipecacuanhæ, radix senegæ; radix altheæ; stibium sulphuratum aurantiacum, apomorphin, pertussin, or liquor ammonii anisatus. The latter may be added to the first-named remedies, and if the cough is irritable it may also be combined with tinctura opii benzoatis or aqua laurocerasi. With the beginning of higher temperature a few powders of calomel are given,—if necessary, in combination with ipecac or pulvis Doveri,—and hydropathic applications are resorted to every half hour; later, when the fever has subsided, the applications are used only every two to three hours to stimulate expectoration and respiration. In intense attacks of strong children bleeding also is to be practiced. In cases with a protracted course and loss of strength, wines, benzoic acid [thiocol], camphor, liquor ammonii anisatus, etc., in large doses, and lukewarm baths with cold showers, are indicated. In

chronic and recurrent bronchitis and broncho-pneumonia, sojourn in the mountains or at the seashore.

[It is customary to distinguish two varieties of catarrhal pneumonia in infants, viz.: primary and secondary. The primary form is due to pneumococcic infection and may terminate either by crisis or lysis. Secondary broncho-pneumonia is caused by a mixed infection, follows or complicates various acute or chronic diseases,—such as influenza, measles, pertussis, chronic bronchitis, rachitis, etc.,—and ends, as a rule, by lysis. The pathology of this disease is practically the same in both varieties, consisting in an irregular consolidation of the pulmonary lobules; an exudation into and thickening of the alveoli and bronchi; an excess of fibrin in the blood, with consecutive thrombosis within the blood-vessels; and a more or less severe localized inflammation of the pleura.

Death is due chiefly to exhaustion of the heart resulting from both obstruction to the pulmonary circulation—the overdistended right heart becoming unable to propel its contents—and septic poisoning. Relapses are not infrequent in the secondary variety, and when they do occur they are apt to give rise to pleurisy and empyema or even furnish a *nidus* for the development of tuberculosis. However, notwithstanding the long duration (ten days to six weeks) and severity of catarrhal pneumonia, the great majority of infants recover under an active method of treatment, if instituted early—the earlier, the better.

The expectant plan of treatment, so highly lauded by some physicians in the management of lobar pneumonia in the adult, is certainly futile in that of the infant, as catarrhal pneumonia is *not self-limited*, and the delay in treating it is apt to be attended by a continuous and rapid extension of the inflammation; and hence the terrible mortality (about 60 per cent., according to Dr. J. Carmichael). It is true, indeed, that we have as yet no specific to combat this disease; Nature has, however, indicated a method of treatment which, if judiciously followed, enables us either to abbreviate the course of the attack or render it surmountable even by a most delicate constitution. We are referring to Nature's method of terminating pneumonia by the characteristic "critical sweat." It is well known that arrest of perspiration in the beginning, due to contraction and

inactivity of the cutaneous vessels, and engorgement of the pulmonary circulation and profuse sweating at the end of the attack are pathognomonic signs of pneumonia, and that, the sooner the external and internal circulations are equalized, the quicker resolution sets in. We are evidently confronted with the correction of a faulty, circulatory rather than a respiratory system, regardless of where the actual pathological lesion may be situated. Dr. W. N. McArtney well says: "The pneumonia patient certainly does not die of pulmonary or respiratory failure. Pleurisy gives us no such mortality, nor does it cause death by respiratory exhaustion even though one lung is compressed by fluid effusion into a small space the size of a hand. Empyema does not kill in five days, though the fever may be high and the entire lung rendered useless, with septic intoxication added. . . . Phthisical patients do not die of respiratory failure, though the lungs may be extensively disorganized."

When called upon to attend a case of broncho-pneumonia a moderate dose of both spiritus ætheris nitrosi and liquor ammonii acetatis should immediately be prescribed, to be repeated every two to four hours, and the application of a poultice consisting of the following ingredients ordered: 5 parts each of flaxseed-meal and camphorated oil, 1 to 2 parts of mustard, and a sufficient quantity of boiling water to make a thick paste by thorough stirring. This mass is spread on thin gauze or paper (two layers) and applied snugly to the chest and back. The child is then wrapped in an oiled-silk jacket, lined with absorbent cotton, and in a blanket, which, with the hyperpyrexia of the body, maintains the heat of the poultices; so that it requires renewal but three or four times in twenty-four hours. This poultice has special advantages over any other in use. As just mentioned, it requires but occasional changing, thus saving time and labor and avoiding unnecessary exposure of and annoyance to the patient. The mustard and camphor act as mild counterirritants, and after some time bring the blood to the surface, thus relieving the pulmonary engorgement. Furthermore, the skin over the chest and back does not become "soggy and sodden," or "waterlogged," from the use of this poultice as is apt to occur from prolonged application of ordinary flaxseed poultices.

The excellent effects obtained from the mode of treatment just given are usually apparent within a few hours; in fact, they are at times marvelous. The suffering child who but a short time before had been on the verge of collapse—moaning, tossing, and twitching from pain and distress, gasping and panting for a free breath of air—now lies peacefully and enjoys calm repose or healthful sleep, prepared to fight a victorious battle for a new life, inspiring courage and hope to the anxious attendant or parent.

Free perspiration having been established by means of the poultices and enhanced by the diaphoretics, the system having thus been relieved of a considerable quantity of toxins, the attack is practically checked. Many cases will be found to recover very rapidly after the induction of free perspiration, while others may linger around for weeks with occasional exacerbations of the disease, but generally come out well at the end.

Apropos of expectorants, occasionally a great deal of absurd criticism is heard as to the use of expectorants. When a little baby is tormented by an incessant, dry, hacking cough and a train of nervous phenomena which are associated with it, which tax the skill and patience of the faithful attendant, small and frequently repeated doses of wine of ipecacuanha or syrup of senega or scilla will often give considerable relief, allay the nervous irritability, and permit the patient to refresh upon a brief period of rest or sleep, which is invaluable in this disease. Then why not use expectorants? Moreover, by enhancing expectoration the lungs rid themselves of a considerable quantity of effete material which more or less obstructs respiration and produces auto-infection by being absorbed into the system. The tent made of bedsheets hung around the bed and moistened with tricresol, creosote, oil of eucalyptus, and the like, is highly to be recommended for the purpose of promoting expectoration, especially as these remedies when inhaled act also as antiseptics on the pulmonary tissues.

Stimulation is of very vital importance in every case of pneumonia in children, and ought to be effected from the earliest inception of the attack. As mentioned before, liquor acetate of ammonia is begun with, and strychnin sulphate in gradually increased doses is added. The latter preparation is pref-

erable to any other stimulant, as it acts both on the cardiac ganglia and cardiac and respiratory centers, but occasionally digitalis and nitroglycerin, according to indications, must be resorted to. Whisky is useful only either in the very beginning or end of the disease, or may be given with milk or eggs more as a food.

As to the question of feeding, the latter two foodstuffs and beef-juice form about the most suitable diet; children refuse, as a rule, any kind of food, and it is often most remarkable how they withstand a very tedious and trying course of the gravest affection with hardly any nourishment at all. Like fish, they seem to thrive on water, and this heavenly beverage should be given to them *ad libitum.*

About the sixth day of the disease the administration of sodium iodid or iodipin in small doses is begun with, and if there is any sign of pleurisy with effusion, the application to the affected parts of the following ointment directed: gaultheria oil, guaiacol, and ichthyol, 1 part of each; and iodin ointment, 4 parts. This combination relieves pain and promotes the absorption of the fluid. In case of very pronounced nervous irritability, restlessness, or wakefulness, sodium bromid with small doses of phenacetin is of value. Occasionally we meet with children who perspire with great difficulty. In such cases it is best first to put the patient in a hot hip-bath with mustard, and then proceed with the treatment outlined before. Protracted cases of broncho-pneumonia do best on moderate doses of creosote carbonate (creosotal), general tonic plan of treatment, and change of air.—SHEFFIELD.]

Croupous Pneumonia (Fibrinous [Lobar] Pneumonia) is not rare in children. It occurs at any age, but especially between the fourth and twelfth years. The anatomical and clinical manifestations, as well as the unilateral involvement of the lungs, the predilection for the lower lobes, etc., are identical with those observed in the adult, except in the so-called "mixed forms" (croupous and broncho-pneumonia), which present a few anatomical and clinical peculiarities. Thus, Fränkel-Weichselbaum's cocci are often found in broncho-pneumonic foci; both processes sometimes occur synchronously in one individual. The clinical picture in these cases is sometimes so complex as

to render the determination of the exact condition impossible during life. Clinically, the fever curve is, perhaps, the most characteristic symptom. It is more regular in croupous pneumonia than in broncho-pneumonia, especially if the latter pursues a protracted course. Not every croupous pneumonia, however, ends by crisis. It sometimes runs a subacute and protracted course, and instead of beginning suddenly it is frequently preceded by a catarrhal stage. Usually, however, the onset of croupous pneumonia is acute, with high fever and sometimes chills (usually absent in children under 4 years of age), frequent vomiting, also diarrhea, and occasionally convulsions. In the first few days, and sometimes also later, the clinical symptoms are not rarely of such a nature as to suggest meningitis, typhoid, or scarlatina, and not lobar pneumonia. Indeed, there are occasionally no respiratory symptoms at all, and cough is either absent or very slight and sometimes remains so during the whole course of pneumonia. Examination of the thorax may reveal no symptoms or only diminution of vesicular breathing upon one side; or, with deep inspiration, slight crepitation; absence of dyspnea, and, only on very careful observation, a peculiarly short respiration which is rapid in comparison with the pulse. The cerebral and gastro-intestinal symptoms (pneumonia cerebralis, typhosa) predominate throughout, and are sometimes associated also with angina, erythema, etc., simulating scarlatina. More rarely the fever is intermittent and arouses the suspicion of malaria. It is not until abatement of these symptoms, and the originally centrally located focus has extended to the periphery that those of the respiratory system become prominent and the diagnosis is settled.

Occasionally there is also uncertainty as to the diagnosis between croupous pneumonia and pleuritis. Pectoral fremitus is almost never distinct in children and, as a rule, is detected only if the child cries aloud. Not until the fourth year does it become sufficiently distinct to be of value. Rusty sputum is not observed in children under 8 years of age. [The latter symptom is occasionally observed in very young children. I saw it in a child 3 years old.—SHEFFIELD.] Not infrequently a correct diagnosis is not made until immediately before or synchronously with the crisis. Even the latter is not always character-

istic. For example, it may progress for from twenty-four to forty-eight hours; or fail to appear. In the majority of cases the crisis occurs between the sixth and eighth days, also between the ninth and tenth, sometimes on the fifth, and rarely on the third day. There are also numerous abortive cases, some lasting only one day and very rarely fulminant cases ending in death after a few days or even after hours.

Relapses are very rare. Convalescence is sometimes very protracted. During the first few days irregularity of the pulse is sometimes noticed, especially on sitting up, and is probably due to parenchymatous change in the heart-muscle resulting from infection. Pneumonia exceptionally terminates in pyothorax, gangrene, or chronic pneumonia.

The PROGNOSIS is quite favorable, particularly if the patient is otherwise well and the pneumonia is unilateral and free from complications. As to the latter, pleuritis is frequent; as a rule, there is only moderate exudation, but it may be copious or purulent, under which circumstances the prognosis is naturally worse. Of rarer occurrence are suppurative inflammation (pneumococcic metastases) of the bones and joints, such as ostitis, osteomyelitis, arthritis; pericarditis, peritonitis, meningitis, and nephritis. The majority of cases of croupous pneumonia get well without special treatment. In the beginning a few calomel powders are often of service. In high temperature, cool packs every half-hour are best, and, like lukewarm baths with cool showers, act very favorably upon the expectoration, brain symptoms, and the general condition. In severe brain symptoms icebags to the head and antipyrin or phenacetin by mouth may be resorted to (also with Dover's powder). In difficult expectoration the different expectorants (see "Bronchitis"), and in debility and collapse alcoholics and analeptics, should be administered. [Creosote carbonate (creosotal) is highly recommended in all forms of pneumonia.—SHEFFIELD.]

Pleuritis and Empyema.—Pleuritis (empyema) is by no means rare in children, and its different forms are now and then observed even in children under 1 year of age. Pleurisy in the newborn is almost always pyemic in nature, arising chiefly from an inflammation of the umbilicus. Acute pleuritis generally produces the same symptoms in children as in adults.

Older children are able to localize the pain with more or less precision, if there is any. Pain is not always present. Younger ones complain, as a rule, of pain in the "belly," but on physical examination, particularly palpation, the pain is found to emanate from between the ribs, and a diagnosis is then easily arrived at. The onset of pleuritis is not rarely misleading, for in children, especially little ones, nervous disturbances—such as headache, vomiting, somnolence, delirium, and convulsions—usually predominate, while the pleuritic symptoms set in later. It is therefore important to examine the thorax in every febrile affection, notwithstanding the absence of respiratory disturbances and even if the apparent brain symptoms are attributed by the parents to "a fall upon the head" (which occurs, of course, quite often in children).

Sometimes, again, the onset of pleurisy is subacute or very gradual. Serious respiratory symptoms are absent for some time, and the other symptoms are attributed to "teething," etc.; so that the child is not seen by the physician until marked emaciation, with increasing cough and dyspnea, is established. This accounts for the frequency of "*latent pleuritis.*" While it is true that latent pleuritis is observed in children more often than in adults, it is very often the result of negligence on the part of parents, or carelessness of the physician who, in the presence of mild symptoms, either fails to examine the thorax or to recognize the exact condition. Although the symptomatology of pleuritis in children deviates but little from that in adults, mistakes are, nevertheless, more apt to be made in the former than in the latter. Thus, *e.g.*, bronchial breathing is often heard in pleuritis of children, especially in fresh cases, over the dull area, even without any trace of pneumonia, and disappears gradually only with increase of the exudation and consequent diminution and finally total cessation of the respiratory sound. Owing to the comparatively insignificant diagnostic value of vocal fremitus in children and failure of expectoration, it is often difficult to determine whether it is pleuritis or pneumonia. Moreover, with simultaneous presence of bronchial catarrh, where the râles often assume a ringing character, owing to compression of the lungs by the exudate, the suspicion of tuberculous consolidation or cavity formation is

often aroused, especially if the patient is very much run down in health, and subject to febrile attacks. With such diagnostic difficulties in view, a great deal of attention must necessarily be paid to all little details. For example, children suffering from pleuritis lie, like adults, on the affected side, and even infants not rarely refuse to nurse from the breast which does not accommodate them in this respect. In purulent pleuritis bulging of the thorax is sometimes observed, particularly anteriorly, at the first and second intercostal spaces, near the sternum.

In regard to the etiology of pleuritis in children, a *primary* form is usually spoken of (catching cold?); but the chief rôle is played by certain fundamental diseases—tuberculosis and pneumonia (chiefly croupous, but also catarrhal, the latter being usually bilateral). Besides there is a *secondary* form of pleuritis which sometimes follows scarlet fever and measles and complicates articular rheumatism. In the latter event it is almost always associated with endocarditis and pericarditis. The latter, like peritonitis (which is much rarer), is also otherwise a much more frequent complication of pleuritis in children than in adults, partly, perhaps, as a result of spreading, and partly owing to bacterial invasion, as is the case with abscesses which not infrequently complicate pleuritis. On the other hand, pleuritis may originate from an extension of the inflammation of the pericardium and peritoneum.

Empyema originates occasionally also from caries of the ribs and from rupture of a tuberculous purulent focus.

Hemorrhagic Pleuritis is not at all rare in children, and is due to trauma, hemorrhagic diathesis, miliary tuberculosis, carcinoma, or sarcoma. Lewine saw it often as a complication of influenza.

Putrid Pleuritis is very rare in children.

The terminations of pleuritis in children are practically the same as in adults. The prognosis is, on the other hand, generally better in the former than in the latter, not only concerning pleuritis serosa, but also other forms (except a few special forms—*e.g.*, pleuritis scarlatinosa). Even severe purulent pleuritis may be rendered free from danger by a reasonably early treatment.

Treatment.—In acute pleuritis absolute rest in bed must be insisted on. The application of a few leeches or, in weak children, dry cups, does well in the beginning; equally so hydropathic applications (they are also beneficial later) [strapping of the chest], eventually icebag [or hot poultices], and finally a few calomel powders, preferably with digitalis or the latter alone. Sodium salicylate [aspirin] is sometimes very serviceable. With increase of exudation there must be a corresponding increase of diuresis [theocin (gr. ss-ij)] digitalis with potassium acetate or diuretin [extractum tritici repens fluidi (*m*ii-x)] is administered, or Wildunger (from 3 to 4 wineglassfuls daily). In pleuritis sicca, Priessnitz compress is very useful, as is also the application of ichthyol ointment or tincture of iodin. In latent pleuritis attention must also be paid to strengthening food and stimulation. Codliver-oil, lipanin, malt preparations, the newer strengthening remedies,—somatose [ferrosomatose], nutrose, puro, etc.; iron and quinin (the latter possibly in conjunction with potassium acetate), and outdoor life (country, mountains, and, in the winter, sojourn in the South) must be resorted to.

Many cases of simple pleuritis, even of several months' standing, will recover under this method of treatment without an operation. The latter is, however, sometimes indicated in cases in which the exudation increases very rapidly and leads to threatening dyspnea, etc. It is just in such cases that immediate aspiration [under aseptic precautions] is urgently demanded, but only a small quantity of fluid should be withdrawn at a time. The puncture-wound is to be protected by iodoform collodion [or rubber adhesive plaster]. One puncture is sometimes sufficient to effect a cure, but, as a rule, several are necessary. Exploratory puncture is sometimes indicated, and is entirely free from danger under aseptic precautions. It is often the only means to determine the nature of the pleuritis, especially in the purulent variety. It sometimes happens that the aspirated fluid appears clear and serous in the beginning, while the pus remains lower down in the pleural cavity; another puncture must then be made below the first one, after changing the position of the patient. Indeed, with failure to detect pus all other signs are unreliable. Even the temperature curve

cannot be relied on, although it is well to bear in mind that continued high temperature, particularly with marked emaciation and exhaustion, points strongly to the presence of pus. Still, these symptoms may occasionally accompany serous pleurisy, while purulent pleuritis may run a slightly febrile or an afebrile course. If empyema is detected, an immediate operation is, of course, imperative, as a cure is hardly ever effected with other remedies alone. The pus may by inspissation lead to caseous residues and prove very dangerous later. To wait for eventual spontaneous rupture of the sac is too dangerous, as the continued hectic fever may in the meantime prove fatal. Furthermore, with sudden perforation in the lungs there is danger of pyopneumothorax, and with slow perforation exteriorly there is danger of a fistula forming in the thoracic wall, with consecutive protracted reduction of strength. Simple aspiration sometimes suffices to effect a cure, and may at any rate be tried if the delay is not fraught with danger; also Bulau's aspiratory drainage is sometimes effective, but looked upon with disfavor by some clinicians.

Except in tuberculosis, when an operation is performed only in threatening suffocation, etc., a radical operation, thoracotomy, is indicated in the majority of cases and consists of the following procedures: A free and deep incision is made, according to Koenig, along the axillary line between the fourth and fifth [sixth and seventh] ribs, to permit free escape of the pus, with or without resection of a rib. This is followed by introduction of a drainage tube [iodoform gauze] or silver cannula, and by an antiseptic dressing. Irrigations with thymol, 1 to 1000, or 2-per-cent. boric acid solution are usually not indicated, except in putrid pleuritis. Resection of ribs is considered indispensable by some clinicians, while others, *e.g.*, Henoch, often saw very excellent results without it—a fact which is important to the general practitioner. The sequelæ of resection, except occasional stubborn fistulæ, which are usually remedied without danger by removal of a larger section of the thoracic wall, are not very much apprehended in children, for the damage so often done by this operation to the thorax and its organs in the adult is usually gradually overcome in children. Many cases of regeneration of several ribs are on record.

Asthma.—Bronchial asthma is not of very frequent occurrence. It has been observed in children only a few months old. It may appear suddenly as an acute and chronic catarrh of the air-passages. Affections of the nose and naso-pharynx, such as catarrh, polypi, and the like, may often cause an attack which resembles the ordinary asthma of adults, especially in the case of neurotic children. The prognosis, however, is better in children, and the affection yields more readily to treatment than is the case with adults.

Treatment.—During the attack strong children are given an emetic, and hot poultices are applied to the chest and warm moist packs to the whole body. As inhalations common salt (℥i-Oj of boiling water), turpentine (℥i-Oj of boiling water), or pyridin *(q.v.)* may be used. Inhalations often give much relief. Internally we administer tinctura lobeliæ or extractum grindeliæ robustæ *(q.v.)*. Potassium iodid is most effective, especially if combined with bromid or chloral hydrate (see "Potassium Iodid"). In the regularly recurring attacks of asthma, quinin (0.1 to 0.3 [gr. iss-v; preferably euquinin] three times a day) is often very useful. When the attacks are very severe morphin given by mouth or hypodermically [or dionin] should be resorted to. Attention should be paid to all etiological factors (removal of nasal polypi or adenoids). Arsenic and hydropathic measures are often very useful. Later, residence at the seashore is to be recommended.

Asthma Dyspepticum (Henoch) must be distinguished from the form of asthma already noted. This disease manifests itself by dyspnea and cyanosis, very weak pulse, and cold extremities. It develops sometimes in dyspeptics through reflex action from the nerves of the stomach and absorption of toxic matter. It disappears rapidly after elimination (by emetic) of the irritating substances. To render the diagnosis certain it is necessary to decide that the nose, throat, lungs, heart, and urine (in order to exclude *asthma uremicum*) are normal.

Asthma Hystericum must also be thought of. The latter is characterized by hysterical spasms of the respiratory tract, which may occur at night with palpitation and a hyperesthesia of the precordial region, which may be mistaken for heart disease. Not rarely there are psychical alterations, convulsions, etc.

[The fumes of niter, stramonium, and compound tincture of benzoin often afford relief. For the prevention of night attacks, small doses of phenacetin or antipyrin and trional are preferable to morphin. Residence in a high, dry, and moderately warm region is, in our opinion, preferable to the seashore.—SHEFFIELD.]

Emphysema Pulmonum.—Acute pulmonary emphysema is not rare in children, and is often overlooked during life. It is more frequently observed on the dissection table, notably in children who die from a disease beginning with violent coughing, such as pertussis and laryngeal or bronchial stenosis. If the patients survive, a more or less rapid adjustment usually takes place, owing to the great elasticity of the puerile lung. Chronic emphysema is then quite a rare occurrence. It occurs, however, in children, *e.g.*, in chronic catarrh of the respiratory tract. It is sometimes observed also in children with an hereditary tendency. On the whole, the signs of emphysema are the same in children as in adults [chiefly exaggerated resonance on percussion—SHEFFIELD], but the detection of the objective signs is often not as easy in the child, owing to the large size of the liver, abdominal tympanites, etc.

The TREATMENT consists of change of air (mountain air), use of pneumatic apparatus, and breathing exercises. [Internally, perhaps, potassium iodid.—SHEFFIELD.]

Bronchiectases are by no means as rare in children as is generally believed. They relatively often form a sequel of bronchial catarrhs, pneumonia, pleuritis, pertussis, and measles; are also found in phthisical processes, and may be produced by aspiration of foreign bodies into a bronchus. They sometimes involve the whole organ, and end more or less rapidly and fatally. Relative recoveries are known. Such cases, however, after several years often terminate in miliary tuberculosis. The symptoms of bronchiectasis are the same as in the adult. [A copious morning expectoration of greenish-yellow, fetid, or muco-pus indicates bronchiectasis.—SHEFFIELD.] The treatment consists in the administration of tonics, respiratory antiseptics [such as thiocol], wholesome food, breathing exercises, expectorants, and inhalations of turpentine or of a 1- to 2-per-cent. carbolic solution [or tricresol].

Pneumothorax is infrequent in children. It is caused by trauma—*e.g.*, fracture of the ribs or clavicle (here usually hemopneumothorax); laceration of the lungs as sometimes seen in pertussis and as a result of foreign bodies in the bronchi; emphysema; internal perforation of empyema; suppurating bronchial glands; and destructive lung processes, such as tuberculosis, gangrene, and bronchiectasis. All these conditions are often associated with pyopneumothorax. The symptomatology and treatment are the same as in adults.

[SYMPTOMATOLOGY.—Severe dyspnea, violent paroxysms of coughing, bulging of the affected side, and tympanitic resonance. When effusion occurs there is dullness over the lower and hyperresonance over the upper portions of the chest and a splashing sound on suddenly shaking the patient.

The TREATMENT consists of opiates for the pain and aspiration for the intense dyspnea.—SHEFFIELD.]

Gangrene of the Lung is not rare in children, but is diagnosticated with difficulty, owing to the deficient quantity of sputum obtainable. Furthermore the gangrenous odor of the breath is often attributed to other usually coexisting affections, such as gangrenous processes in the mouth and throat. [Hemoptysis is often a characteristic symptom.—SHEFFIELD.] Pulmonary gangrene is not rarely a result of pneumonia, but occurs also in phthisis. It is sometimes met in gangrenous processes of the skin, especially after measles, scarlet fever, and typhoid; of the mucous membranes—gangrene of the vulva; noma; diphtheria; scarlatinal necrosis of the pharynx, etc.; in foreign bodies of the air-passages; in carious softening of the petrous portion of the temporal bone; and in wasting diseases, such as furunculosis, severe intestinal catarrh, typhoid, etc. General debility plays an important rôle, owing to the retarded blood-flow and tendency to thrombosis.

The PROGNOSIS is usually bad.

TREATMENT.—Roborants and inhalation of vapors of oil of turpentine (10 to 30 drops several times daily in hot water). Internally creosote [or guaiacol carbonate].

Tumors of the Lung may either be carcinomas or, more rarely, sarcomas. Echinococcic tumors also are on record.

Mediastinal Tumors may originate from the thymus gland, the lymph-glands of the anterior mediastinum, and more rarely from the sternum. Sarcomas are relatively frequent; carcinomas are rarer. The symptomatology consists of dyspnea, progressing to orthopnea, rapidly increasing dullness beneath the sternum and vicinity, anterior arching of the thorax, edema of the face and dilatation of the veins of the neck, dislocation of the heart, dropsical pleural exudations, etc. Dr. Soltmann found actinomycosis *(q.v.)* in the posterior mediastinum in a child 6 years old who swallowed an ear of corn. Vomiting of blood was the first symptom, and a diffuse, painful tumor afterward gradually developed to the right of the vertebral column.

Actinomycosis is very rare in children. It does occur, however (*e.g.*, case of Soltmann: boy 6 years old with actinomycosis in the posterior mediastinum). The internal administration of potassium iodid has recently proved useful in a number of cases, and ought to be tried before operative interference is attempted.

XII.

Diseases of the Blood and Spleen.

The Blood.—The blood in the newly born infant is remarkably dark. It has many variously sized red blood-corpuscles—among them numerous nucleated cells, which soon disappear—and a comparatively large number of white cells. The ratio is about 1 white to 130 red. This relationship remains stationary until puberty, when it approaches that of the adult. The number of erythrocytes is 5,500,000, in artificially fed infants somewhat less. The hemoglobin content is very high, especially if tying of the navel has been delayed, under which circumstances the number of the red and white corpuscles attains the highest value. It diminishes considerably between the first and fifth years, but from then on it continues gradually to rise. The specific gravity is 1.046 to 1.066 up to the second year; and, afterward, 1.052 to 1.053.

Anemia and Chlorosis.—Anemia is quite frequent in children, especially when secondary to hereditary syphilis, tuberculosis, scrofula, rachitis, malaria, heart and kidney disease, loss of the vital fluids (blood, pus, diarrheas), helminthiasis, acute infectious diseases and digestive disturbances such as dyspepsia, and prolonged constipation. *Primary anemia* is really identical with or leads to *chlorosis*, and is chiefly due to external conditions, such as deficient nutrition or bad air. It occurs very frequently in school children 8 to 12 years old who reside in large cities. The atmosphere of the large city, especially of overcrowded schoolrooms, in conjunction with insufficient exercise, faulty mode of eating (quick eating before and during school hours), and clothing (corset!), certainly form the strongest etiological factors in the production of anemia in growing children more or less exposed to sexual influences (approaching puberty, menstruation!). "Green" complexion, debility, fatigue from slight exertion, increased nervous irritabil-

ity, headache, restless sleep, anorexia, painful sensations (epigastrium, intercostal spaces), a moderate degree of struma, which usually disappears spontaneously after a time, attacks of (nervous) dyspnea, in addition to the usual symptoms which also occur in nervous adults, make up the clinical picture.

TREATMENT.—First removal of all underlying diseases already mentioned or (as in primary anemia) of all other etiological factors. Special attention to diet and correction of faulty mode of clothing. An infant of 9 or 10 months should receive, in addition to milk, other light food, such as eggs, spinach, fruit-juices, beef-juice, and gradually fresh meat, fruit, rice, grits, barley, cocoa, etc. Slow eating should be enforced. Liberal exercise in the fresh air, also athletic exercise in gymnastics, swimming, skating, etc.; later bicycle-riding. In severe cases, complete change of residence (airy boarding schools and high-schools in small country places), at least for a certain length of time. High sunny places are much to be preferred to sylvan low ground. Mountainous regions are very good for smaller children. Sea air and cold sea and river baths often do not agree well. Poorer children should be sent to the many charitable summer resorts.

Medicinal Treatment.—Iron in small doses is to be continued for months, or some of the recent iron preparations may be more advantageous (hematogen, hemogallol [2 to 4 grains one-half hour before each meal], sanguinal, etc.). Likewise the various nutrient remedies in digestible and concentrated form (somatose, lactosomatose, and ferrosomatose [the latter may be given in 10 to 12 gr. doses in milk or bouillon every four to six hours], hygiama, eucasin, puro, beef-extract and beef-peptone, nutrose, sanose, etc.). In intractable cases arsenic may be tried. As adjuvants: warm baths (with "Mattonis Eisen moor saltz") [enteroclysis, with normal salt solution—SHEFFIELD]. Sometimes also symptomatic treatment (*e.g.*, orexin tannate in anorexia).

ANEMIA PSEUDOLEUKEMICA INFANTUM (SPLENICA), von Jaksch, is distinguished, aside from the characteristic appearance of the blood—high polymorphous leucocytosis, white blood-cells to red ones as 1 to 20-12 with preponderance of the polynuclear forms, with no increase in the eosinophile cells,—

by pronounced splenic enlargement, with slight enlargement of the liver and lymphatic glands. It is frequently caused by rachitis, syphilis, and grave errors of diet. The etiology is, however, often obscure.

The same holds good for *pernicious anemia.* This form is, however, sometimes due to worms, such as *Bothriocephalus latus, Anchylostomum duodenale.* The symptoms and course are the same as in the adult. [Severe cases of anemia often do much better with rest than with exercise.—SHEFFIELD.]

Hodgkin's Disease (Adénie, Pseudoleukemia [Lymphatica]) occurs also in children and differs in no way from the same condition observed in adults. [It is characterized by a general hyperplasia of the lymphatic glands throughout the body. The changes in the blood are identical with those observed in anemia without an increase in the number of leucocytes. Occasionally there are local symptoms, such as edema, pain, cough, or dyspnea due to mechanical compression by the lymphomata. —SHEFFIELD.]

The PROGNOSIS is very doubtful. According to Monti and Berggruen, Hodgkin's disease is the preliminary stage of true leukemia. In some cases the disease does not advance and recovery takes place, while in others transition into leukemia occurs. Recoveries from Hodgkin's disease are on record. Arsenic treatment seems to act favorably at times.

Leukemia will be discussed under "Spleen Affections." It may here be mentioned that lienomedullary forms are also observed which are characterized by the presence of an abnormally high percentage of the so-called "marrow-cells" [myelocytes] of the normal blood. It is associated with a relative and absolute increase in the white cells, diminution of the neutrophilic polynuclear and transitional forms with lobulated nucleus (in normal blood they form the bulk of the white cells—from 70 to 80 per cent. of all leucocytes; in leukemia only from 30 to 40 per cent.), and, furthermore, no relative increase in the eosinophile cells. In the healthy adult the latter vary from 1 to 11 per cent., and in children even larger numbers are physiological.

The PROGNOSIS is bad.

The SYMPTOMS are the same as in ordinary leukemia.

There is also an ACUTE LEUKEMIA which progresses rapidly with high temperature, acceleration of pulse, marked alteration of the general condition, and ends fatally in a few weeks (from four to eight), after at times showing deceptive improvement. The etiology of this rare disease is as yet obscure. On several occasions syphilis was suspected.

Hemophilia is an inherited and congenital tendency to profuse hemorrhages which are controlled with difficulty or not at all. It affects chiefly boys, particularly of Jewish ancestry and is either spontaneous (in all tissues) or, more often, traumatic in nature. Indeed, the slightest injuries, such as vaccination, circumcision, extraction of a tooth, opening of abscesses, etc., are followed by severe hemorrhages, and a bump or stroke, etc., gives rise to a large extravasation of blood. This phenomenon is important forensically, for it may be mistaken for an act of cruelty. Bleeders often lie in giving their history and maintain never to have bled before. Sometimes melena neonatorum; bleeding from the navel, notwithstanding careful tying; and precocious menstruation are also due to hemophilia. Hemophilia is not infrequently associated with an inflammation of the joints.

TREATMENT.—There is no specific remedy against hemophilia. Small doses of phosphorus continued for a long time are said to be useful. The main thing is to avoid, as much as possible, even the slightest surgical operations in bleeders.

Regarding circumcision it is well to remember that there is also a transitory hemophilia the etiology of which is obscure. It often occurs in children of syphilitic parentage, and in postpartal septic infection. The tendency to hemorrhage is greatest between the seventh and thirteenth days of life, especially on the eighth day, at which time circumcision is usually performed —hence the great mortality. The hemorrhagic tendency then gradually diminishes and disappears on the ninetieth day. In such cases, therefore, circumcision ought to be practiced later, and the physician should be supplied with the whole therapeutic armamentarium against hemorrhage, as it often happens that the ordinarily effective remedies fail and many others must be tried to arrest the hemorrhage. Unfortunately sometimes everything fails. Bienwald successfully injected a Pravaz syringeful of

coagulable blood from a healthy person directly into the bleeding wound.

The PROGNOSIS, especially in very young and delicate children, is therefore bad. [Good results have recently been obtained from the use of sterilized liquid gelatin administered hypodermically (or by mouth). Some recommend prolonged administration of thyroid-gland substance.—SHEFFIELD.]

Purpura is a hemorrhagic diathesis manifested chiefly by hemorrhages in the skin, mucous membranes, and other tissues. It is customary to distinguish:—

1. *Purpura Simplex,* which is characterized by cutaneous hemorrhages only. The spots, which must not be mistaken for flea-bites, are almost always isolated and at most lentil sized. They develop without any apparent cause, often in badly nourished, anemic, or rachitic children who live in damp dwellings. It is frequently associated with splenic tumors, leukemia, and pseudoleukemia.

2. *Purpura s. Peliosis Rheumatica.* — In this variety the hemorrhagic spots are more numerous and more intense. The children suffer pain in the limbs, especially in the articulations, which are at times also associated with swellings. The hemorrhages are located especially upon the lower portions of the legs and feet and also in other localities. They are manifested by smaller or larger, deep red or bluish spots, which do not change on pressure with the finger. Here and there they present a central papular hardness (coagulation of fibrin) and sometimes also an urticarialike efflorescence, with a central bluish blood extravasation *(erythema nodosum).* Aside from the articular pain and swelling just spoken of, a feeling of pressure upon the tibia and knuckles, soreness of the soles, and difficulty in walking are not infrequently perceived. More rarely there is slight edema upon the dorsum of the feet and around the malleoli. Fever and disturbances of the general health are usually absent or slight. Occasionally there is irregular fever in the evening.

The PROGNOSIS in both varieties of purpura, especially of the first, is almost always favorable.

TREATMENT.—Absolute rest in bed [and nutritious diet]. Medicinally, acid Halleri [arsenic and iron]. In purpura rheumatica potassium iodid is sometimes useful.

Henoch describes another form of purpura which usually affects children from 7 to 12 years old, and is manifested by abdominal symptoms, such as vomiting, intestinal hemorrhage, and colic, in addition to cutaneous hemorrhages and articular affection. The latter may be absent. It occurs in paroxysms at intervals of several days, weeks, or months. Fever, if present, is moderate. The heart is normal, showing that the affection is not due to an embolic or endocardial process. Recovery is possible, but the prognosis is doubtful, owing to frequent development of nephritis. The latter sometimes occurs in other forms. Examination of the urine should therefore be made.

Treatment.—Absolute rest in bed, icebag to the abdomen, iced milk, and opiates.

Purpura Hemorrhagica (Morbus Maculosus) is manifested by hemorrhages in the skin and mucous membranes, particularly of the nose and gums. Its onset is almost always sudden in the enjoyment of apparently complete health. Without fever or disturbances of the general health, there is a sudden development of variously sized blood-spots, which do not disappear on pressure, or streaks and voluminous hemorrhagic conglomerations; so that the skin is covered by them within from twenty-four to thirty-six hours. There is usually but one attack, of from ten to fourteen days' duration, or rarely a recurrence, when it is of longer duration. The hemorrhages in the mucous membranes are rarely very profuse. Severe hemorrhage often follows slight irritation of the skin, such as needle-pricks or scratches.

Treatment.—Rest in bed, acid Halleri, and ergotin [styptic in, ferrosomatose, turpentine].

Severer cases are rarely observed, and are usually manifested by an insidious, slow course; profuse bleeding from the nose, mouth, intestines, and lungs, and recurrences (gradually anemia and debility). These cases end fatally, after months or years, from exhaustion or hemorrhages into delicate organs, such as the brain and spinal cord. Sometimes there are intervals of complete euphoria. The cause is obscure. Children from 8 to 14 years of age, who are otherwise well, also those who live in good hygienic circumstances, are affected by it, sometimes after scarlet fever or measles.

Treatment.—Iron, country or mountain air, and cold water treatment usually afford only temporary relief.

Still more dangerous is the form of purpura described by Henoch as PURPURA FULMINANS. It is rapidly fatal. In this variety there is no hemorrhage in the mucous membranes, but extremely rapid extension of cutaneous bleeding. Within a few hours whole extremities become blue, hard, infiltrated, and covered by sero-hemorrhagic maculæ. Death occurs in less than twenty-four hours, or four days at the latest, without complications. The etiology is obscure. Postmortem examination is negative. Treatment is futile.

Spleen Affections are manifested by enlargement of the spleen. Tumefaction of this organ can be demonstrated in children only by palpation. Percussion too frequently leads to errors. Muscular contractions of resisting children, a full stomach or intestine, etc., are especially apt to mislead in this direction. Tuberculosis is the most frequent affection of the spleen, and can be diagnosticated only by the presence of tuberculosis in other organs. An acute splenic enlargement may be caused by malaria, typhoid, recurrent fever [and influenza]. Very rapid enlargement of the spleen is sometimes followed by rupture of the spleen, hemorrhage in the abdominal cavity, and death. Spleen affections are more rarely caused by acute miliary tuberculosis and cerebro-spinal meningitis. Splenic enlargement has been observed also in morbilli, scarlatina, erysipelas, and angina.

Aside from very rare tumors, such as sarcoma, carcinoma, echinococcus (Baginsky reported a case of hemorrhagic cyst of the spleen following trauma), chronic splenic enlargement develops also from amyloid degeneration, in caries of the bones, syphilis, suppuration of glands, etc., and engorgement of the portal circulation, *e.g.*, in cirrhosis of the liver. Most frequently, however, it results from hyperplasia of the organ, which is not always due to chronic malaria, leukemia, or pseudo-leukemia, but often to an unknown cause. It is usually met in patients with a pale, waxy complexion, and is sometimes preceded by dyspeptic disturbances (diarrheas); also by rachitis, syphilis, and scrofula. Occasionally an hereditary and family diathesis is discovered. Often there is nothing to account for

the condition; the patient is otherwise perfectly well except the sallow complexion and the splenic tumor just spoken of; or there may be also edema of the feet and eyelids, small cutaneous hemorrhages, and bleeding from the mucous membranes. Examination of the blood at times reveals the presence of leukemia; the latter condition is usually observed in children from 5 to 14 years of age, more rarely in younger ones, but it may be found even in sucklings. As a rule, the proportion of red to white blood-corpuscles is normal, except, of course, the diminution of red blood-corpuscles from anemia, and the preponderance of white cells, which is also often otherwise met in children.

In leukemia the PROGNOSIS is always bad; but it is also dubious in cases of spleen affections free from leukemia, owing to the fact that most children affected by chronic spleen affections gradually lose in flesh, become anemic, often suffer from severe and even fatal hemorrhages (*e.g.*, from the nose or slight wounds, such as vaccination, etc.), and develop anasarca and dropsy if not previously carried off by intercurrent diseases, such as pneumonia. Recovery is, nevertheless, possible under suitable treatment, even where the tumor is very large and the case severe; but it is hardly to be expected in cases due to true leukemia. Quinin and iron (see "Iron Preparations") are most serviceable, but they must be continued for months or years; iodid of iron also is useful, especially if syphilis is suspected. Arsenic may be tried. The best of nourishment (in infants, woman's milk) and lukewarm salt-water baths. [Sojourn in the country.]

[Movable Spleen (Wandering Spleen, Lien Mobilis) may be acquired or a result of congenital conditions. In both instances there is elongation of the gastro-lienal ligament. In the acquired form the elongation may result from pressure upon the splenic region, from blows, continuous coughing, or, as is quite often the case, from enlargement of the spleen itself.

The organ is usually felt with ease below the edge of the ribs. The normal splenic dullness is wanting in the left hypochondrium and especially posteriorly. Subjective symptoms may be absent. Sometimes, however, the patient, if old enough, complains of a dragging sensation or pain in the left side. Trac-

tion exerted upon the stomach or upon the intestines may produce attacks of severe colic, with retching and vomiting. Sometimes the pressure may lead also to other symptoms, such as constipation, dysuria, etc.

[TREATMENT.—In mild cases the use of abdominal binder; in very pronounced instances splenectomy may be necessary.—SHEFFIELD.]

XIII.

Diseases of the Circulatory System.

Circulatory Organs.—The relation between the size of the heart and the width of the blood-vessels is inversely proportional to that in the adult. Children have a relatively small heart and wide arteries. The blood-pressure in the greater circulation is considerably lower in children than in adults, but in the pulmonary circulation it is higher. The heart undergoes gradual enlargement until puberty, at which time the arterial system is relatively narrowest. From then on its growth is quite rapid. Young children often exhibit a "trochaic" heart-rhythm, and the first sound over the whole heart is somewhat more accentuated than the second; however, as the "iambic" rhythm is also observed, this symptom is of no clinical interest.

Auscultation and Percussion (see pages 24 and 25).

Vitia Cordis [Heart Disease] may be congenital, as a result of fetal endocarditis or arrested development. These affections are often associated with other malformations of the body. In addition to other symptoms ordinarily met in heart disease, such as edema, epistaxis, enlargement of the liver and spleen, anemia, tinnitus aurium, fainting spells, etc., heart diseases are recognized especially by the presence of cyanosis *(q.v.)*. The latter usually is the chief symptom of congenital vitia cordis, but at times it is absent. The diagnosis may be corroborated by physical examination revealing enlargement of the heart (especially of the right side), systolic or diastolic murmurs, etc. An exact diagnosis as to the character of the heart disease is, however, almost never made, as there are no positive signs characteristic of the individual malformations. Like cyanosis, all the other symptoms may be absent or appear only in a very indefinite manner (slight palpitation of the heart and dyspnea on mounting stairs or running). Objective signs sometimes fail to develop and heart lesions are sometimes over-

looked until accidentally recognized while examining the child for other diseases. In this event the diagnosis of *congenital vitia cordis* is made by exclusion in the absence of any etiological moments. The cardinal symptoms of the heart lesions may at times appear during the course of another disease, particularly of the respiratory tract, or during acute endocarditis, which may develop in children with congenital vitia cordis equally as often as in old acquired heart diseases ("recurrent endocarditis"). This is especially the case in congenital *stenosis* and *atresia* of the conus or *pulmonary artery.* In that event dilatation of the heart and passive congestion of the whole venous system supervene; thus, cyanosis; the area of cardiac dullness is enlarged and extends beyond the right sternal border; the heart impulse is visible and palpable over the enlarged area and often accompanied by a thrill; a systolic murmur is heard over the cardiac region, loudest over the ostium of the pulmonary artery as far as the clavicle. The murmur is sometimes audible over the whole thorax and spine. The symptoms are rarely as plain; usually they are obscured by the presence of other anomalies; so that a positive diagnosis is impossible. The diagnosis is still more difficult in the other forms of vitia cordis.

Even under the best of care children with congenital heart disease usually live only a few years. During this period they may readily overcome all sorts of diseases, even febrile affections, such as exanthemata. A fatal termination, however, is unavoidable. Death sometimes occurs suddenly, or incidentally during the course of other diseases which in normal children are not dangerous to life, especially respiratory affections.

All that can be done for children suffering from congenital vitia cordis is to guard them against disturbing elements. Disturbances of compensation should be treated symptomatically.

Acquired cardiac lesions are not rare in children. They are usually preceded by endocarditis *(q.v.)*, which in children, as in adults, finds various etiological moments. Anatomically and clinically they are manifested as in adults.

[The course of *acquired chronic heart diseases* in children is divided, as in adults, into two periods, the first being that in which compensation is present,—associated with cardiac hyper-

trophy, forcible heart's action, shortness of breath on exertion, sometimes headache, tinitus aurium, etc.; the second that in which compensation has failed,—cardiac dilatation, dyspnea, orthopnea, cough, enlargement of the liver and spleen, congestion of the kidney, albuminuria, dropsy, etc.

TREATMENT.—During the stage of compensation attention should be directed to improvement of the general condition by wholesome food, moderate exercise, avoidance of mental overexertion, and correction of anemia or digestive disturbances, if present. When the "compensation ruptures" prolonged rest in bed, strengthening but bland diet, iron (hemogallol, ferrosomatose), and general tonics; caffein-sodium benzoate, and digitalis in cardiac dropsy with low arterial tension; saline purgatives and diuretics to relieve an overloaded venous circulation; ammonia, camphor, strychnin, and nitroglycerin in cases of sudden heart-failure.

With early and proper hygienic and general management life may be prolonged for many years. The prognosis as to complete recovery is bad.—SHEFFIELD.]

Endocarditis may be of fetal origin (see "Vitia Cordis"), but is usually acquired. It is most frequently caused by acute articular rheumatism, which is not at all rare in childhood, and also by other rheumatic affections, such as erythema nodosum, etc. Even very mild and afebrile attacks of rheumatism may give rise to it. In some cases endocarditis is the first symptom of rheumatism, the articular affection not developing until a few days later. Endocarditis in children is anatomically, clinically, prognostically, etc., identical with that in adults, with the exception that it may remain latent for a long time, and cause no symptoms even after severe exercise, mounting stairs, etc. Complete restitution may frequently occur. It may also be latent in the initial stage, when general malaise, acceleration of pulse, and fever, or sometimes the latter symptom alone may be the only indication, and even then its nature may remain obscure until the subsequent appearance of local signs, especially of a systolic heart-murmur, which is often distinctly heard, either over the whole cardiac region or only at the apex. On the other hand, endocarditis may sometimes run a very violent course, and give rise to hypertrophy of one or both ventri-

cles within a few months after the rheumatic attack. As a rule, permanent heart disease develops also in children after an attack of endocarditis and often in conjunction with chorea. The latter disease, however, is independent of the endocarditis, but often due to the identical cause (rheumatism). Rheumatic endocarditis is frequently complicated by pericarditis *(q.v.)*. Endocarditis is also caused by other affections, most frequently by scarlatina, and more rarely by measles, typhoid, diphtheria, and pyemia; also by inflammation of the pleura and lungs; the latter diseases are more apt to be complicated by pericarditis. However, not every transient systolic murmur associated with scarlatina or with its consecutive nephritis is due to endocarditis; and it is referable to true endocarditis only when it persists for a long time after subsidence of the fever. The differential diagnosis between endocarditis and pericarditis is far from easy, because the pericardial murmur in children is softer and is systolic instead of frictional in character.

The TREATMENT of endocarditis in children is the same as in adults. [Perfect rest in bed; antirheumatic remedies. In excessive cardiac action small doses of aconite or opium. Bland, but strengthening, diet. (See also "Vitia Cordis.") — SHEFFIELD.]

Pericarditis is, first of all, produced by the same causes as endocarditis (rheumatism, scarlatina, etc.), with which it is frequently associated. Furthermore it may be induced by affections in the vicinity, such as pleuritis, pneumonia, and caries of the ribs, which may give rise to sero-fibrinous or purulent exudations; or it constitutes a part of the symptomatology of septic processes with purulent exudation. Tuberculosis is a very frequent cause of pericarditis. In such cases the pericarditis is often associated with myocarditis, and is manifested by miliary tubercles upon the pericardium in addition to fibrinous or hemorrhagic exudation. Pericarditis is much more rarely caused by syphilis, under which circumstances it may be associated with gummatous tumors in the pericardium. Finally pericarditis is occasionally produced by trauma. The clinical symptoms and treatment are the same as in the adult.

Dry as well as exudative pericarditis usually gives rise to adhesions between the pericardium and heart, with subsequent

obstinate disturbance of the heart's action, although total synechiæ occasionally remain entirely latent. Baginsky, who recently reported his extensive experience with this disease, believes that pericarditis—notably the serous, fibrinous, hemorrhagic, and purulent varieties—is quite frequent in childhood. He found that serous pericarditis is usually ushered in with severe symptoms: thus, quite high fever, as high as 105 $^1/_2$° F., generally followed by irregular, changeable temperature, with violent exacerbations and brief remissions; anxious expression of the face, denoting great suffering; pain, which is particularly intense if the pericarditis is associated with polyarthritis; usually rapid, often extraordinarily accelerated, respiration, and sometimes also severe cough. The pulse may remain quite strong, but it is sometimes small and barely perceptible, ranging from 120 to 150 beats or more; it is sometimes arhythmic and occasionally also very regular.

The DIAGNOSIS is sometimes very difficult. The symptoms obtained on percussion must therefore be carefully weighed (see pages 25 *et seq.*). Extension of the area of cardiac dullness and a certain displacement of the heart, while of some moment in proving the presence of a pericardial exudation, are not sufficiently characteristic to exclude with any degree of certainty simultaneous dilatation as the cause of the extension. Auscultation is always the most reliable method of diagnosis of this condition. In pericarditis with serous exudation auscultation usually reveals pericardial murmurs at a point where the pericardium envelops the large vessels, and more rarely at the apex. Stress has also been laid upon a peculiar humming sound, which is said to occur in children at the apex of the heart. Rosenbach particularly emphasized the fact that a humming sound is frequently heard at the heart-apex which is not pericardial, but endocardial, in nature, and frequently seems to have the endocardial character. Indeed, these humming murmurs do occur in pericarditis without eliciting actual sounds, but they are by no means frequent; on the contrary, there is sufficient evidence to prove that in those forms in which pericardial exudations are present the humming sounds can, after gradual abatement of the exudation, readily be attributed to the simultaneous presence of endocardial symptoms; further-

more the endocardial signs become more and more pronounced after disappearance of the friction-sounds. The recognition of purulent pericarditis is still more difficult. The latter variety was seen by Baginsky in phlegmonous erysipelas, severe angina, caries of the ribs, fibrinous pneumonia and broncho-pneumonia, gastro-enteritis, furunculosis, phlegmons of the throat, and empyema. [I saw a case of purulent pericarditis complicating pyemia in a boy 13 years old. The child died within ten days.—SHEFFIELD.] In these severe affections the general symptoms, such as extreme fatigue, general cachexia, pyemic fever, etc., predominate, while the local symptoms are comparatively insignificant; even the exudation is usually slight. Purulent pericarditis may occur even in infancy. Baginsky lost a child 10 days old. The bacterium coli, streptococci, and staphylococci, and occasionally the bacillus pyocyanus are usually found bacteriologically. Tuberculous pericarditis is not frequent in tuberculosis; but, if it does occur, it is a very malignant affection, manifesting itself by enormous hypertrophy of the pericardium and extensive adhesions of the heart, large quantities of pus between pericardium and heart, and numerous tubercles in the pericardium.

The most important variety is pericarditis complicating articular rheumatism. In the latter disease the pericarditis usually sets in quite early, and in the majority of cases it is manifested by serous exudations, which may again disappear. Often, however, a distension of the area of cardiac dullness remains which may diminish or increase, showing that fluid is undoubtedly present or that dilatation has already developed. The decision in this respect is, as a rule, difficult, for the fibrinous variety is also very frequently met with here. If another attack of rheumatism develops within from one-half to one year the same phenomena reappear. The child may succumb to the second attack under symptoms of extreme dyspnea, extraordinary enlargement of the area of dullness, and synchronous distribution of all symptoms of passive congestion. The pericardium and heart may become totally adherent, and the organ assume immense size.

The PROGNOSIS depends upon the age of the patient and underlying disease. Thus, the prognosis in septicemia and tu-

berculosis is hopeless, in rheumatism fairly good, and in scarlatina and other diseases doubtful.

If a young child is affected by rheumatic polyarthritis followed soon by a recurrence, permanent recovery is almost out of the question; the heart remains incapacitated in its functions and the malignant heart affection usually ends fatally at about the period of puberty. In these forms of pericarditis and endocarditis all remedies fail. Considerable relief from the increasing symptoms of passive congestion may, however, be procured for days or even weeks by the administration of digitalis [agurin] and diuretin, the latter in doses of from 1 to 2 grams daily. [The TREATMENT of acute pericarditis consists of perfect rest in bed, counterirritation, hot poultices or icebag to the heart, and small doses of aconite and opium to relieve excessive heart-action and pain. In sudden large pericarditic effusions threatening syncope, aspiration (in the fifth intercostal space a little to the left of the border of the sternum) and rapid free diuresis (*e.g.*, by theocin) may be tried. In large purulent exudations incision and drainage.—SHEFFIELD.]

Heart-murmurs (Functional).—Functional heart-murmurs are rare up to the seventh year of age and have thus far very rarely been observed in children under 4 years of age. That they do occur even in nurslings is proved by the case recently described by Thiemich. The child in question was 6 months old, very anemic, rachitic, and poorly nourished. A few days before its death it presented a very distinct accidental murmur along the left mammillary line. This murmur diminished rapidly in intensity outside of this line, but remained quite audible along the base of the heart up to the right sternal border. The murmur was blowing in character, but became more frictional the firmer the stethoscope was pressed against the chest. It was entirely restricted to the systolic sound. Postmortem examination revealed no etiological factor. There was neither a valvular lesion nor a malformation. The possibility of having mistaken it for a cardiac pulmonary sound—which, by the way, is extremely rare in early childhood—is out of the question for the reason that the murmur was heard equally well during a respiratory pause following prolonged crying. It could therefore have been only a functional cardiac murmur.

Palpitation of the Heart (Nervous) is not rarely observed in boys and girls at the age of from 10 to 14 years, especially in those who grow fast or are anemic or neurasthenic. Aside from the palpitations, the patients also complain of flying stitches in the chest, difficulty of breathing during strong exercise, headache, etc. Nothing is detectable about the heart except accelerated action. The palpitation usually amounts to nothing serious and gradually disappears after puberty at the latest.

The TREATMENT consists in restriction of mental activity of the patient, suitable exercise, regulation of diet, removal of etiological factors, such as anemia or masturbation, etc., if present, avoidance of alcoholics, coffee, tea, and tobacco, etc. Symptomatically the following combination of bromid, aqua laurocerasi, and valerian is ordered:—

℞ Sodii bromidi ..... 5.0 [3j].
Aquæ laurocerasi ..... 5.0 [3j].
Tincturæ valerianæ ..... 15.0 [3iv].
M. Sig.: From 15 to 30 drops three times a day.

Myocarditis is infrequent in children. It is relatively often found in conjunction with endocarditis and pericarditis and also in tuberculosis, in which condition the pericarditis is more frequently complicated by peripheral fatty degeneration of the heart-muscle. Partial fatty degeneration of the hypertrophied heart-muscle is also observed in valvular disease of the heart, and very frequently in diphtheria and scarlet fever. Typhoid, chronic pneumonia, and pertussis also occasionally lead to myocardial changes. Extensive chronic fatty degeneration of the heart-muscle is almost never observed in children, while interstitial myocarditis with induration is rare. In syphilis gummata are sometimes found in such indurations. Myocarditis occurs also in nephritis.

The PROGNOSIS and TREATMENT are the same as in the adult.

[As a rule, there are no symptoms during life. Occasionally a faint apex impulse; a slow, weak, irregular pulse; pallor, dyspnea, and attacks of syncope; and in later stages signs of cardiac dilatation, such as dropsical effusions, etc., are observed.

The TREATMENT is chiefly prophylactic. Recumbent posture for several weeks after severe infectious diseases. Avoidance of sudden exertion. General tonic plan of treatment.—SHEFFIELD.]

Cor Bovinum is a term used by Hauser to designate a strongly hypertrophied and enlarged heart of a baby 11 months old, who died after a very severe attack of pertussis of several months' duration. The latter affection, with its ever-recurring intense muscular exertions, was, Hauser believes, responsible for the increase in volume of the organ. In every case of cor bovinum in childhood, however, congenital hypertrophy must always be thought of. It is a condition which, according to Virchow, certainly exists, and is produced in two ways: either as the result of valvular deformities, which may readily escape notice, or of a congenital rhabdomyoma of the heart (no circumscribed swelling, but rather a strong hypertrophy of both ventricles).

Arteriosclerosis is very rare in children, but it certainly occurs. The subjective as well as the objective symptoms (displacement of the heart over the left mammillary line) are the same as in adults. The parents of the patient are usually subjects of arteriosclerosis when young. The etiology is obscure. At times it seems to be caused by infectious diseases. Syphilis also often plays an important part. Sonnenberger saw two syphilitic children bleed to death after circumcision, caused by arteriosclerosis of the superficial arteries of the glans.

Aneurisms very rarely occur in children. Syphilis as well as injuries seems to play a part. Jacobi observed a case of aneurism of the abdominal aorta which he thinks was due to invasion of the wall of the blood-vessel by the tubercle bacillus. Aitken holds an embolus responsible for an aneurism of the abdominal aorta observed by him in a child suffering from aortic and mitral heart lesions. The form of aneurism most frequently met is that of the cardiac valves and aortic arch. Once an aneurism of the basilar artery was observed. The symptomatology is the same as in adults.

XIV.

Diseases of the Thyroid, Thymus, and Lymphatic Glands.

Cretinism is endemic in some regions, especially mountainous districts, but it is not infrequently sporadic in others. It is a pathological condition the etiology of which is as yet obscure. It is closely related to myxedema and idiocy, and is chiefly dependent upon nutritional disturbance of the growing organism, which manifests itself by precocious arrest of development of the bony system, with excessive growth of certain soft structures. For example, existing anomalies of the cranial base are due to a premature ossification of the occipito-sphenoidal synchondrosis. It is a condition undoubtedly due to arrested intra-uterine development. Heredity plays a very important rôle. Thus, descendants of people coming from regions where cretinism is endemic are subsequently affected by cretinism even if they live somewhere else. At times syphilis and rachitis also seem to favor the development of cretinism. The thyroid gland participates conspicuously in this process, since most cretins are also strumous, or the thyroid gland is absent entirely. Occasionally the parents suffer only from struma while the children develop into cretins. The most prominent sign of cretinism is physical and mental backwardness. The cretin is dwarfed in stature, *e.g.*, children 10 to 12 years of age appear to be but 2 years old. Their mental development is very low. Physically a cretin usually represents a distinct type. The head is large and plump and set upon a thick, short neck; the face is weak and senile; the root of the nose is very deep; the eyelids and lips are thick; the tongue is thick and often protrudes from the mouth, and the abdomen is distended. The extremities are often deformed; the joints are thickened; the gait is dragging and awkward [sometimes walking is im-

possible]; sexual development is greatly delayed or the sexual organs are undeveloped. [The hair is thin.] These symptoms are, of course, not always well marked ("half-cretin").

The TREATMENT is not promising. Although cases are on record in which the use of thyroid gland [or iodothyrin] produced physical and mental improvement, complete success was rarely attained. Indeed, the result was often negative.

Myxedema is a disease due to the absence of function in the atrophied or extirpated thyroid gland, and is closely related to cachexia strumipriva and cretinism. It sometimes develops also in grown children, and here produces the same symptoms as in adults. The disease is also congenital, and appears in the newborn, or at least in the first few months of life. This so-called "*infantile myxedema*" (also called "*sporadic cretinism*"), which is generally due to absence of the thyroid gland, gradually leads to the following characteristic clinical picture: Thickened, dry, waxlike, pasty skin, which causes, *e.g.*, the peculiar staring expression of the face and the slow and awkward movements of the clumsy extremities. The hair is lusterless and brittle; there is eczema of the head; the anterior fontanelle is open; the teeth are defective; pseudolipoma occurs in the clavicular spaces; the voice is husky; the tongue is very thick; the temperature is subnormal; the pulse is slow, etc.; physical and mental development is arrested, etc. The growth of the body is more or less retarded (dwarfism) and ossification incomplete—the fontanelles remain open for an unusually long time; the embryonic cartilaginous epiphyses and synchondroses are found intact by Roentgen rays. The teeth come through very late; the child stoops, becomes kyphotic, etc. If the changes in the skin are indistinct, myxedema may readily be mistaken for rachitis (open fontanelles, deficiency in teeth, kyphosis, etc.). Mental development also remains strikingly backward, and not infrequently myxedema results in total idiocy. The prognosis is not altogether bad. Persistent treatment with thyroid gland substance [or iodothyrin] not infrequently leads to quite marked improvement.

Acromegaly (Giant Growth) is a rare, abnormal enlargement of various parts of the body, especially of the extremities, the nose, jaw, ears, and tongue, or only of several toes or fingers

and possibly also of the whole body (so-called giant children). The enlargement often begins just at puberty. It usually involves the bones, although the soft structures may also be affected. Enlargement of the fingers and toes is noticed at first, and the other portions of the body become involved gradually. It is frequently traceable to an hereditary disposition (rarely congenital). It sometimes follows infectious diseases, such as scarlatina and measles [influenza]. The nature of the disease is as yet unknown. Persistence of the thymus gland, enlargement of the thyroid,—which may, however, be entirely absent,—and hypertrophy and tumors of the hypophysis cerebri were found in a few cases. The latter by pressure upon the chiasm and basilar nerves is the cause of the frequent anomalies of vision, such as hemianopsia, limitation of the field of vision, atrophy of the optic nerve, etc., and the disturbance of motility of the eyes. All the other symptoms are identical with those in the adult. Treatment is of no avail. Thyroid gland substance is rarely effective.

Basedow's Disease (Exophthalmic Goiter, Graves's Disease) is very rare in children, particularly in boys. Etiologically, heredity, psychical affections, hysteria, and anemia are of some moment. Basedow's disease usually begins with only one of the cardinal symptoms, namely, either cardiac manifestations or exophthalmos, more rarely with struma, and still more rarely with tremor. At the onset exceptionally two of the cardinal symptoms may be present, but never more than that. Sometimes no characteristic symptom is present at the onset, and the disease is introduced by such symptoms as fatigue, debility, loss of flesh, and headache. Subsequently struma is a constant symptom. The goiter grows somewhat faster than in adults, but, as a rule, it remains moderate in size. Another constant symptom is moderate tachycardia, the pulse ranging between 100 and 120 beats. In the majority of cases there are marked pulsation of the carotids, temporals, and thyreoidei. Often a systolic heart-murmur, and more rarely heart arhythmia. A less constant symptom is exophthalmos, which is either entirely absent or, if present, but slightly marked. Graefe's and Stellwag's symptoms are rarely present, while that of Möbius, as well as palsies of the eye-muscles, is almost never observed. As

a whole, this disease appears in children not rarely in a rudimentary state *(formes frustes)*. Even the cardinal signs are either entirely absent or scarcely noticeable; so that the diagnosis is often quite difficult. Basedow's disease generally reaches its acme more rapidly in children than in adults.

Among other manifestations there relatively appear: Disturbances of digestion, particularly diarrhea, vomiting, and anorexia. Hysterical stigmata. Insomnia. Change in temperament—quiet children become restless, peevish, irritable, quarrelsome, and untruthful; some change in disposition and lose their memory. Abnormal perspiration. Loss in weight and also rise in temperature.

The PROGNOSIS is better in children than in adults, but, nevertheless, doubtful.

The TREATMENT with thyroid gland (iodothyrin) may be tried. Considerable benefit is sometimes derived from the prolonged use of small doses of arsenic, atropin, and ergotin (in anemia in conjunction with iron). Good results are also obtained from electricity and change of air (mountains). Quite often everything fails. The patient must be kept from psychical alterations, overexertion, etc.

Struma [Goiter] may be congenital in nature, particularly in countries where goiter is endemic. It is rarely so severe as to require treatment. Cases do occur, however, in which asphyxia, cyanosis, severe dyspnea, etc., demand immediate operation. Otherwise, an expectant plan of treatment is usually indicated, for the struma generally disappears spontaneously after a few weeks or months. Sometimes struma also develops in the first few years of life, but more frequently in school children from 8 to 14 years old, particularly in girls. *Struma follicularis cystica* is most commonly observed and other varieties more rarely. The disfigurement occasionally leads the patient to the physician. On the other hand, dyspnea and asthmatic attacks (also sudden death) may occur from compression of the trachea; headache, dizziness, and tinnitus aurium from passive congestion of the blood-vessels; and paralysis of the vocal cords from pressure against the nerves.

The TREATMENT consists in the employment of iodin externally (iodin ointment) and internally (potassium iodid),

and also the administration of thyroid gland preparations [*e.g.*, iodothyrin], which are very effective. Operative interference is now and then indicated.

There are also *transitory* forms of struma, *e.g.*, in pertussis, from singing and crying, too tight clothing around the neck, too forcible twisting of the neck backward in school, etc. *Strumitis* occurs in children as in adults, *e.g.*, metastatic strumitis. Baginsky once saw suppuration of the thyroid in erysipelas. Accessory strumas also are observed, particularly on the neck. Seldowitsch once observed it at the root of the tongue.

Tumors of the Thyroid Gland.—Carcinomas, adenomas, and syphilitic gummata of the thyroid gland are occasionally met also in children. Besides these, tuberculosis of the thyroid has been observed. As to the occurrence, etc., of struma see page 293.

Diseases of the Thymus Gland.—The thymus gland is situated in the anterior mediastinum; its functions are as yet obscure. It is small in the newborn, grows larger up to the end of the second year, remains unchanged until the ninth or tenth year, and gradually diminishes in size until puberty, when it either disappears entirely or nearly so. Its weight varies greatly (between 5 and 25 grams [3j and 3vj]). This organ shows at times certain pathological changes. It may become hyperemic or hemorrhagic as a result of a hemorrhagic diathesis, lung or heart disease, pertussis, rubeola, diphtheria, suffocation, drowning, or asphyxia neonatorum. It is subject to inflammation *(thymitis)*, which may lead to suppuration and multiple abscesses (in pyemia, syphilis). Tuberculous processes, tubercles, and caseation may also be detected. These processes are rarely primary, but are usually secondary to general miliary tuberculosis. Finally, it may harbor tumors (sarcomas or carcinomas) and give rise to mediastinal growths.

But all this is not of common occurrence, and is diagnosed with difficulty, for in diseases of the thymus the functional disturbances usually escape notice, or at most make themselves conspicuous only by enlargement of the organ (*e.g.*, in tumor formation) and certain secondary manifestations, such as dyspnea, rapidly increasing dullness on percussion, dilatation of the veins of the neck, dislocation of the heart, accentuation of aus-

cultatory signs of the heart and lungs, arching and distension of the thorax, etc. More frequently simple *hypertrophy* of the thymus is met, which is sometimes inflammatory in nature (adhesions to neighboring organs) or sometimes of obscure origin. The hyperplasia may assume considerable dimensions, and give rise to more or less severe manifestations through congestions due to pressure of the gland against blood-vessels, nerves (cardiac and laryngeal branches of the vagus), trachea, and bronchi.

In former times a great deal of stress was laid upon hyperplasia of the thymus gland as a cause of spasmus glottidis *("asthma thymicum");* it has, however, been demonstrated that other etiological factors play a more important rôle. It is, at any rate, certain that enlargement of the organ interferes with respiration, and may give rise to symptoms of stenosis (also to the so-called "inspiratory stridor of sucklings," which is often mistaken for laryngospasm); furthermore that danger of suffocation may readily supervene (acute turgescence of the enlarged organ) and cause death *(thymus death)* in small children. Indeed, hypertrophy of the thymus (see "Status Lymphaticus") is often all that is found on postmortem examinations; sometimes also the site of compression of the trachea is visible. These deaths are often a mystery without a postmortem examination, owing to the fact that they not infrequently strike apparently healthy children, for, as mentioned before, the hypertrophy of the thymus is rarely discernible unless acute turgescence happens to set in and can only occasionally be proven by objective signs. Indeed, distinct dullness may now and then be elicited behind the upper portion of the sternum, but this may equally as well be due to swelling of the bronchial glands. Biedert mentions, as a special sign of the latter, marked predominance of dullness on one side, particularly the left; furthermore that the dullness ends, as a rule, at about the second rib, and is often also demonstrable on the back between the scapulæ; it is, in addition, distinguished by the presence of swollen lymph-glands in the lateral lower region of the neck, which may sometimes be seen to continue deeply down between the clavicles and the side of the sternum. The thymus gland may occasionally also be felt as an arched elastic swelling

in the middle line above the incisura sterni, which may ascend more or less up to the thyroid gland.

Rauchfuss seeks the cause for the sudden death in the obstruction of the air-passage. Demme, on the other hand, in stasis of the blood and compression of its vessels. Pott, moreover, in the encroachment upon the nerves; but, after the establishment of such an impaction of the enlarged organ in the upper part of the thoracic cavity, sudden death is probably due to all the causes combined.

Pott, who has repeatedly observed the course of these fatal attacks of asphyxia, describes them as follows: The children bend their heads suddenly backward—owing to resulting excessive lordosis of the cervical region of the spine there is pressure of the thymus against the trachea; make soundless, gasping, inspiratory movements; the eyes are turned; the face is black and blue; the cyanotic tongue is impacted between the jaws; the veins of the neck swell; the hands are clinched; the forearms pronated and abducted; the legs stretched; the large toes abducted and flexed backward; the spine arched backward; the heart's action, heart-sounds, and pulse cease immediately with the onset of the attack; after a few more futile inspiratory movements the face turns ash-gray and the child is a corpse in one or two minutes at the latest. Pott believes to have felt the vocal cords closely together in the median line; but he nevertheless concedes that death is caused by heart-failure, and not by closure of the glottis, for he twice performed immediate tracheotomy by *one* incision without any benefit. Biedert is nevertheless of the opinion that closure of the glottis, through suffocation-stasis in the heart and thymus, might be responsible for the attack and its serious consequences.

In the TREATMENT of an attack, immediate tracheotomy or intubation must at any rate be thought of. If thymus hypertrophy can be detected beforehand, an attempt may be made to remedy it by energetic antiphlogosis by ice, gray ointment, calomel internally, and, in strong children, a few leeches. In chronic cases iodin (solution or salve), also soap inunctions over the thorax ($^1/_2$ to 1 teaspoonful daily), may be tried. Recently successful attempts have been made to treat disorders attributable to hyperplasia of the thymus by surgical means;

Rehn was first to fix the thymus to the sternum; Koenig resected first the greater part of this organ and lately Purrucker removed even the entire gland.

Status Lymphaticus [Lymphatism].—In sudden deaths of previously healthy children certain regularly recurrent anomalies with no gross organic alterations were recently found on postmortem examination which were designated as *status lymphaticus.* The pale, pasty-looking children, at times also presenting signs of rachitis or scrofula, showed first an hyperplasia of lymphatic tissue—viz., enlargement of the spleen with distinct follicles, swelling of the follicles upon the dorsum of the tongue, the lymphatic pharyngeal ring, the peripheral lymphatic glands, and the follicles of the intestinal walls, but principally enlargement of the thymus gland *(q.v.).* While such sudden deaths were formerly attributed to compression of the air-passages by an enlarged thymus gland, there is now a disposition to refer them to the entire *status lymphaticus,* the inherent constitution of the body, since *status lymphaticus* predisposes to syncope and paralysis of the heart. Death may occur without apparent reason as the result of slight causes which produce psychical excitement, a shock, and are of no consequence in healthy children, but are fatal in those affected by *status lymphaticus.* Thus, a serum injection (case of Langerhans), wet packs (in prurigo, case of Escherich), narcosis, etc., may produce sudden death. In the same manner many deaths in diphtheria and in laryngospasm, to which children with *status lymphaticus* are greatly predisposed, may be explained. Some children are found dead in the morning after having retired apparently well the night before. The cases mentioned serve as a warning to proceed carefully in the employment of even small therapeutic measures in children in whom *status lymphaticus* is suspected.

Scrofula. — The clinical symptom-complex of scrofula is generally characterized by great vulnerability of various tissues of the body, particularly of the glands, skin, mucous membranes, organs of sense, and bones. It is manifested by simultaneous or successive development of chronic, frequently recurring inflammations which have a great tendency to hyperplasia and caseous degeneration. Tubercle bacilli are often

found in the abscesses. Scrofula, however, is by no means identical with tuberculosis, and not all children are tuberculous or later become so, although tuberculosis is prone to occur in a great number of cases. The tubercle bacilli which enter the body in some way or other undoubtedly find a very favorable soil in the products of scrofula, which are disposed to decay. The nature of scrofula is as yet quite unknown. It is certain, however, that scrofula is very frequently hereditary (the parents are scrofulous, tuberculous, or syphilitic); that it often attacks children reared under bad hygienic conditions, such as moldy, dark, damp dwellings; improper feeding; bad care of the skin, etc., and those with an inherent diathesis to certain diseases, such as pertussis and measles; and that it is prone to develop after vaccination. Scrofulous children are rarely (at most in the beginning) of blooming, healthy appearance. On the contrary, with their pale, partly swollen, sometimes fat, flabby face, they present the so-called *"torpid habitus."* This, in conjunction with the thick nose; thick upper lip, which is reddened and excoriated by an acrid nasal discharge; thick and red eyelids, which are spasmodically closed by every ray of light; and eczematous face, which is covered by yellowish-green scabs (papules, vesicles, and pustules), often render the diagnosis easy by mere inspection.

Swelling of the lymph-glands, particularly of the neck, inguinal and more rarely of the axillary regions, is the *first symptom of scrofula.* Roundish, pea- to hazel-nut or hen-egg sized, painless, glandular nodules, which are movable under the skin, are particularly observed under the jaw, on the sides of the throat, and on the upper portion of the neck. It must be remembered, however, that moderate swelling of the cervical, occipital, and auricular glands may occur independently of scrofula from irritation during dentition; eczema of the face and head [naso-pharyngeal catarrh], etc.; slight injuries, such as piercing the ears; and, finally, from leukemia and pseudo-leukemia. The scrofulous glandular enlargements usually persist for months or even years, often in conjunction with other symptoms of scrofula, and either subside gradually or, more often, develop into extensive, hard, painful infiltrations. The latter gradually redden, fluctuate, and, notwithstanding spon-

taneous or artificial evacuation of their contents, rarely cicatrize, but, on the contrary, very often give rise to ulcers with undermined edges, which heal with difficulty, and usually not until extirpated, leaving ugly, ropelike cicatrices.

The skin, subcutaneous tissue, and mucous membranes are the *next most frequent seats of predilection* for the disease. The external skin is most frequently affected by chronic eczema, particularly of the face, ears, and head; also by ecthyma, for example, of the back and nates, with slowly healing ulcerations. In the subcutaneous connective tissue there are found circumscribed hazel-nut sized infiltrations, which almost always, although usually very slowly, suppurate and thereby produce cold abscesses.

Finally, scrofula of the mucous membranes, particularly of the nose, ears, and eyes, is manifested by: *(a)* Chronic rhinitis with reddening of the mucous membrane; excoriations, swelling, and thickening of the external surface of the organ; and discharge of a sero-purulent secretion, which dries and obstructs the nares by yellowish-green scabs. *(b)* Chronic conjunctivitis, very often with formation of phlyctenulæ on the corneal border; strong lacrymation; marked photophobia; frequently also blepharo-adenitis, giving rise to a tendency to chalazion formation, madarosis, and callous thickening of the edges of the lids. *(c)* Fetid, sero-purulent, usually bilateral, otorrhea, sometimes as a result of chronic inflammation of the external auditory meatus, but also caused by otitis media, caries of the petrous portion of the temporal bone, or rupture of a glandular abscess in front or back of the ear into the meatus.

All these affections may gradually, usually after years, cause deeper destructions by spreading to the neighboring structures. Thus, the rhinitis may spread to the perichondrium and nasal cartilage, to the periosteum, muscles, and nasal bones and produce fetid suppuration, necrosis, and ulcerative destruction and considerable deformity. Indeed, it may spread even to the cribriform plate and meninges (lethal meningitis). Or, beginning with the nasal cavity, it may cause carious perforation of the hard palate; so that the oral and nasal cavities communicate. The conjunctivitis may spread to the cornea and cause opacity and ulceration. Even with a favorable course, the

opacities may not rarely persist for a long time or be permanent; while with an unfavorable course they may terminate in perforation, staphyloma, panophthalmitis and atrophy of the eye. The external ear trouble may spread to the tympanum, the mucous membrane of the tympanic cavity, or even to its osseous border; finally, to the petrous portion and the entire mastoid process. Ejection of small pieces of bone and even of the auditory ossicles may also occur. Sometimes profuse hemorrhages, development of fistulous tracts, and spreading to the petrosal sinus (meningitis, pyemia) supervene.

Other mucous membranes also may become affected: *(a)* The throat: there may be a tendency to angina, chronic pharyngitis, hypertrophy of the tonsils, and adenoid vegetations. *(b)* Genitalia: colpitis (vaginitis). *(c)* Air-passages: bronchial catarrhs, pneumonia, and stubborn affections of the air-passages leading to hyperplasia of the bronchial glands. *(d)* Intestines: diarrheas, which are usually very refractory to treatment. There is a greater disposition to hyperplasia of the mesenteric glands, which are very prone to undergo caseation and to form a *nidus* for miliary tuberculosis.

The third seat of predilection is the bony system. Localization is usually earliest in the phalanges of the fingers and toes and the metacarpal and metatarsal bones. In the phalanges scrofula manifests itself by hard, gradually enlarging, at first painless, normally colored, olive-shaped swellings *(spina ventosa s. pedarthrocace)*, which often persist for months, until, finally, the skin reddens and opens at one or more places, permitting the escape of a thin, purulent secretion from the fistulous tracts. The metacarpal and metatarsal bones sometimes undergo a similar destructive process. These extensive inflammations *(osteomyelitis)* starting from the interior of the bone, are very obstinate, inasmuch as the periosteum constantly generates new lamellæ from without, which are again destroyed from within. Furthermore they are frequently undoubtedly tuberculous in nature, *i.e.*, secondarily; originally being purely scrofulous inflammation. They eventually also affect the long, tubular bones; vertebræ *(spondylitis)*; also the cranial bones, the sternum, and ribs, and, finally, the joints, particularly of the elbow, hip, and knee (ankylosis of the joints, deformities).

The PROGNOSIS is relatively most favorable in spina ventosa and caries of the tubular bones. Here, after several years' persistence, elimination of the osseous particles with cicatrization sometimes takes place. Even here, however, after prolonged suppuration there is danger of hectic fever, cachexia, and amyloidosis. This danger is still greater in scrofula of other localities, owing to the development of very severe sequelæ, as a result of extension to neighboring parts—*e.g.*, in caries of the vertebræ (involvement of the spinal cord and its membranes); in caries of the ribs and sternum (implication of the mediastinum and pleura); in caries of the cranial bones (encroachment upon the brain, ear, etc.). Such severe processes, however, are not frequent under early and suitable treatment. The process is often limited from the beginning to single organs; thus, to glandular swelling, with or without blepharitis and skin eruptions, or to a combination of rhinitis and spina ventosa, etc. As long as scrofula is limited to chronic inflammation of soft structures (glands, skin, and mucous membranes), the prognosis regarding life is favorable; it is, of course, also doubtful owing to possible extension to more delicate parts. If bones and joints are affected the prognosis is bad.

TREATMENT.—The patients should first of all be placed under the most favorable conditions in regard to air (healthy, light, airy, well-ventilated dwellings; sent several years in succession for six to eight weeks at a time to the country, seashore, or mountains), nutrition (strengthening, mixed diet), care of the skin, etc. This is often sufficient to cure mild forms of scrofula. If this is not within the reach of the patient, substitution, which is not as beneficial, should be tried. Salt baths at home (from 1 to 5 pounds of sea or Strassfurter salt, also with the addition of from 1 to 2 pounds of motherlye—*e.g.*, of Kreutznach), but only every two to three days, as they are otherwise injurious. Of drugs, iodin is the best; also in combination with iron. It must be administered for months (see "Iodid of Iron," "Iodin," and "Iron"). In slim children codliver-oil acts splendidly, but it should be given only in the winter, in teaspoonful doses from two to three times a day, the dose to be gradually increased to a tablespoonful. In summer lipanin instead of codliver-oil, in similar doses. Malt-extract or malt-

beer is also quite useful. Some practitioners have seen good results from creosote *(q.v.)* and creosotal *(q.v.)*, and recently from myelen [ichthalbin *(q.v.)*]. All artificial nutrient preparations enumerated under anemia *(q.v.)* are useful also in scrofula, besides symptomatic treatment, *e.g.*, of the anorexia by orexin tannate and of the glandular swellings by massage with iodin or iodoform ointment or iodoform-vasogen; soft soap inunctions may be tried (from 1 to 2 teaspoonfuls). The soap should be rubbed in once a day in different regions. Attention should be paid to the rhinitis, eczema, etc.

Addison's Disease [Bronzed Skin] is very rare in children. Monti found only 11 cases in children among the 290 cases of all ages so far recorded. One was 3 and one 11 years old; the others were older. Since then (1878) a few more cases have been reported, 1 by Bar and Grandhomme ("Addison's Disease in the Newborn, with Hematuria, Without Changes in the Suprarenal Capsules"). The symptoms, prognosis, etc., are the same as in the adult. Tuberculosis of the suprarenals (once carcinoma of this organ) is a more frequent etiological factor in children than in adults. It is practically incurable. The future may yet enlighten us as to the value of suprarenal extract. The gastro-intestinal symptoms and the spasms which usually predominate in this disease must be combated symptomatically. As a rule, death occurs very rapidly and at times even suddenly.

XV.

Diseases of the Uro-Genital System.

Congenital Malformations, etc. (see pages 75 *et seq.*).

Nephritis.—Postmortem dissection of normal or slightly swollen kidneys of many children reveals a more or less extensive grayish discoloration of the cortical substance. This "cloudy swelling," which may finally lead to fatty degeneration, presents during life only a slight albuminuria [small hyaline casts are not infrequent]. This condition is observed particularly in small, atrophic children, or after exhausting diseases, especially if associated with great loss of fluids, such as dysentery, cholera, general tuberculosis, etc., and after severe acute infectious diseases such as pneumonia, typhoid, and scarlatina. In apparently healthy children (occasionally in brothers and sisters) the urine sometimes contains albumin, with very few, if any, organized elements, after exercise, sometimes even after changing from recumbent to an erect posture, but never early in the morning. It disappears after prolonged rest in bed—"*cyclical albuminuria.*" While the etiology is obscure, the suspicion of latent nephritis is justifiable.

Genuine nephritis in children is very rarely chronic. It is usually acute, and occurs most frequently after scarlatina. *Scarlatinal nephritis* will therefore be taken as an example in describing nephritis. Scarlatinal nephritis is usually interstitial, while diphtheritic nephritis is more parenchymatous. A little albumin in the urine is occasionally seen in the incubation stage of scarlet fever and sometimes a few casts. Not infrequently the latter alone are found. In severe cases of scarlatina (otherwise only exceptionally) pronounced nephritis is seen in the first or second week. As a rule, nephritis occurs rather as a sequel, usually on the twelfth to the fourteenth day and often not until three weeks or four to six weeks after eruption of the exanthema. It often occurs in spite of the most careful atten-

tion and nursing. Nephritis is sometimes quite mild and transient and rapidly subsides (often after hours) without any symptoms. Such attacks, however, should be taken seriously and treated properly, since otherwise severe nephritis not rarely develops later. In permanent albuminuria, even if severe in nature, weeks may pass without the nephritis causing any other symptoms except, perhaps, gradually increasing pallor of the skin.

Systematic examination of the urine is, therefore, very important. The urine is usually found to be scanty, but sometimes copious. It generally deposits a reddish-yellow sediment, which sometimes may be observed several days previous to the advent of albuminuria. It usually contains also a large quantity of urates, some red blood-cells, hyaline casts, leucocytes, and desquamated epithelium. These may not rarely escape detection until after repeated examinations. More frequently, however, the diagnosis can be made from other clinical symptoms, such as peevishness, anorexia, and headache. The disease occasionally sets in with complete anuria, which may last twenty-four hours. Edema is not rare at this time, and may vary in intensity even several times in one day. It sometimes involves only the eyelids and backs of the feet and the knuckles, but it may be present also in the greater portion of the body. Not infrequently it is barely perceptible; at other times it is so severe that the eyelids cannot be opened and the skin of the thigh bursts, macerates, and gives rise to extensive excoriations. In these cases the prognosis is unfavorable. On the other hand, the edema may be absent during the entire course of the disease.

During the later stages the urine is almost always scanty (sometimes strangury), acid, cloudy, reddish or dark yellow, and very often contains many red blood-corpuscles. In this form of hemorrhagic nephritis the color of the urine is cherry-gray or black-red. The number of lymph-cells and desquamated epithelial, hyaline (covered by blood and epithelial cells), and cylindrical casts gradually increases. It may here be mentioned that, as a rule, these ingredients are seen only in the sediment. Therefore the urine must be filtered or centrifuged before it is examined. Occasionally the urine contains also uric acid crystals and fatty and granular *detritus*. The albumin content, the

color of the urine, and the quantity of the organized elements vary greatly. Nephritis not infrequently manifests itself only by the abnormality of the urine just mentioned and by edema, while the general condition is barely disturbed. Under proper treatment recovery usually takes place within from two to three weeks. Relapse, however, must always be apprehended, for a recurrence of blood, albumin, and edema, even if only of short duration, is not infrequent. Therefore the *prognosis* should never be made absolutely favorable. Even with complete euphoria serious symptoms, such as uremia, may set in. The prognosis should be guarded, particularly in cases with extensive anasarca and scanty urine, even though the general condition is good. In mild cases, also, dropsical effusions in internal cavities are not rare (most frequently ascites, more rarely pleural and pericardial effusion), which render the prognosis considerably worse, especially if ascites is associated with hydrothorax.

A pericardial effusion is usually observed in fatal cases in the latest stages. Sudden pulmonary edema is the most dangerous complication of nephritis. Edema of the glottis is more rarely observed. Furthermore, vomiting—which is, however, not always uremic in nature nor a bad sign—is one of the most frequent symptoms. There is usually constipation, but rarely diarrhea. If the latter occurs, caution is demanded, since nephritis is occasionally associated with diphtheritic inflammation of the intestinal mucosa, which may run a more or less latent course. Fever is often absent; indeed, the temperature is occasionally subnormal. It may be present, however, either only in the beginning (from 101° to 104° F. for a few days) or for weeks, with a normal temperature in the morning and exacerbations (from 101° to 102 $^1/_2$° F.) in the evening. There may also be ephemeral febrile attacks with an otherwise normal course. Not infrequently the fever is a result of an inflammatory complication which occasionally may accompany even the mildest attacks of nephritis, *e.g.*, bronchitis, pneumonia, pleuritis (often the cause of death), rarely peritonitis, pericarditis, and endocarditis. The latter is often latent and escapes superficial examination of the heart.

The pulse in nephritis is not rarely slow (even as low as 48 beats to the minute), but it is very intense and sometimes irreg-

ular even without any anomaly of the heart or disturbance of the general health. This symptom is often insignificant and disappears within a few days or weeks. It may, however, prove to be the onset of uremia. Cardiac debility also is not rare. It is particularly to be apprehended in nephritis, owing to the tendency to serous exudations and consecutive passive congestion of the lesser circulation, which may readily give rise to pulmonary edema. The left ventricle very often becomes slightly hypertrophied and dilated during the course of nephritis. The more intense the nephritis and the more scanty the secretion of urine, the more rapid the development of cardiac complications. On the other hand, mild nephritis usually remains free from them. Acute cardiac hypertrophy just referred to is rarely discernible clinically; indeed, in some cases there may be no alteration of the pulse; on the other hand, the pulse may be altered without any anomaly of the heart. In mild degrees of nephritis the cardiac anomaly usually does not persist, or it is gradually equalized, so that the heart is later perfectly sound. Uremia *(q.v.)* is another complication that must always be guarded against in nephritis. Even in the mildest cases the duration of nephritis is from two to three weeks, and usually much longer. Transition into chronic nephritis is rare; the kidneys, however, remain a *locus minoris resistentiæ* for years.

Treatment.—First of all, rest in bed and strict diet. The latter should at first consist of milk gruel and bouillon. After from two to three weeks some white meat and egg may be allowed, but no tea, coffee, or alcohol, except when especially indicated. In the absence of diarrhea the treatment should be begun with a purge, to be given two or three days in succession, such as:—

℞ Infusi sennæ compositi,
Syrupi spinæ cervinæ.....aa 25.0 [3vj].
M. Sig: One teaspoonful every two hours.

This treatment is often sufficient in mild cases. It may be combined with a diuretic, especially potassium acetate *(q.v.)*, digitalis, or (in anemic and debilitated children) with decoction of cinchona (see "Potassium Acetate"). Diuretin [or theocin]

and the recently recommended uropherin are also useful. In addition to these, Wildunger or Biliner (from 2 to 4 wineglassfuls a day). Diaphoretics, such as daily warm baths (96° to 100° F.) followed by rolling the patient in blankets (pneumonia is no contra-indication), and also pilocarpin *(q.v.)* may be tried. In bloody urine: sesquichlorid of iron *(q.v.)*, ergot *(q.v.)*, tannin *(q.v.)*, or quinin tannate *(q.v.)*; the latter two drugs may also be tried in otherwise obstinate cases of nephritis, especially if edema is not pronounced. Cupping, from six to ten dry cups over the region of the kidney, should only exceptionally be resorted to, *e.g.*, when the urine is very scanty, or in anuria with fever, or (rarely) in severe pain. In all these cases venesection is often quite effective. Regarding the treatment of uremia, see next page.

Aside from scarlatina, nephritis also occurs in other diseases, particularly in diphtheria, and more rarely in morbilli, varicella (once also after vaccination), pneumonia (pneumococcic nephritis), and intestinal catarrh (bacterium coli). It is also occasionally observed in intermittent and typhoid fever, influenza, epidemic parotitis, pertussis, erysipelas, and chronic eczema. It is also artificially produced by the internal use of potassium chlorate, turpentine, cantharides, antitoxin, etc.; by external application of tar, balsam of Peru, tincture of iodin, and carbolic acid. "Catching cold" is certainly also a cause of nephritis. In newly born infants albumin is sometimes found in the urine without any apparent cause. It usually soon disappears, but it is sometimes followed by severe nephritis. Children are occasionally affected by edema *(q.v.)* without albuminuria.

Chronic Nephritis is rare in childhood. It is usually caused by acute nephritis, syphilis, and tuberculosis. The course is the same as in adults, and the treatment is almost the same as that of acute nephritis.

Uremia is not a rare complication of even mild cases of nephritis, and is generally, but not always, preceded by marked diminution of the urinary secretion up to complete anuria. Not infrequently, without any prodromata or after vomiting, headache, dizziness, sometimes also somnolence, amblyopia, retardation and arhythmia of the pulse, and epileptiform convulsions

of variable intensity and extension set in and recur in rapid succession for hours or days. Occasionally single groups of muscles or half of the body is involved and not rarely the convulsions are general and violent. During the attacks there is usually total loss of consciousness, reflex immobility of the pupils and often high fever, sometimes followed by sudden marked drop of temperature, up to fatal collapse. During the intervals there is either complete sopor or at least somnolence or states of excitement, raving, or happy delirium.

The PROGNOSIS is generally bad, but sometimes [often] is favorable in scarlatinal nephritis. Not infrequently deafness, amblyopia, and amaurosis are left behind; in some cases these sequelæ may disappear after hours or days [see page 182]. More rarely uremia is followed by aphasia, hemiplegia, ataxia, and mental weakness.

TREATMENT.—In strong children with tense, hard pulse: five to six wet cups behind the ears or at the temples (no after-bleeding is to be allowed!), or venesection, icebag to the head, strong purgation, and a diaphoretic (pilocarpin hypodermically [theocin by mouth]) may be tried. In weak patients: stimulants, warm baths, with subsequent packing. For the convulsions also chloral hydrate [morphin (see page 184)].

Pyelitis and Pyelonephritis are by no means rare diseases of childhood. They often occur as sequelæ of cystitis or acute infectious diseases, such as scarlatina, diphtheria, variola, cholera Asiatica, and pyemia. More rarely they are results of stones or tumors (tuberculous!), and, still more rarely, they develop idiopathically ("catching cold"). They are more frequently seen in intestinal affections, either mild in form, as in dyspepsias with constipation, or severe (almost always fatal), as in violent summer diarrheas and other intense gastro-intestinal affections. The bacterium coli is frequently found, particularly in girls, as the exciter of pyelitis. Infection probably takes place from without, but that bacteria migrate from the intestines or by way of the blood is also quite certain. Pyelitis sometimes occurs in gonorrheal vulvo-vaginitis.

The SYMPTOMS [rigors, high and fluctuating temperature, frequent and scanty urination, pyuria, pain in the lumbar region; also symptoms of nephritis, which is the principal source

of danger—SHEFFIELD], termination, prognosis, etc., of pyelitis and pyelonephritis in children are the same as in adults.

The TREATMENT also is based upon the same principles: Thus, elimination of the fundamental disease if possible; rest in bed; milk diet; trial with tannin, infusion of uva ursi folia, sodium salicylate [sodium benzoate, urotropin], salol, but chiefly drinking of Wildunger, Vichy, and Ems water; narcotics, if the pain is severe.

Hemoglobinuria occurs in children either in epidemic form, as Winckel's disease *(q.v.)*, or sporadically after burns, as a result of poisoning by phosphorus, potassium chlorate, arseniureted hydrogen gas, carbolic acid, and morels, and in acute and chronic infectious diseases, such as scarlatina, diphtheria, erysipelas, intestinal catarrh, intermittent fever, and hereditary syphilis. Sometimes it is hereditary. In other cases hemoglobinuria appears in paroxysms *(paroxysmal hemoglobinuria)*.

The ETIOLOGY is often very obscure. Occasionally, with initial vomiting and chill and symptoms indicating a state of a more or less severe ill health, a dark discoloration of the urine suddenly appears in the previously healthy child. The color of the urine is mahogany-brown to black, has a high specific gravity, and forms a brownish coagulum on boiling. Microscopically the urine is found to contain brown granules and several hyaline casts, but no red blood-corpuscles. The spectroscope reveals the bands of hemoglobin. It is occasionally also associated with transient exanthemata of different nature and also albuminuria. The attacks usually last several hours, during which time the little patients appear very sick; they are cold, cyanotic, peevish, have a weak pulse, and at times high fever. Gradually the urine becomes lighter and the other symptoms disappear, so that after one day at the latest there is complete euphoria. The attacks are sometimes observed to occur regularly after exposure to cold or severe muscular exertion. In paroxysmal hemoglobinuria the children must be guarded against these influences.

The TREATMENT during the attack consists of rest in bed and a copious supply of liquids. In every case it is important to inquire as to the existence of syphilis, malaria, etc., in order to remove the trouble by remedying the underlying disease.

Stones in the Kidney [Renal Calculus, Nephrolithiasis] may occur in children of any age and give rise to symptoms identical with those observed in the adult. [Sudden attacks of pain in the lumbar region, shooting down along the course of the ureters, and extending to the testicles, groins, and thighs. There may be vomiting, nausea, and even collapse. The urine is passed frequently, in small quantities, and contains blood. The urine may, however, be normal if it comes exclusively from the other free kidney. On the other hand, there may be complete anuria if both ureters are obstructed. The stone may sometimes become impacted in the ureter and give rise to hydronephrosis or pyonephrosis or even pyelonephritis. — SHEFFIELD.] It is caused by an hereditary disposition, uric acid diathesis, improper feeding, etc.

In the TREATMENT of this condition it is important to regulate the diet of predisposed children and to avoid digestive disturbances. If stones are present, a copious supply of alkalies in the form of mineral water or medicines (sodium bicarbonate or lithium carbonate [piperazin]; in oxalate calculi sodium phosphate) is most effective. Moderate physical exercise (practice of gymnastics) to stimulate metabolism may be recommended. In renal colic: heat (poultices, baths), opium or morphin [codein with phenacetin], chloral hydrate (internally or by enema). [In severe cases operation is indicated.]

Movable Kidney [Ren Mobilis].—Movable kidney occurs also in children; it is only occasionally congenital. Sometimes only the tendency to misplacement of the organ is congenital—*e.g.*, owing to very long renal blood-vessels, folding of the peritoneum, or weak condition of the perirenal connective tissue. Slight injuries, such as a kick or blow in the loin or buttocks, brisk jumping, severe physical exertion, obstinate cough, vomiting and straining, or too tight lacing (corset) may often cause movable kidney at an early age. This condition can usually be remedied by a well-fitting abdominal supporter.

Tumors of the Kidney.—Usually the greatest variety of medullary myxosarcomata and cystosarcomata are found in children. Some of these tumors develop during intra-uterine life and grow very rapidly after birth, often reaching an enormous size. Kidney tumors are almost always unilateral; the urine,

therefore, sometimes manifests no characteristic changes. As they can rarely be outlined, and as other signs are usually absent except that the intestines are pushed forward (so that they sometimes contrast by sharp contours) and that symptoms of bad general health, emaciation, etc., are occasionally present, the diagnosis can frequently not be made. Tumors of the kidney are often manifested by hematuria, even before the tumor is palpable and while the general condition is good. If a diagnosis is possible the tumor should immediately be extirpated (see also "Echinococcus"). The results of an operation are sometimes good, but more frequently there is a recurrence.

Cyclical Albuminuria ([Physiological] or Functional Albuminuria) affects especially young individuals. The excretion of albumin in the urine occurs only at certain times of the day, especially when changing from rest to exercise. Thus, while the urine remains free from albumin during rest, it appears in the morning soon after rising *(orthotic albuminuria of Heubner)*, increases in intensity until evening, and disappears at night. Under proper care and treatment the albumin disappears entirely after a time, but may return after a shorter or longer interval *(intermittent form)*. No morphological constituents are found in the urine, and no evidences of any organic disease. The patients are often pale, weak, etc., but are otherwise healthy. The albuminuria affects the system very little. The nature of the disease is as yet very obscure. In some cases it was preceded by a diphtheritic or scarlatinal nephritis, which was cured long before. Sometimes it can be traced to a family predisposition. Heubner looks upon cyclical albuminuria as an expression of general debility.

The PROGNOSIS is, in general, good, but must be given with reserve, although thus far no attacks of true renal disease ever followed [?].

TREATMENT.—Rest in bed for some time; living in dry, sunny, airy rooms (country). Avoidance of corporal and mental fatigue, as well as exposure to cold (woolen underwear!). The diet should be bland and nutritious for a long time. Spices and alcoholics should be avoided. Medicinally: iron [*e.g.*, hemogallol, and alkaline waters, if the urine is of high specific gravity.—SHEFFIELD].

Diabetes Mellitus [Glycosuria] is not at all rare in childhood and has been observed even in the first month of life.

ETIOLOGY.—Heredity (neuropathic, syphilitic), traumatism (head), severe diseases, especially acute infectious diseases, protracted gastro-intestinal affections, exposure to wet, hydrocephalus, and syphilis.

The course is almost the same as in adults, but frequently much quicker and more severe. The onset is often very sudden; at times death takes place within a few days. Some cases, however, run a slower course, up to two years (rarely longer). There are usually emaciation in spite of good appetite, dry and hard skin, marked increase in the quantity of urine, usually with a larger quantity of sugar than in adults, enuresis nocturna and diurna, change in disposition (excitable children become quiet and silent), frequent pulse, later also digestive disturbances, skin affections, such as furunculosis, abscesses and onychitis, cataract, and nervous diseases. Friedreich's ataxia is frequently complicated by diabetes mellitus. Death usually takes place from exhaustion or intercurrent diseases (pneumonia) and frequently with coma. In children its termination in phthisis is rare.

The PROGNOSIS is unfavorable and recovery rare.

TREATMENT.—First of all, strict diet. In small children milk (sour milk may be tried), also amylaceous food (to be considerably restricted), can hardly be dispensed with. In larger children chiefly meat, with spinach, asparagus, and the like [diabetin]. Fresh water; saccharin instead of sugar; Carlsbad water (3 to 4 wineglassfuls a day); also natural Carlsbad salts with sodium bicarbonate ($^1/_2$ to 1 teaspoonful twice a day). In older children sodium salicylate, from 3 to 6 grams [gr. xlv to ʒiss] *pro die,* may be tried; and also antipyrin. Arsenic is sometimes effective [as are, also, hemogallol, ichthalbin, and codliver-oil].

Diabetes Insipidus is rare in children, but has been observed in infants only a few months old.

ETIOLOGY.—Heredity, trauma (head), peripheral injuries (once it was caused by an insect-bite), brain diseases (tuberculosis!), syphilis, alcoholism, masturbation, and febrile affections, such as infectious and gastro-intestinal diseases.

The SYMPTOMS are identical with those in the adult. Thus, excessive thirst, polyuria [free from sugar], dry skin, etc. The course is very protracted.

The PROGNOSIS in regard to permanent recovery is very doubtful; only alcoholic and syphilitic diabetes insipidus is easily curable. The prognosis regarding fatal issue is favorable. The patients often remain backward in development.

TREATMENT.—Suitable diet, largely of meat; plenty of fresh air, with moderate exercise. Carlsbad water, strychnin, ergotin, or belladonna are sometimes effective (usually transient!); sometimes also arsenic and opium.

Cystitis is not rare in children. It is observed even in babies, especially those who are atrophic and delicate. It is usually secondary to concretions (see "Stones in the Bladder"), foreign bodies, and tumors in the bladder, or inflammation of the kidney and the pelvis of the kidney (on the other hand, neglected cystitis may extend upward through the ureter and cause pyelitis, etc.), urethra, vulva, and vagina (gonorrhea). Cystitis occurs also in severe infectious diseases, *e.g.*, scarlatina, diphtheria, typhoid, cholera, and tuberculosis. It may follow catheterization and chemical irritation (cantharides, balsams, fresh beer!). Invasion of the bacterium coli commune may also give rise to cystitis (see "Colicystitis"); and, finally, general or local colds (sitting on cold stones, grass, etc.) may cause it.

The symptoms are identical with those in the adult. Sensitiveness and tenesmus vesicæ (also recti) and painful micturition—small children cry before voiding a few drops of urine. The urine is cloudy, acid, neutral, or even alkaline, and contains numerous bladder epithelia,—in diphtheria at times whole membranes,—pus-corpuscles, frequently mucous shreds, and rarely traces of albumin. The urine, by irritating the external genitalia, may also produce moderate leucorrhea in small girls! In acute cases there are more or less fever and alteration of the general health, such as restlessness, lack of appetite, etc.

TREATMENT.—A laxative (calomel), rest in bed, bland diet, milk, eggs, and abundance of plain or carbonic mineral water. To relieve pain Priessnitz compress and warm baths, or suppositories of narcotics [and anodynes]. Internally extract of hyoscyamus [urotropin], uva ursi leaves, salol [sodium ben-

zoate], tannin, potassium chlorate, or sodium salicylate. In chronic cases local irrigations (from two to three times daily by means of Nélaton's catheter) with lukewarm solution of boric acid (1 to 3 per cent.), ichthyol ($^1/_2$ per cent.), creolin, lysol [or tricresol ($^1/_4$ per cent.)] or potassium permanganate (1 to 1000).

Colicystitis is a very frequent disease of the bladder, especially in girls. It has only recently received deserving attention (Escherich, Trumpp). It is chiefly due to the entrance of the bacterium coli commune into the bladder. There are two varieties of colicystitis. A *mild* form, which is distinguished by local symptoms, such as troublesome vesical tenesmus; sensitiveness over the region of the bladder; dustlike, cloudy, or finely flocculated urine, which is either normal or meat-juice-like in color, always acid, and contains, commensurately with the content of pus, some albumin and isolated bladder epithelia in addition to the bacteria just named. Recovery usually takes place within from one to two weeks after proper treatment (see further) and often also spontaneously; otherwise it terminates in the second, or *severe*, form, which, aside from the local symptoms just mentioned, is more intense (*e.g.*, fetid odor, larger quantity of pus and albumin, more pronounced cloudiness); it is also associated with general, often intense symptoms which greatly undermine the patient's health, such as vomiting, anorexia, and high, chiefly intermittent, fever. The course of the disease is very obstinate, often lasting weeks and months, but with proper treatment it is nevertheless curable, although it is very frequently accompanied by sequelæ and danger of ascending nephritis (not rarely with fatal issue!). Colicystitis occurs often secondarily, notably in severe enteritis, under which circumstances it sometimes runs a latent course. Owing to the preponderance of female patients, it was originally assumed that the bacteria migrate directly through the short and wide female urethra; but, as boys are also subject to it, it is more likely that the bacteria enter the bladder through the intestinal mucous membrane, which is not intact in enteritis. Some chronic cachectic conditions following intestinal catarrh, which are at present looked upon as anemia or hydrocephaloid, may be due to cystitis or pyelitis produced by the colon bacillus.

The PROGNOSIS is favorable.

TREATMENT.—Irrigation of the bladder with from 50 to 150 grams [℥ii-v],—depending upon the capacity of the bladder,—of a $^1/_4$ per cent. lukewarm lysol [or tricresol] solution to be retained for a few minutes. Internally salol, 0.25 to 0.5 [gr. iv-viij] three times a day [and urotropin].

Bacteriuria refers especially to the presence of the bacterium coli commune in the urine as it occurs in colicystitis *(q.v.)*. According to Nicolaysen, this bacterium is also found in some cases of enuresis (especially diurnal), so that a certain as yet unknown relationship seems to exist between bacteriuria and incontinence of urine. Rovsing met bacteriuria in two cases of renal calculi. The urine of nephrolithiasis should therefore be examined for bacteriuria, and, on the other hand, on finding the latter, nephrolithiasis should always be suspected.

Chyluria, lymph in the urine, manifests itself as a milky cloudiness and is frequently observed in the tropics, caused by the *Filiaria sanguinis*. Bouchet saw it once in a Parisian hysterical girl, 15 years of age, and Jacobi in a child 11 years old (etiology unknown). [Caillé recently saw a case of chyluria in a girl, 12 years old, born and raised in New York. The etiology could not be determined.—SHEFFIELD.]

Stones in the Bladder [Vesical Calculi] of all kinds—urates, oxalates, phosphates—are frequently observed in children, especially in boys, from 2 to 7 years of age, but they also may be seen in children only a few months old. As a whole, the symptoms are the same as in adults, namely, painful urination, severe vesical tenesmus (small children cry continuously) with the escape of but small quantities of urine. The stream of urine is often interrupted in the midst of urinating, and further urination is possible only in certain positions of the body. Sometimes there is complete anuria, which may continue for several days and cause enormous distension of the bladder. Sometimes, again, there is continuous dribbling of bloody urine and occasionally passage of small stones or impaction of a large calculus in the urethra. In the latter event there is anuria, severe pain, edema of the genitals, and not rarely also reflex spasm and convulsions. If the disease is of long duration it is

complicated by cystitis, catarrh of the renal pelvis, and prolapsus ani. Henoch advises search for stone in the bladder in every case of persistent prolapsus ani, especially in boys who have passed beyond the period of second dentition. Finally elongation and hypertrophy of the penis, owing to frequent manipulation during urination, and pain, which is often localized chiefly in the anterior portion of the urethral canal, are characteristic symptoms. Most children with vesical stones are usually very much debilitated. In large, rough stones, which are also found in small children, pericystitis and also fatal pelvic abscesses may develop, if the disease is not diagnosticated and treated in time. In every case of suspected vesical calculus, particularly in every case of chronic dysuria with or without cystitis, an exploration of the bladder with a sound, best done under anesthesia, should be made.

In mild cases the same (medicinal, dietetic, bath, etc.) treatment as in the adult should be employed. As a rule, however, operative interference is unavoidable. Opinions differ as to the most suitable method for children. The majority are in favor of suprapubic lithotomy, but other methods also have strong advocates.

The PROGNOSIS is always dubious even after operation. It depends upon the general condition of the patient and upon secondary changes in the bladder, ureters, kidneys, etc.

Prolapsus (s. Inversio) Vesicæ Urinariæ through the urethra or vagina is sometimes observed in girls, *e.g.*, in dysentery. It manifests itself by a reddish or livid tumor, from which urine dribbles, causing urinary disturbances. It is usually successfully treated by reposition and suitable bandaging to retain the prolapsed portion in place.

Tumors of the Bladder are very rare in children. They may occur either secondarily to tumors of neighboring organs, *e.g.*, carcinoma of the prostate, or primarily, particularly in the form of papillomata, sarcomata, myosarcomata, and occasionally also carcinomata and fibromata. The symptomatology is identical with that in the adult. It is often mistaken for stone in the bladder.

In malignant tumors the PROGNOSIS is naturally bad.

TREATMENT.—Extirpation by suprapubic incision.

Spasm of the Bladder (Spasmus Vesicæ, Cystospasm) occurs at times in the newly born as a result of physiological uric acid infarct. Later in life it is due to an abnormal amount of uric acid or phosphates in the urine, to renal gravel, flatulence, cold (*e.g.*, cold baths), and drinking of fresh beer. It may occur also in hysteria and onanism. It manifests itself by intense pain. Small children become restless, cry, draw the legs up against the abdomen spasmodically; often priapism in boys, and temporary anuria (the bladder is distended with urine). It is differentiated from intestinal colic by the absence of intestinal disturbance, and by the presence of distension of the bladder. The napkins are found dry for an unusual length of time and the patient does not obtain relief from pain until after the bladder is emptied. It must be learned if the dysuria is due to other causes, such as cystitis, vesical calculi, phimosis, etc.

The TREATMENT consists of catheterization, local heat, and narcotics (suppositories). [Abundance of water with alkaline diuretics; small doses of urotropin and hyoscyamus.—SHEFFIELD.]

Dysuria is usually caused by concretions in the urinary system, but the passage of a very concentrated acid urine through the urethra, during high fever, may also give rise to painful micturition. The same is the case in cystitis. Furthermore dysuria may be produced by anomalies of the external genitals, such as phimosis, atresia of the glans or prepuce, and adhesion of the labia minora, gonorrhea (male or female), and also by other forms of vulvitis (*e.g.*, following scarlatina).

[Anuria (Idiopathic) is an arrest of urinary secretion, without definite cause. It is to be distinguished from *suppression* of urine, often associated with renal and vesical disease, and from *retention* of urine, which is observed in acute diarrhea with copious intestinal discharges. Idiopathic anuria seems to be of nervous origin. I recently saw a case of this form of anuria of over twenty-four hours' duration in a boy 10 months old. The infant was otherwise in the best of health. On catheterization the bladder was found empty. According to Holt, this condition is not very uncommon in infants and may continue for from twelve to thirty-six hours. (See also "Cystospasm.")

TREATMENT.—Plenty of water, alkaline diuretics, and hot fomentations over the kidneys.—SHEFFIELD.]

Hydronephrosis (see page 75).

Polyuria.—Aside from polyuria associated with diabetes, there is also an innocent polyuria which occasionally develops after acute infectious diseases, *e.g.*, typhoid, and which under certain conditions is curable by rapid elimination of certain effete products. Furthermore, hereditary polyuria, which in some families runs through several generations, is not injurious to health. Finally, polyuria may be a symptom of localized cerebral disease, such as syphilis or tuberculosis, and of rachitis.

Enuresis (Bed-wetting) denotes an involuntary voiding of urine, that usually occurs in the night *(enuresis nocturna)*, either every night (as a rule, once or twice in the first few hours of sleep or toward morning) or at intervals of days or weeks; or, more rarely, during the day *(enuresis diurna)*. Enuresis is rarely caused by atony of the sphincter vesicæ (occurs rather exceptionally in healthy children), more frequently by general debility, as, for instance, after severe diseases, notably infectious diseases, and also by diseases of the spinal cord. Enuresis usually results from spasm of the detrusors. Sometimes it is merely a question of a purely functional anomaly, a neurosis, which is characterized by an increased reflex irritability of the muscles of the bladder and sometimes by a discernible hyperesthesia of the neck of the bladder. In such patients there are usually an hereditary tendency and neuropathic predisposition, and not infrequently other symptoms, such as irritability, increased patellar reflex, spasms, psychical alteration, *pavor nocturnus*, etc., are present. Also psychical irritability, colds, masturbation, and the like sometimes form predisposing causes. Enuresis is frequently due to other pathological processes, which act reflexly upon the muscles of the bladder. Thus, it may be a symptom (sometimes the first) of diabetes mellitus or nephritis. Overloading of the urine with lithiates or phosphates may cause enuresis and the same may be said of cystitis, vesical or kidney stone, tumors of the bladder, adhesions of the prepuce, hypertrophy of the clitoris, phimosis, epispadias, hypospadias, stricture of the urethra, vulvo-vaginitis, fissura ani, proctitis, gonorrhea, accumulation of fecal masses, worms, adenoid vegetations, and undescended testicle.

The study of such etiological moments is very important for the treatment, as enuresis often disappears without further treatment after removal of the causes. Therefore, before instituting any method of treatment, it is advisable first to look for the causes just mentioned and carefully to examine the whole body. Often nothing is found.

TREATMENT.—An attempt must then be made to remedy the enuresis in some other way. This is not very difficult in some cases, but requires a great deal of patience in others. In atony of the bladder and in simple nervous predisposition this is usually attained internally by general tonics and locally by cold spinal douches or a moderate galvanic current, one pole being placed on the symphysis or in the rectum, the other on the perineum. Some attribute the good results obtained to psychical influences, but the same may be said also of all other methods of treatment. Indeed, many cases of enuresis may almost miraculously be arrested by suggestion, through fear of painful and operative interferences. Warm baths and cold douches [also sinapisms over the lumbo-sacral regions] should be resorted to, especially in hyperesthesia of the bladder. In obstinate cases, stretching of the posterior part of the urethra —in boys with Oberlaender's dilator, in girls with metal catheters, which are introduced daily with moderate pressure—and cauterization of the neck of the bladder are deserving of trial.

Medicinally, chloral [or sulphonal] may be ordered at night, or strychnin may be given subcutaneously ($^1/_2$ to 1 milligram [gr. $^1/_{120}$ to $^1/_{60}$] daily) or tincture of nux vomica by mouth *(q.v.)*. In spasms of the detrusors atropin or extract of belladonna (evenings, 0.005 to 0.01 [gr. $^1/_{12}$ to $^1/_6$]) may be tried; or extract of rhus aromatica (1 to 2 drops three times a day according to age).

In every case dietetic measures are of value: no irritating foods or drinks; avoidance of drinking for several hours before bedtime! As it has been determined that children usually wet the bed when lying on their backs, this habit must be corrected. On the other hand, enuresis may sometimes be cured by allowing the child to lie on the back in such a manner that the head and trunk lie deeper than the buttocks. It is done by raising the lower end of the bed. This prevents the urine from flowing

toward the pars prostatica and from causing a contraction of the bladder. Enuresis usually ceases spontaneously at puberty. Finally, it is well to remember that enuresis is not necessarily due to a pathological condition, but merely to laziness and a bad habit. In the latter event it is usually quickly arrested by remonstrance or by threatening a painful surgical operation. [In enuresis due to atony:—

℞ Extracti ergotæ fluidi..... 12.0 (3iij).
Extracti rhois tox. fluidi..... 4.0 (3j).

M. Sig.: Five to ten drops every four to six hours to a child 6 years old.

In enuresis associated with hyperesthesia of the neck of the bladder or spasm of the detrusors:—

℞ Extracti hyoscyami ..... 2.0 (3ss).
Natrii bromidi ..... 4.0 (3j).
Aquæ anisi ..... 30.0 (℥j).
Syrupi simplicis .....q. s. 60.0 (℥ij).

M. Sig.: One teaspoonful every four to six hours to a child 6 years old.

In all cases it is very important to instruct the patient (if old enough) not to abstain from micturition when called upon by nature to do so, and to train small children to void urine about every three hours, and not to permit them to hold the urine for a longer period. This is very important, for overdistension of the bladder and retention of the urine for hours in the bladder favor decomposition and are often the primary cause of the secondary etiological factors, such as atony or hyperesthesia of the bladder, presence of concretions, cystitis, etc.—SHEFFIELD.]

Onanism [Masturbation] is an extremely common vice in children. Small children and even sucklings sometimes indulge in it. They are observed to rub their thighs against each other or against the breast of the wet-nurse and manifest a peculiarly excitable behavior. Rocking motions of the upper part of the body also are observed. In larger children the act itself is only exceptionally seen, but the remaining effects on the system are frequently indicated by their flushed cheeks, glistening eyes,

accelerated breathing, etc. If onanism has been practiced for some time an examination of the genitalia shows that in boys the penis is much longer and thicker than normal, and that girls suffer from vulvitis and vaginitis. Spots on the clothing and other apparel, which are often remains of pollution and spermatorrhea in boys and of leucorrhea in girls, confirm the suspicion. More frequently the attention to the vice of the patient is not attracted until the development of the more remote results of onanism already mentioned on several occasions. In some cases of onanism the general health is not affected and the children continue the practice unpunished. As a rule, aside from the local symptoms just mentioned other consequences are soon detected. The children are languid, suffer from headache, palpitations, mental and physical relaxation, anemia, emaciation, and change of demeanor—*e.g.*, a bashful shyness, apathy, and even pronounced hysterical and neurasthenic manifestations, psychical alteration, etc.

All these symptoms should awaken the suspicion of onanism. Children of psychopathic parents are especially prone to onanism; but other disturbances of health, such as itching from skin eruptions upon the genitalia, accumulation of smegma, phimosis, vaginitis, friction of the genitalia during physical exercise, oxyurides, renal calculi, etc., may frequently act as etiological factors. Finally, persuasion on the part of playmates, especially in schools and boarding houses, or vicious wet-nurses, servant-girls, governesses, erotic pictures and lectures, and many other things arouse and stimulate the vicious habit.

Sound mental and physical training; sleeping on a hard mattress; rising early in the morning; outdoor life; avoidance of overloading the stomach, of alcoholics, irritating food, and beverages; regular attention to bowels; and careful selection of studies, associates, and diversion will prove effective in the prevention of onanism. Naturally all this must be allowed to take firm root, if the child had already acquired the bad habit. In this event it is difficult to remedy the evil in larger children. Favorable results, however, are often obtained with good words, elucidation of the vice and its consequence, careful watchfulness, severe punishment, etc. By timely administration of

bromids a cure may often be obtained. [Masturbation is frequently a symptom of mental degeneration—*e.g.*, idiocy. Removal of the etiological factors, such as elongated prepuce or clitoris, and application of mechanical devices to restrain the practice of onanism are often very helpful in effecting a cure.—SHEFFIELD.]

Gonorrhea appears in the newborn as "ophthalmoblennorrhea" *(q.v.)*, which, on conveyance of the pus from the eyes to the genitalia, may also give rise to gonorrheal vulvo-vaginitis. The latter disease, however, is much more frequently found in older girls, in whom most, but not all (see "Vulvo-vaginitis"), vaginal discharges (leucorrhea) may be traced to gonorrhea.

The DIAGNOSIS is made positive by the demonstration of the gonococcus. The other symptoms of vulvo-vaginitis in children are the same as in adults. Usually the urethra is chiefly involved by this process, and, as a rule, direct pressure causes a few drops of pus to exude from the urethra. The latter is a pretty certain differential sign from simple vulvo-vaginitis, which is not specific in nature. Sometimes hemorrhages occur and are often mistaken for metrorrhagias and precocious menstruation. These are really due to prolapse of the urethral mucosa or vegetations therein.

The ETIOLOGY is not always traceable to a direct sexual act, but to transmission by parents, brothers, and sisters, etc. Soiled clothing, sponges, diverse articles in use, bedding, and the like play an important rôle.

The TREATMENT is usually tedious. Strictest cleanliness is imperative. In addition to regular hip-baths and ablutions of the external genitals (liquor aluminium acetatis, 2 teaspoonfuls to $^1/_2$ liter of water), the vagina is washed out at first from three to four times daily until the irrigating water returns clean. The irrigation is done by means of an irrigator or syringe with a small, thin, rubber tube [catheter] attached, with antiseptic solutions, such as potassium permanganate (1 to 1000), corrosive sublimate (1 to 2000), or formalin (10 to 100; 1 tablespoonful of this solution to 1 liter of water). Soon astringent irrigations, such as zinc sulphate or zinc sulphocarbolate ($^1/_2$ to 2 per cent.), ichthargan (1 per cent.), alum, or zinc chlorid ($^1/_4$ per cent.), are to be used. Also daily swabbing of the vagina with ichthyol

(1 to 10 of glycerin) or instillations of silver nitrate (1 to 3 per cent.) are at times very efficient in obstinate cases. Some practitioners introduce iodoform bougies (see "Iodoform"). Whitthauer recommends the introduction of 3 per cent. alumnol bougies (six centimeters long) every third day, and at intervals hip-baths twice daily to cleanse the external genitalia. Ointments of ichthyol or iodoform (1 to 30) may be applied to the vulva; also fomentations of lead-water are to be employed. The attendant must endeavor to keep the children from scratching the genitalia, as the disease may in this way be carried to their eyes or to those of other persons. Gonorrhea in children is also liable to give rise to metastases. Frequently arthritides—the so-called gonorrheal rheumatism, usually monarticular, notably that of the knee—were observed, with or without involvement of the tendinous sheaths; also endocarditis, pleuritis, etc. The gonococci may also migrate directly into the bladder, uterus, etc., and cause purulent salpingitis and even death (with pyemic symptoms; see also "Vulvo-vaginitis").

Gonorrhea is observed in boys more rarely than in girls. Several cases of true gonorrheal urethritis are on record which developed through manipulation or attempts at cohabitation and the like. Gonorrhea should therefore be suspected in every case of dysuria in boys. The symptomatology as well as treatment of this disease is the same as in adults. Even postgonorrheal strictures occur.

Vulvo-vaginitis.—While this affection is by no means always caused by stuprum, it is generally gonorrheal in nature (see "Gonorrhea"). Cases are observed, however, which are due simply to uncleanliness (accumulation of sebum and desquamated epithelium); manipulation (simple playfulness or onanism); foreign bodies, oxyurides, etc. Vulvo-vaginitis sometimes occurs in scarlatina, by transition of the skin affection of the labia to the mucous membrane. Simple anemia is sometimes responsible for the development of vulvo-vaginitis, and scrofulous girls have a special tendency to it. Not infrequently vulvo-vaginitis is complicated by erosions and ulcerations of the vaginal mucous membrane and adjacent skin as a result of maceration or mechanical irritation. Such lesions should not always be looked upon as syphilitic or tuberculous.

[According to its etiological factors, vulvo-vaginitis in children may be classified in the following manner:—

(a) Catarrhal vulvo-vaginitis, which is due to: (1) lack of cleanliness or (2) chemical irritation.

(b) Traumatic vulvo-vaginitis, which is due to: (1) masturbation (?), (2) mechanical injury, or (3) indecent violence.

(c) Parasitic vulvo-vaginitis, which is due to: (1) oxyurides, (2) saprophytes, or (3) pathogenic bacteria, especially the gonococcus.

The treatment of nongonorrheal vulvo-vaginitis is, in addition to removal of the cause, practically the same as in the gonorrheal variety. The child should be placed in the dorsal posture and the legs spread wide apart. The exuding pus should be wiped away with absorbent cotton; then by means of a glass syringe holding half an ounce, a 5-per-cent. solution of sodium bicarbonate should slowly and repeatedly be injected into the vagina until the accumulated pus is completely removed. This should be followed by the injection, through a small, soft-rubber catheter, of 1 to 2 syringefuls (depending upon the age of the child) of a 1- to 3-per-cent. protargol solution, which should be allowed to remain in the vagina for about five minutes by bringing the labia closely together. This process should be repeated from three to five times in twenty-four hours. When the urethra is involved crayons prove very useful:—

℞ Protargol,
Iodoform ..... aa 12 grains.
Balsam of Peru ..... 6 drops.
Extract of belladonna ..... 1 grain.
Cacao-butter ..... q. s.

M. Make twelve crayons two inches in length and one-eighth of an inch in circumference.

Sig.: One to be introduced into the urethra once or twice a day. The same crayons may be used also for the vagina in case syringing proves impracticable.

Painful micturition is greatly benefited by the administration of alkaline sitz-baths and, at times, by alkaline diuretics.—Sheffield.]

Menstruatio Præcox. — It is not uncommon to find girls from 8 to 10 years of age who menstruate regularly. These

girls are either strong and healthy or rather delicate, especially those of tuberculous parentage. Occasionally, however, menstruation occurs in children from 1 to 3 years of age and even in sucklings. The menses may last for from one to five days, occur at irregular periods, and sometimes only once or twice, returning only with the advent of puberty. Generally, however, the menses occur regularly in these children every four weeks, and are often associated with pain, change of temper, sensation of discomfort, fever, swelling of the mammæ, and sexual excitement. If a period is missed, the cessatio mensium may, as in the adult, give rise to manifold symptoms, *e.g.*, of nervous nature. *Vicarious menstruation* (*e.g.*, epistaxis) has also been observed. Sometimes a precocious development of the genitalia or even of the whole body occurs synchronously with the appearance of menstruation. Precocious menstruation is generally free from danger to the child, and it is only when the hemorrhages are profuse that more or less anemia results. This is particularly the case with delicate girls and those with an hereditary tuberculous diathesis. Before menstruatio præcox is diagnosticated everything else must carefully be excluded; thus, injuries to the genitalia (coitus, masturbation) [hemophilia], not infrequently papillomatous growths of the vulva or vagina, prolapse of the urethral mucous membrane, vesical tumors (sarcomata), etc. It must also be remembered that hemorrhages from the genitalia occur after infectious diseases, that a bloody discharge may be found in girls who masturbate or who are affected by severe vaginitis, and that slight genital bleeding is sometimes seen even in the newly born. Only the periodicity of the bleeding is actually decisive for the diagnosis of menstruatio præcox.

The TREATMENT consists of rest (best in bed), avoidance of exciting food and drink, etc. Small doses of ergot [stypticin] or hydrastis are indicated only in profuse bleeding.

Uterine Affections are very rare in young children. Sometimes inflammations, *e.g.*, parametritis complicating tuberculosis, vulvo-vaginitis, etc., are observed. A few cases of congenital prolapse and hematocolpos (in girls approaching puberty), owing to atresia hymenalis, have been described. Also tumors (sarcomata and carcinomata) have been met with.

Ovarian Tumors may occur in girls of every age. Dermoid cysts, more rarely sarcomata, carcinomata, and tuberculous neoplasms usually are observed. Their diagnosis is based on the same rules as in adults. Early recognition is of great value, for ovariotomy in children offers very good chances of recovery.

Gangrene of the Genitalia.—Gangrene of the vulva has been spoken of under "Noma." Gangrenous vulvitis, which is always of doubtful prognosis, occurs also in infectious diseases or develops in connection with phlegmonous and erysipelatoid affections about the genitalia which have resulted from one cause or another. Gangrene of the scrotum also is often a result of erysipelas first involving the skin of the abdomen or thigh and gradually spreading to the other parts. As a rule, it first manifests itself by a tense infiltration of the parts, and later by gangrene. The onset is usually marked by severe constitutional symptoms. Gangrene may also develop secondarily to a phlegmon resulting from an inflammation in the vicinity—suppuration of lymph-glands, phlegmonous processes in the prepuce. Baginsky saw such a case produced by an unskillful ritual circumcision which was complicated by laceration of the prepuce. [I saw a case of gangrene of the penis follow liberal application of carbolic acid ointment after circumcision.—SHEFFIELD.] Finally, gangrene arises from lesions in the urethra as a result of traumatism or operative interference, which may also lead to infiltration of urine.

The PROGNOSIS is always dubious, especially in young children and in cases complicated by infiltration of urine. Death usually ensues rapidly under septic manifestations. Even with a most energetic method of treatment—which is the same as in adults—it is often impossible to stay the unfavorable result when gangrene is once established. The prognosis is, however, more favorable if the original phlegmon terminates in simple abscess.

Orchitis.—Acute orchitis or epididymitis in children is always traumatic in nature. It occurs in parotitis much more rarely in children than in adults. Syphilitic orchitis is quite frequently observed even in small children. [Orchitis in children, as in adults, is sometimes gonorrheal in nature.

TREATMENT.—Removal of the cause. Rest in bed. Fomentations and an opiate for the relief of pain. If suppuration occurs: evacuation of the pus by a free incision. In chronic cases: iodids and mercury internally and externally.—SHEFFIELD.]

Tumors of the Testicle are generally tuberculous in nature. As a rule, they arise from the epididymis. The prognosis is very favorable, because of their usually slow course, the limitation of the process for a long time to the testicle, and the not infrequent spontaneous recovery. The treatment is therefore expectant. Castration should not be resorted to until very urgent indications arise. Carcinoma and medullary sarcoma are occasionally observed (comparatively frequent in nurslings), which generally originate from the testicle and are said to be cured by an operation. Enchondroma and dermoid cysts are very rare.

XVI.

Diseases of the Nervous System.

Congenital Malformations, etc. (see pages 50 *et seq.*).

Serous Meningitis is a symptom-complex first established by Quincke. It usually develops after infectious diseases, such as measles, influenza, pneumonia, typhoid, and ear disease and more rarely after cranial traumatism or mental exertion. It resembles partly suppurative or tuberculous meningitis and partly cranial tumors. It most frequently affects children from 1 to 5 years of age. In rare cases the disease begins very acutely and violently, but generally it appears more slowly and is more benign in nature. Since the introduction of lumbar puncture many recoveries have taken place. The rapid change for the better which follows lumbar puncture is quite characteristic of serous meningitis. In acute attacks of serous meningitis, however, this operation [lumbar puncture] is usually ineffectual, and the disease sometimes terminates fatally in several hours, or more frequently in from one to two days. Ordinarily, serous meningitis is characterized by a benign course.

The DIAGNOSIS can often be made with accuracy by examination of the fluid obtained by lumbar puncture. It is light and clear, and free from tubercle bacilli or meningococci.

The TREATMENT, aside from lumbar puncture, is the same as ordinarily used in meningitis [see "Meningitis Simplex"].

Simple Meningitis (Purulent Meningitis) usually involves the convexity of the brain and is generally secondary to otitides; rhinitis; empyema of the frontal sinus and antrum of Highmore; injuries of the skull, especially fissures and fractures; and also to simple concussion. It may also occur secondarily to operative interference (*e.g.*, puncture of a meningocele); suppuration or tumors of the cranial bones; furuncle of the scalp; erysipelas; and acute diseases, such as scarlatina, morbilli, typhoid, pyemia, pneumonia, pertussis, influenza, polyar-

tritis, and nephritis. Meningitis sometimes develops without any known cause. The first year of life is especially predisposed to it. It is rarer than the tuberculous variety. In sucklings its course is usually more rapid than in older children. Sudden rise of temperature, increased pulse and respiration, profuse vomiting, convulsions, either from the beginning or soon thereafter, mark the onset of the disease. The temperature is high, —104° F. and over,—the convulsions become more frequent, and the patient passes into a state of sopor, which generally increases in intensity. This is usually accompanied by signs of motor irritability and also rigidity of the neck, distension of the fontanelles, and constipation. The sopor gradually becomes deeper and is occasionally interrupted by loud shrieks; the convulsions grow more severe and the pulse smaller and more irregular. In such cases death usually takes place within from two to six days. In larger children the attack is sometimes preceded by prodromata of a few days' duration, such as headache, dizziness, and vomiting. Often, however, the onset is very rapid, and severe headache, especially when moved about; marked sensitiveness to noises and light; vomiting; high fever; acceleration of pulse; excitability; convulsions; gradually increasing sopor; jactitations; delirium; grinding of the teeth; frequently inequality of the pupils; retracted abdomen; rigidity of the muscles of the neck; contractures; and, toward the end, often paralysis make up the symptomatology. Death usually occurs within a few days; at most, within two weeks. Rarely gradual recovery occurs. In the latter event it is very often followed by deaf-mutism, aphasia, and amaurosis. The disease sometimes runs a protracted course, in which the symptoms vary in intensity. On the other hand, it may continue for weeks with periods of marked improvement or almost complete euphoria and finally end fatally. Recoveries are on record. Generally, however, the prognosis is very serious, especially when the course is acute.

Treatment.—In the beginning of an attack of meningitis simplex strong antiphlogosis is indicated. In older and especially robust children from six to ten leeches (arrest any afterbleeding!) or wet cups are applied to the neck or spine; in small and debilitated children dry cupping should be resorted to.

Icecap or mercury ointment [or unguentum Credé] (0.5 to 1.0 [gr. viii-xv]) should be applied to the neck or spine every three hours. Calomel internally (0.015 to 0.03 [gr. $^1/_4$ to $^1/_2$] every two hours). Also opening of suppurative foci—*e.g.*, paracentesis of the drum-membrane, etc. Later, in active restlessness chloral [sulphonal], morphine, and warm baths with cold douches. If the patient recovers he should be kept from school and reside in the mountains or country.

Tuberculous Meningitis (see pages 229 *et seq.*).

Epidemic Cerebro-spinal Meningitis (see pages 209 *et seq.*).

Hemorrhagic Pachymeningitis (Hematoma of the Dura Mater) is a more or less marked inflammation of the inner surface of the dura with consequent blood extravasation and often, also, pseudomembranous deposit. It is an infrequent disease of childhood, though it is often observed after trauma, erysipelas of the head, caries of the petrous portion of the temporal bone, suppuration of a cephalhematoma, in hereditary syphilis, and in hemorrhagic diathesis. It may run its course without symptoms. If, however, the hemorrhage becomes more severe it may produce symptoms which indicate filling of the internal meningeal space and pressure upon the cranial capsule. Thus, there may be convulsions, coma, opisthotonos, strabismus, dilatation of the pupils, etc. The process may assume an acute course and rapidly end in death,—without being precisely diagnosed until postmortem.

The DIAGNOSIS is frequently obscure even in chronic cases. The latter are apt to be mistaken for hydrocephalus *(q.v.)*, inasmuch as the symptoms of this form of "meningeal" hydrocephalus may closely resemble the former.

The TREATMENT is the same as in meningitis.

Anemia of the Brain is a condition usually understood as "Hydrocephaloid" *(q.v.)* and occurs especially after exhausting diseases (profuse diarrhea), but it is also apt to develop as a sequel of brain hyperemia.

Hyperemia of the Brain is, as a rule, an active, *i.e.*, acute arterial hyperemia. It occurs especially in sunstroke, and more rarely in traumatism, in mental and physical overexertion, and in summer diarrheas. It is manifested by deep redness of the face and eyes, contracted pupils, hot skin, high temperature,

accelerated pulse, strong pulsation at the carotids, and frequent respiration. The patient complains of severe headache and excessive thirst. The attack is frequently accompanied by clonic and tonic convulsions, coma, delirium, and sometimes vomiting; so that the clinical picture resembles that of severe meningitis. After several hours, however, although usually not until one or two days, the condition improves, and quite frequently the symptoms disappear and the patient recovers. There are, of course, also severe cases, in which the sopor gradually increases and is rapidly followed by convulsions and death, but, on the other hand, there is also a milder form of cerebral hyperemia—namely, the passive form—which is produced by passive congestion, owing to cardiac debility, and which manifests itself by headache, fatigue, restlessness, and the like.

TREATMENT.—Icecap to the head; warm baths with cold douches; mustard to the calves of the legs; calomel, or some other cathartic, internally. In strong children one or two leeches to the mastoid processes, and even venesection should be tried. If the convulsions continue: chloral hydrate [or trional] by rectum may be administered.

Hydrocephaloid has already been referred to in the discussion of cholera nostras, which not rarely terminates in this affection. Hydrocephaloid manifests itself in two stages: First, that of *excitation* which is of brief duration and characterized by fever, restlessness, jactitations, increased irritability and insomnia. Second, that of *prostration*—sunken face, half-closed eyes; delayed reaction; apathy; sopor; superficial, frequent, irregular respiration; weak, irregular pulse; cold extremities; subnormal temperature, 95° to 97° F.; sunken fontanelles—cranial bones shoved over one another; scanty micturition, etc.

Hydrocephaloid is usually the beginning of the end, death setting in with coma and convulsions. It rarely yields to suitable treatment: energetic feeding and strong analeptics.

Hydrocephalus. — *Chronic hydrocephalus,* the subject chiefly under discussion, is a gradually progressive accumulation of serous, slightly albuminous fluid, usually *within the ventricles* and more rarely *between the meninges.* The gradually increased pressure produces atrophy of the brain; so that, *e.g.,* in severe cases, the brain is practically made up of flabby sacs contain-

ing but little true brain substance. Hydrocephalus is recognized chiefly by the increased size of the head. This enlargement of the head causes the children to be brought to the physician in the first half-year of life. It is usually not quite pronounced at first, but soon becomes more distinct; so that if correctly measured an increase of 1 centimeter or more is found from time to time. The measurements must embrace not only the transverse diameter from one mastoid process across the vertex to the other, and the longitudinal diameter, from the root of the nose across the vertex to the occipital tuberosity, but particularly the circumference—glabella and occipital tuberosity forming the centers—which in the normal newborn is from 30 to 40 centimeters; in children from 6 to 12 years old, 40 to 45 centimeters, and which is supposed to reach 50 centimeters at 12 years of age. In hydrocephalus the measurements by far exceed those of the normal—*e.g.*, in children 3 to 5 years of age 50 to 70 centimeters. Marked prominence of the frontal bone and lateral projection of the parietal bones are almost constant signs of hydrocephalus. A dolichocephalic shaped cranium is rarely met here. Prominence of the parietals is particularly important in the differential diagnosis between the hydrocephalic and simple rachitic head, before the development of the hydrocephalic disturbances of intelligence, motion, etc. Both conditions may coexist.

The hydrocephalic head is usually traversed by dilated veins, and soon shows distinct signs of defective ossification. The latter sign is rarely absent; indeed, there is even thickening of the bones; so that the fontanelles are widely open and also fluctuate and pulsate; the sutures appear gaping and often more or less arched forward. The child is soon unable to hold up his progressively enlarging head, which contrasts strangely with the small, emaciated face. He shakes his head to and fro and turns it from side to side. The eyes are especially striking in appearance. The expression is usually peculiarly staring; the bulbi are cast downward, so that half of the iris is covered by the lower lid and the greater part of the scleral portion is exposed. These symptoms are due partly to pressure upon the upper orbital wall, partly to partial paralysis of the branch of the oculomotor supplying the superior rectus. There are also

paralysis of other branches of this nerve and occasionally divergent strabismus and other abnormal positions of the eye. Pressure-atrophy of the papilla of the optic nerve is very often detected with the ophthalmoscope.

There is often dullness of intellect, varying from partial to total idiocy. This manifestation, however, may be absent. At times, children with severe hydrocephalus are intelligent. Quite often, but not constantly, there is paraplegia of the lower extremities, with spastic rigidity of the muscles; cases of hydrocephalus in which the intellect is quite normal, and, perhaps, the circumference of the cranium not enlarged laterally (which condition may also occur), are therefore apt to be mistaken for spastic spinal paralysis. The child is thus neither able to stand nor to walk, and if it attempts to walk it is very prone to fall forward. The motor functions of the upper extremities are usually intact, but sometimes moderately affected. Convulsive attacks, such as spasmus glottidis, rolling of the eyes, nystagmus, and general epileptiform attacks, with contractures, also occur. Respiration and circulation are usually unchanged. The same is also true of digestion. The patients often have a voracious appetite. Nevertheless nutrition soon suffers, increasing atrophy sets in, and most of the patients generally succumb, in the first year of life, to the atrophy, convulsions, or intercurrent diseases. Some hydrocephalic children, however, reach the age of youth. Not infrequently adults with large heads are met who present signs of having suffered from hydrocephalus during infancy. However, hydrocephalus of any degree of severity offers, as a rule, but few chances of recovery, and a rapidly increasing hydrocephalus especially is fatal.

Treatment is almost useless in ventricular hydrocephalus. The reported recoveries probably refer to meningeal hydrocephalus. Puncture and the recently introduced lumbar puncture, while at times of temporary benefit, are rarely permanently so. If syphilis is present energetic specific treatment is justifiable and sometimes leads to recovery. Hydrocephalus is often congenital, and, if such a child is born alive,—congenital hydrocephalus often forms an impediment to birth and requires perforation,—it frequently presents other deformities, such as clubfoot, spina bifida, etc., and, as a rule, dies very soon. In the

majority of cases hydrocephalus develops in apparently healthy born children not until the first few months of life. It is impossible to decide whether or not these cases of hydrocephalus are of intra-uterine origin and have merely made their gradual appearance after birth. In the majority of cases the etiology is unknown. Frequently it is a question of a slowly progressing intra-uterine or subsequent inflammation of the ependyma of obscure origin, and only rarely is it traceable to syphilis. Sometimes hydrocephalus is undoubtedly acquired later, as a result of passive congestions in the lymphatic or venous systems, compression of tumors of the brain, or of other brain diseases, which here play a rôle by gradual extension to the ventricles. Hydrocephalus in older children may give rise to gradual extension of fontanelles and sutures.

Hydrocephalus is sometimes certainly preceded by meningeal symptoms. In such cases there is an accumulation of fluid between the meninges. Such a *hydrocephalus externus s. meningeus,* which is undoubtedly preceded by pachymeningeal processes, is at times at a later period difficult of differentiation from ventricular hydrocephalus, and a diagnosis can at best be arrived at only from the history, the meningeal symptoms just mentioned, and puncture — the fluid is reached immediately after puncturing a very thin layer.

It is always advisable to try puncture as a curative measure, as absorption of large accumulations is often produced by this means. Also inunction of the head and neck with unguentum cinereum (1.0 [gr. xv] *pro die*), painting with tincture of iodin or iodoform collodion (1 to 15); and internally iodids and calomel should always be tried with the view of promoting absorption of the fluid.

The condition known as *acute hydrocephalus* is usually nothing else than tuberculous meningitis *(q.v.)* and but rarely simple basilar meningitis extending to the ventricles. Indeed, genuine acute primary transudations into the ventricles or between the meninges do occur, but usually only just before death (from, *e.g.,* acute miliary tuberculosis, nephritis, and scarlatina). As the same symptoms, however, occur in edema of the pia and the brain without hydrocephalus and the signs are as uncharacteristic, the diagnosis is very rarely possible.

[Acute hydrocephalus sometimes results from severe gastro-intestinal intoxication. Lumbar puncture, repeated two or three times, if necessary, is especially effective in these cases. —SHEFFIELD.]

Cerebral Paralysis (Polioencephalitis) presents more or less the clinical picture of hemiplegia, with or without involvement of the facial and other cranial nerves. The upper extremity is usually more affected than the lower (the leg is dragged after). Bilateral "cerebral diplegias" occasionally occur which are probably not rarely mistaken for spastic paralysis. Monoplegias are very rare. Cerebral paralysis is sometimes congenital (see further).

It usually develops in the third to the twelfth month of life or later, not infrequently with symptoms of an infectious disease. Thus, fever for days or weeks; headache; often vomiting, sopor, and also convulsions. Atrophies and contractures set in later. The limbs are colder, shorter, etc. This occurs very slowly, not until several years after, and then usually in moderate degree. The reflexes remain intact and electric irritability does not disappear until the atrophy has progressed very far. As a rule, sensation also remains unaffected. On the other hand, choreic and athetotic movements are often observed in the paralyzed limbs; sometimes also disturbances of speech. There is often alteration of the intellect, from mild dullness up to complete idiocy; and spasms and epileptic attacks are not infrequently observed. Indeed, these symptoms sometimes prevail even before the paralyses have occurred.

The PROGNOSIS is therefore bad. The patients may, however, attain the age of 20 and 30 years, though they are usually helpless and succumb to convulsions or accidental complications.

Anatomically, it is manifested by atrophy or defect (porencephaly) of certain portions of the brain—of several convolutions, an entire lobe, or of the large brain ganglia. Not rarely arrested development (congenital smallness of the gyri, etc.) plays a rôle, and often an encephalitic process with hemorrhage during fetal life or later. The shattered portions of the brain become encapsulated, owing to reactive inflammation; the contents of the cyst undergo fatty degeneration and absorption, leaving a simple cyst or a contracted sclerotic spot.

Trauma *in utero* or during labor (precipitate labor!), asphyxiated birth, and infectious diseases are probably etiological factors. The predisposition is furnished by an hereditary nervous tendency, family cachexias (phthisis), alcoholism in the parents, and less often by syphilis. That an infectious agent exerts some influence in the production of cerebral paralysis is proved by its frequent occurrence in epidemic form (see "Spinal Paralysis").

The TREATMENT is practically the same as in spinal paralysis *(q.v.)*.

Encephalitis.—Encephalitis purulenta is described under "Abscess of the Brain" *(q.v.)*. *Acute hemorrhagic encephalitis* will be spoken of here as it occurs after infectious diseases, particularly after influenza, also after typhoid, ulcerative endocarditis, pertussis, morbilli, scarlatina, and parotitis. This form of encephalitis begins with headache, dizziness, depression, or irritability, and is followed by coma, fever, and sometimes chills. Often consciousness is partially retained. During the first week decided remissions occur; so that stupor of several hours' duration is followed by wakefulness and restlessness. Pupillary reflexes are normal or slow. The deep cutaneous reflexes are unchanged. Rigidity of the neck and slight opisthotonos set in early and very soon also paralysis, either in the form of monoplegia or hemiplegia. The latter is very often associated with aphasia. Also paralysis of the ocular or other cranial nerves and neuritis optica may develop. Respiration is usually irregular and the heart's action accelerated, irregular, or retarded.

The SYMPTOMS usually depend upon the seat of the disease. Thus, encephalitis of the convexity frequently manifests itself by loss of consciousness, convulsions, and paralysis, while encephalitis of the base, by paralysis of the cranial nerves, dizziness, difficult deglutition, disturbances of speech, also hemiataxia, nystagmus, and symptoms of cerebellar disease. Encephalitis may be mistaken for meningitis—marked involvement of the cranial nerves and violent course are suggestive of the latter disease, while motor aphasia and paraphasia of encephalitis; also for cerebral syphilis, which is, of course, very rare in children, and besides lacks the irregular course of the fever and the rapid development of the symptoms, etc., observed in encephalitis.

The course of the disease varies with the intensity of the process. In mild cases, which usually follow influenza, improvement takes place in from two to three weeks, with gradually increased remissions, and, finally, recovery. Often, however, the patients linger for a long time and die. The more rapid the development of the first symptoms, and the more violent the course, the more certain the fatality; on the other hand, the slower the development of the coma and the more distinct the remissions during the first weeks, the more probable is the recovery.

TREATMENT.—Absolute rest, cold to the head and neck, and calomel [potassium iodid].

Abscess of the Brain (Encephalitis Acuta Purulenta) is not a rare disease of children. It develops sometimes from embolic and hemorrhagic foci which undergo secondary softening. It more frequently arises from extension of purulent inflammations of neighboring organs, such as the eye, panophthalmia; the nose, chronic rhinitis, caries of the cribriform bone; and especially of the ear, otitis media or interna, with caries of the petrous portion of the temporal bone. It also develops from trauma,—a sudden plunge or fall, the kick of a horse, etc.,—which is not always necessarily associated with fracture of the skull. Furthermore it may develop from pulmonary abscess or gangrene, chronic pneumonia, bronchiectasis, emphysema, and, finally, from septic and pyemic processes; more rarely as the result of cerebral tumors, such as tubercles, syphilomata, etc., and occasionally secondarily to thrush (two cases of Zenker). Sometimes no source can be found. Under these circumstances an invasion of intestinal bacteria and their toxins must be suspected.

It is very often unrecognized or mistaken, especially in the beginning, for meningitis, since the symptoms of the original disease often obscure those of the brain affections. Moreover, the symptoms of the latter appear frequently either too complex or insignificant. Dilatation of the pupils, soporous conditions, vomiting, convulsions, and paralyses sometimes direct attention to the development of a new condition; but this is not fully appreciated until the patient is already in a raging fever, perhaps with or without chills, and very severe headache, or until

apathy, slowness of pulse, and convulsions rapidly appear. The clinical picture becomes more complete with the appearance of focal symptoms, *e.g.*, paralysis of facial and oculomotor nerves, aphasia, monoplegia or hemiplegia, and the like. The latter are not constant. After such a violent attack a brief remission of the symptoms frequently takes place, but is soon followed by a more violent period, which ends in early death. Sometimes it runs a very protracted course, especially after trauma. After the first attack has passed apparent recovery takes place. This is probably due to the fact that the abscess becomes encapsulated and the brain accommodates itself, more or less well, to the foreign body. The patients may remain free from severe symptoms—that is, the disease may continue in a mild form, with occasional headache, vomiting, rise of temperature, mild pareses, etc.,—for months or longer, when, owing to rupture of the abscess in the brain ventricles or meninges, very acute symptoms suddenly develop and death occurs in a few hours. In all these stages the clinical picture is so clear and suggestive of the condition that the diagnosis is easy. It may frequently be mistaken for tumors or meningitis, which is not rarely associated with it. In other cases the differential diagnosis is facilitated by the presence of symptoms, such as irregular fever and chills and by the history.

The PROGNOSIS is bad, and relatively best in cases due to trauma. The possibility of recovery by encapsulation should by no means give rise to much encouragement, as the disease process is apt again to become acute after an interim of years.

Surgery has recently saved many patients. It could save by far more lives, were it not that an operation can be attempted only where the abscess is very superficial (as is the case in the majority of abscesses due to otitis, where actually many splendid results were obtained); furthermore the difficulty of diagnosis but rarely enables the surgeon to proceed early and energetically enough. Traumatic brain abscess also has frequently been cured by trephining, incision, and drainage. Prophylaxis may prove very beneficial indeed, especially in otitis, provided the course of the latter is carefully watched and at a given moment (caries of the petrous portion, retention of pus) operative interference is immediately resorted to before the brain has become affected.

Cerebral Hemorrhage is of rare occurrence in children owing to the fact that its chief causes—atheromas and aneurisms of the small arteries—are usually absent. Cerebral hemorrhage is often mistaken for hemorrhagic encephalitis and embolism *(q.v.)*, which are more frequently met in children. There exists, however, a true cerebral hemorrhage in children, namely, as a result of traumatism or syphilis (syphilitic arteritis), severe venous congestions (most frequently in pertussis), and friability of the blood-vessels (hemorrhagic diathesis, typhoid, pyemia). It occurs also in nephritis and cardiac hypertrophy (excess of blood in the head), in richly vascular tumors (apoplectiform, cerebral hemorrhage). Sometimes the hemorrhage is only capillary in nature, resembling those met in tuberculosis of the brain, tubercular meningitis, sinus-thrombosis, etc. Such hemorrhages usually run a course free from any distinct symptoms, or the latter are inseparable from those of the fundamental disease. Often, however, the symptom-complex of cerebral hemorrhage — dullness of consciousness, convulsions, and death or consequent focal signs, particularly hemiplegia—appears clear even in children. The details of the symptomatology, treatment, prognosis, etc., are identical with those in adults.

[Symptomatology.—Unconsciousness, face flushed, and pupils insensible to light and usually unequal in size. The pulse is slow, hard, and full. Respiration is slow and irregular. Heavy snoring. The features are generally drawn to one side.

Treatment. — Icecap; counterirritation. Perfect rest. Enemas of sulphonal and bromids. Later ergot and iodids.—Sheffield.]

Embolism of the Brain Arteries is rarer in children than in adults. In adults embolism or hemorrhage is generally diagnosticated whenever sudden paralysis following partial or complete loss of consciousness is observed. In children, on the other hand, such symptoms are usually first attributed to an acute or chronic encephalitic process, particularly tuberculosis, and next to embolism or hemorrhage.

Heart affections, such as endocarditis, valvular defects, or myocarditis, are the chief causes, but embolism may sometimes occur after rheumatism, chorea, scarlatina, diphtheria, and

pneumonia. In 50 per cent. of the cases the artery of the Sylvian fossa is affected and next in frequency the internal carotid. It is usually difficult to distinguish embolism from a hemorrhage. In both affections the well-known symptoms appear instantly, although the general symptoms of the attack disappear more quickly in embolism. The existence of heart disease often decides in favor of embolism. The absence of heart-murmurs, however, by no means precludes embolism, inasmuch as the thrombus, which is responsible for the embolism, may be situated between the trabeculæ of the left ventricle, in the left auricle, or even in the pulmonary veins.

The PROGNOSIS and TREATMENT of this condition are the same as in adults.

Sinus-thrombosis may be due to retardation of the venous blood-current, resulting from cardiac debility *(marantic thrombosis),* as occurs in exhausting diseases, such as profuse diarrhea, suppurations, and hemorrhages. Usually the longitudinal sinus is affected. As a rule, sinus-thrombosis is not manifested by marked symptoms, or those of hydrocephalus predominate. The prognosis is naturally bad, but an attempt should be made to improve the circulation by the administration of stimulants. Retardation of the venous blood-current may also be a result of impediment to the venous outflow, as occurs, *e.g.,* in cases of compression by tumors of the neck.

Phlebitic sinus-thrombosis, which not infrequently assumes a pyemic character, is of more practical importance. It is due to extension of an inflammation from the vicinity, *e.g.,* purulent skin eruptions on the head, erysipelas, purulent processes of the nose and eyes and particularly of the ear, where caries of the petrous portion of the temporal bone—whether the result of acute or chronic otitis—not rarely continues to spread and leads to sinus-thrombosis. In this form of the disease the transverse and petrosal sinuses are usually affected, but also the other sinuses. Thrombosis involving these parts causes nervous symptoms, clonic and tonic convulsions, coma, delirium, paralyses, etc. Local symptoms are sometimes discernible. Thus, in thrombosis of the cavernous sinus: passive congestion in the ophthalmic vein, hyperemia of the fundus oculi, exophthalmos, and edema of the eyelids and half of the face. In thrombosis

of the petrosal sinus: edema behind the ear. In thrombosis of the transverse sinus: lessened fullness of the external jugular vein on the affected side,—because it can more easily discharge its contents in the empty internal jugular. Marantic sinus-thrombosis in nurslings is often manifested also by bulging of the previously sunken fontanelles. In purulent processes sinus-thrombosis also produces pyemic fever and may cause embolic processes, hemorrhagic infarcts, and general pyemia. Even here the symptoms are often not very characteristic and the diagnosis is quite difficult.

The DIAGNOSIS is somewhat facilitated by lumbar puncture, inasmuch as the fluid obtained from hemorrhagic sinus-thrombosis permits of microscopic differentiation between primary (marantic) and secondary (septic) sinus-thrombosis, the diagnosis depending upon the presence or absence of micro-organisms.

In phlebitic sinus-thrombosis operative interference, if begun early, offers some chance of saving the patient. At present attempts are frequently made to reach the affected sinus itself. The physician, however, should rather endeavor to prevent the occurrence of sinus-thrombosis (see "Otitis").

Sclerosis of the Brain in its diffuse and disseminated forms is of infrequent occurrence in children. It is either congenital or appears, frequently after infectious disease, in apparently healthy and normally developed children in the first few years of life. It develops gradually, but usually presents a quite distinct clinical picture. It begins, as a rule, with disturbance of motion, which gradually increases to spastic paraplegia, first of the lower, then of the upper, extremities. This is followed by disturbance of speech, which is at first slow and later scanning. Soon the intellect becomes involved; the patient becomes forgetful and dull and gradually idiotic. Finally, there is a disturbance of the corporal development, *e.g.*, anemia, emaciation, etc.; intention tremor, difficult deglutition, sometimes nystagmus, amaurosis, deafness, and attacks of disturbance of consciousness. Incontinence of feces and urine soon follows, and, with general decay of the body, death occurs, usually with sopor. The development of the disease can but rarely be checked by therapeutic measures. If syphilis is suspected, specific treatment should be tried.

The PROGNOSIS is unfavorable.

Tuberculosis of the Brain (see pages 232 *et seq.*).

Tumors of the Brain.—Aside from brain tubercle, already described, which is the most frequent neoplasm found, sarcoma in most diverse forms (myxosarcoma, gliosarcoma, etc.) is relatively of frequent occurrence in the infantile brain. Gliosarcoma, like the other primary or secondary tumors (carcinoma, osteochondroma, gummata, echinococci, cysticerci, dermoid cysts) which are met with here more rarely, causes the same symptoms in children as in adults. In slow-growing brain tumors especially the corresponding place on the opposite side of the growing brain often assumes the functions. Total latency often exists, and it is not at all rare for the situation not to be revealed until sudden appearance of symptoms, *e.g.*, when compression of the adjacent parts exceeds certain limits; when the tumors arising from the bone spread directly to the meninges and brain; or when, in highly vascular tumors, an extensive hemorrhage brings on apoplectic attacks, etc.

Therapeutic measures achieve good results only in cases of gummata (which are very rare). It is therefore advisable to institute energetic specific treatment if syphilis is suspected. Operative interference has in recent years been repeatedly and successfully attempted in brain tumors easily accessible to the knife. The cases that can actually be cured by it, however, are extremely rare.

Spastic Spinal Paralysis (Congenital Rigidity of the Limbs, Little's Disease) is quite a rare affection. It is sometimes not detected until the children begin to walk, but sometimes it is noticed soon after birth. While bathing the child, the mother notices a peculiar rigidity of its body; that the child does not kick, but usually lies motionless with the legs pressed against each other, or, perhaps, one upon the other. The child attempts to walk late and with difficulty. The patient takes short rigid steps with the feet in a tiptoe position, the knees pressed closely together, or the legs are thrown across each other and the lower parts of the legs are rotated inward, the feet usually touching the ground with the great toes only. There is also tension of the muscles, particularly rigid contraction of the abductors of the thigh and calf muscles, and later involvement of the upper

extremities and even of the trunk. The paresis and rigidity of the lower extremities become gradually more pronounced. At first the patients are able, if supported, to move a few steps forward in a clumsy, spastic, paretic gait, but they soon are rendered helpless by development of fixed contractures. The patellar reflex is exaggerated. The skin of the lower extremities is often cool, somewhat cyanotic, and its sensibility is disturbed. The electromuscular contractility of the muscles and the functions of the sphincters are normal. There is usually no atrophy of the musculature. In some cases, however, atrophy (amyotrophic spinal paralysis s. lateral sclerosis) and brain symptoms (especially bulbar symptoms) are later observed. Sometimes there is defective psychical development from the beginning, in other cases not until later. Not infrequently also complete idiocy, stammering, nystagmus, strabismus, and convulsions are observed. Opinions differ greatly as to the real nature and anatomical changes of spastic paralysis. An alteration in the pyramidal tracts, however, seems to be the chief cause. Premature birth; difficult, protracted labor with trauma during parturition; and intra-uterine diseases are mentioned as exciting causes. Consanguinity of the parents was often observed, and hereditary syphilis sometimes seems to serve as a contributing cause. According to Flechsig, the pyramidal tract of the spinal cord is formed last (in the fifth to seventh fetal month); moreover the fibers do not receive their medullary sheath until the ninth fetal month, and its complete development does not take place until the first few months of extra-uterine life. It is therefore not at all surprising that an arrest of development often occurs in premature births; that in difficult labors with mild injuries, mild encephalitic changes, hemorrhages in the spinal cord, and injuries of the vertebral column the undeveloped tract suffers; and that in more severe injuries (intra-uterine disturbances, inflammation and defective development) the brain is involved.

The PROGNOSIS of spastic spinal paralysis is not absolutely unfavorable except when the disease is complicated by severe cerebral symptoms. Prolonged pauses, improvement, and even cure are observed; even amyotrophic lateral sclerosis runs a slower course in children than in adults.

TREATMENT.—Early orthopedic measures. Galvanization of the spinal cord and of the peripheral nerves; careful massage; also immobilization and passive movements; practice in gymnastics, baths, etc. Tenotomies (tendo Achillis) if necessary.

Myoclonus (Paramyoclonus Multiplex, Friedreich) is often mistaken for hysteria or grouped with chorea electrica. It is, however, a disease *per se*, and of quite rare occurrence. It consists of rapid, regular, clonic twitchings of symmetrical muscles or muscle groups, particularly of the extremities. It rarely involves other parts of the body, and almost never the face. It occurs in paroxysms, ceases during sleep, and does not hinder voluntary movements. It is said to be due to irritation of the anterior horns resulting from mental and physical overexertion or violent emotion. The muscular irritability is not at all or but slightly exaggerated. The patellar reflex is usually exaggerated, while the electric excitability, the coarse motor power, and co-ordinated movements are unchanged.

The PROGNOSIS is very doubtful. Occasionally myoclonus is said to have been improved or even cured by galvanization of the spinal column, gymnastic exercises, etc.

Myotonia Congenita (Thomsen's Disease) is a rare and sometimes hereditary affection. It consists of prolonged muscular contraction and rigidity of a group of muscles whenever voluntary movement is attempted by the patient, *e.g.*, arising from any attitude is very difficult; the hand given to some one is released with difficulty. Myotonia usually affects only individual muscle groups. Sometimes, however, the whole body becomes rigid as the result of external causes, such as psychical effects, coughing, sneezing, etc. The pathology of the disease is obscure. The affected muscles are normally developed and often hypertrophied; otherwise the individual is normal and healthy. The disease is uninfluenced by treatment and remains so throughout life. It may easily be mistaken for tetany or for muscular dystrophy, yet there are a number of objective signs which facilitate the diagnosis. The mechanical irritability of the muscles is considerably exaggerated; a single stroke with the precussion hammer causes a slow tonic contraction of the muscle-fibers, which continues for some time. The nerves show no exaggerated mechanical irritability. There is, however, a

very marked alteration in the behavior of the muscles toward electric stimulation ("myotonic reaction," Erb); namely, the faradic irritability of the nerves is not changed, but by applying a stronger current the muscles supplied by certain nerves contract very firmly and remain in this condition for some time after interruption of the current. The direct faradic irritability of the muscles is so strongly increased as to require only a mild current to produce a prolonged contraction. The galvanic irritability of the nerves is not increased, but rather diminished; the identical muscular phenomenon, however, is observed on galvanic as on faradic stimulation of the nerve. The direct galvanic irritability of the muscles is increased, and the anodal contraction is usually stronger than the cathodal contraction. The contractions are slow and continue a long time after interruption of electric stimulation. The most characteristic symptom is the peculiar rhythmical wavelike contraction which progresses from the cathode to the anode. This manifestation is best observed when a strong current from 20 to 25 milliampères is employed and the negative pole is applied over the tendinous extremity of a muscle. If the cathode is placed in the palm of the hand and the anode on the shoulders, a wavelike contraction is seen gradually to spread from the muscles near the wrist to those of the shoulders (Sachs).

[**Treatment.**—The condition may be improved by active muscular exercise.—SHEFFIELD.]

Ataxia Hereditaria (Friedreich's Disease).—A rare disease of family nature (two or more members of one family are often affected). Heredity is sometimes traceable through several generations. There is sometimes a history of alcoholism in one or both parents or a diabetic ancestry and less frequently syphilis or onanism is blamed. In a few ataxia developed after scarlatina. The etiology is otherwise obscure. It affects male and female alike. Anatomically there is a degeneration of the white posterior columns of the cord, especially the column of Goll and partial degeneration of the lateral columns. Involvement of the posterior gray horns is rare. The degenerative process manifests a tendency to progress longitudinally. Some believe in an arrest of development of the spinal cord inasmuch as the latter is at times reduced in width.

The disease usually begins insidiously in the sixth or seventh year of life (up to the age of 15) in a masked manner with ataxic disturbances of the lower extremities. At first there is an unsteadiness and hesitation of the gait, then frequent stumbling, and "throwing" of the legs forward and falling; gradually the tabetic-cerebellar gait develops, and later complete inability to walk or stand. Slowly the upper extremities become affected, until finally the static and locomotor ataxia become very distinct. Hereditary ataxia sometimes begins with enuresis, and nodding movements of the head, which are often a late symptom, may also be noticed at the outset. These latter symptoms are accompanied by disturbances of speech. The speech, which is slightly scanning, reminds one of that observed in multiple sclerosis, but is at times hesitating and stumbling and again slow and awkward. The patients are often affected by a coarse tremor, later by paralyses, contractures, and atrophies, especially of the shoulder and pelvic region. Nystagmus, kyphoscoliosis, and the so-called Friedreich's foot—dorsal flexion of the toes, very pronounced excavatio plantaris, and pes equinus —appear in later years.

The cutaneous reflexes are always present, while the tendon reflexes are absent. If these reflexes are increased, the disease is not hereditary ataxia! There are usually no disturbances of sensibility. Romberg's symptom is, according to Sachs, at times present. Optic atrophy is of rare occurrence and the Argyll Robertson symptom is absent. Neither is there any pronounced disturbance of the bladder or rectum (may develop in later stage). Intelligence remains intact for a long time, but late in the disease a decline of the mental faculties and a stupid expression of the face becomes apparent. There is also vertigo, palpitation, and occipital headache. ["Unprovoked and uncontrollable laughter is quite a characteristic symptom of the disease."—SHEFFIELD.]

A differential diagnosis is, as a rule, made by exclusion of other affections. Thus, *multiple sclerosis* does not begin with ataxia. In *tabes dorsalis* the reflexes are usually increased. There are disturbances of sensibility, and the gait is purely tabetic. In *small tumors* of the brain head symptoms chiefly prevail, while the upper extremities are unaffected. *Hérédo-*

ataxie cerebelleuse appears later, and the tendon-reflexes are normal or exaggerated.

Friedreich's disease runs a very chronic course, it may last decades. The patient may live to the age of 40 years. Sometimes temporary remission or even improvement occurs, but, as a rule, the affection is progressive in character. In the course of from four to six years the patients are usually crippled. A cure is out of the question. Death occurs from general exhaustion or intercurrent diseases, sometimes with cerebral symptoms.

TREATMENT.—Administration of tonics, ergotin, potassium iodid [iodipin], electricity, and galvanization of spine. Fraenkel's compensatory exercises may be tried. Treatment in watering places.

Spinal Paralysis (Poliomyelitis Acuta Anteriora, formerly Essential Paralysis) is a frequent disease of childhood. It is observed especially in children of from 1 to 4 years of age and more rarely in older ones. When brought to the physician for examination, they are usually already paralyzed. Ordinarily they are otherwise healthy, often robust in appearance, and while free from disturbances of sensation they are afflicted by atonic paralysis, sometimes even in the stage of retrogression. The history in all of them is almost always the same. While enjoying perfect health the child is attacked by either high or moderate fever, headache, more or less somnolence (rarely real sopor), sometimes also vomiting and twitchings, and even convulsions. This clinical aspect, which resembles that of an acute infectious disease, persists for a few days and finally subsides, leaving a paralytic condition varying in degree and extension.

The prodromal stage varies greatly in duration, from a few hours to a week or longer. It may barely be noticeable or may be entirely absent; so that the paralysis occurs very abruptly. The paralysis usually affects either both legs and one arm or one upper and one lower extremity on opposite sides, and more rarely on the same side, and still more rarely both arms or both legs. Occasionally one extremity is affected, or only the muscles of the neck. Sometimes all four extremities are simultaneously involved. The paralysis is immediately complete; very rarely it is not so in the beginning, but becomes complete a few days or weeks after the attack. The paralysis does not remain long in its

original intensity, but begins to recede, often after a few days or a week, gradually disappearing in several affected limbs or at least in several groups of muscles. Some parts of the body, however, remain permanently paralyzed. Thus, the muscles of the shoulder and arm, more rarely those of the forearm and the lower extremities (usually the muscles supplied by the perineus nerve) and the thigh (the quadriceps, etc.). If the paralysis does not disappear within the first few weeks, it usually persists later and often for life. Unexpected improvements are very rare in the later stages. A few weeks or months after the beginning of the attack atrophy, with its consequences, follows. Thus, the affected limb, especially the deltoid and shoulder group of muscles gradually becomes weaker; so that a distinct gap is formed between the head of the humerus and the acromion. Often the whole extremity becomes atrophied, the muscles are flabby and thin, and the articular bands so lax that the limb appears elongated and even undergoes subluxation or true luxation. Frequently there is atrophy of the bones; so that the extremity appears shortened. The temperature is gradually lowered, and the paralyzed limb cool and at times also cyanotic. This symptom sometimes occurs as early as the fifth day of the onset of the paralysis, more often not until from one or one and one-half weeks after. It is generally of bad omen, as the parts thus affected usually remain powerless throughout life.

A diminution or complete extinction of the electromuscular excitability appears sooner than the visible atrophy. The faradic reaction is soon lost, while the galvanic persists for some time, the duration depending upon the progress of the muscular degeneration. Finally, there is a loss of the plantar and patellar reflexes. The sphincters are almost always intact! The parts that do not recover from the paralysis within the first ten to twelve months usually remain hopelessly lost forever, and, owing to the preponderance of the antagonistic muscles over those which are paralyzed, deformities (pes equinus, varus, club-hand, etc.) are the inevitable result. This is the first stage of the disease.

It must especially be emphasized that the mental development never suffers, but that the cicatrized myelitic foci may

subsequently give rise to new spinal affections, such as new poliomyelitis, progressive spinal muscular atrophy, etc. The patients remain cripples if the disease is not remedied somewhat by energetic treatment (see further).

Anatomically the disease consists of multiple myelitic processes, particularly of the gray substance of the anterior horns, especially in the cervical and lumbar enlargements of the cord. It sometimes attacks also the antero-lateral tracts, spreading upward and downward, and occasionally also the gray substance of the posterior horns. This explains the pain in some cases and the anesthesia in others. The brain is usually unaffected. Some symptoms, however, may also arise here. This is almost always the case in the beginning of the attack, but may also be seen later; indeed, even mixed forms between spinal and cerebral paralyses are observed. Not infrequently there is an epidemic simultaneous appearance of both forms; so that there is a tendency to attribute both affections to one and the same unknown infectious agent. The etiology is otherwise obscure.

Generally spinal paralysis is strongly characteristic and can usually be easily differentiated from the other form. The initial febrile stage, the sudden and complete development and synchronous partial disappearance of the paralysis, the almost constant integrity of the sphincters and the sensory sphere, the lowered temperature in the affected parts, and the rapid extinction of the faradic reaction furnish a clear clinical picture. Only certain paralyses which are caused by laceration and compression of the nerve-trunks (by trauma, luxation of the humerus, etc.) may come in question; here, however, the febrile initial stage is absent. Furthermore it may be mistaken for simple atrophy, which at times occurs as a result of defective development, but in the latter there is no paralysis; on the contrary, the muscular power and electric reaction are intact.

Treatment.—In the febrile stage, when the physician is very rarely consulted, icecap to the head (also a few leeches behind the ears, or inunction of unguentum hydrargyri), and a few doses of calomel [salicylate of soda]. One or two weeks later electricity should be applied and very regularly and carefully continued two or three times a week, seven minutes at a time. First the constant current is to be used; later the far-

adic. The large anode is kept stabile on the neck and the small cathode on the muscles. In addition to this, massage and gymnastic exercises are to be resorted to. Also "sool" and "moor" baths and treatment in different watering places may be tried. Internally also potassium iodid. In later stages only the surgeon or orthopedist may still be of service by partly preventing deformities or correcting them by tenotomy, arthrodesis, and the recent method of tendon transplantation *(q.v.)*.

Compression Myelitis may occur in acute form from fracture of the vertebral column, and gradually from syphilitic disease of the vertebræ, aneurisms, and tumors. In children, however, it is almost invariably caused by caries of the vertebral column (see "Spondylitis"), and not so much by pressure of a displaced bone as by compression on part of developing tuberculous masses and exudates between the dura and bone substance —a compression producing not only pressure-atrophy, but also a direct inflammation of the spinal cord. Myelitis is rarely unilateral, giving rise to symptoms of a unilateral lesion, but, on the contrary, although otherwise gradually progressive, it spreads rapidly to the other side. Sometimes it is discernible sooner than the bone disease. As a rule, both progress at the same pace, but the caries may be more or less strongly developed at the time the first signs of myelitis appear. On the other hand, pronounced caries may exist without the presence of myelitis.

It usually begins with neuralgic pain, then by distinct debility of the muscles supplied by nerves from the spinal cord below the compressed portion. Thus in compression of the cervical portion of the cord there is first an involvement of the upper extremities and then of the lower; in compression of the dorsal portion the lower extremities only are involved. The debility gradually gives way to paresis and then to spastic paralysis. Later on the paralyzed parts become subject to twitching, tremor, contracture, etc. The tendon and skin reflexes are at first exaggerated and then abolished. Anesthesia sets in and the paralyzed muscles atrophy. If the compressed portion is high up, the diaphragm also is involved, so that respiration is interfered with; and, if the lesion is situated in the lumbar region, there is complete paraplegic paralysis of the

sphincters. Finally, trophic disturbance, such as decubitus and convulsions arise, and under these manifestations (also pneumonia, etc.) myelitis eventually terminates fatally.

If the primary disease can successfully be mastered before destruction of the cord has progressed too far, there is hope for partial or complete retrogression of the compression myelitis. Often, however, treatment is begun too late, and, while it may yet be possible to arrest the spondylitis, the symptoms of myelitis never abate. It is therefore important to detect the caries first and treat it as soon as possible. If after curing the latter some disturbance still remains, an attempt must be made to improve the condition by massage, baths, treatment in watering places, or cautious use of the constant electric current.

Disseminated Sclerosis (Multiple, Insulated Sclerosis; Sclérose en Plaques) is a disease of individuals from 20 to 30 years of age, but occasionally in younger ones. The prodromata are sometimes observed much earlier. Sachs's youngest patient was 14 years old and presented prodromal symptoms for four years; Totzke found the first symptoms twice at birth, once at the age of 5 years, and once at 14 months. Infectious diseases, such as measles, scarlet fever, typhoid, influenza and pneumonia, traumatism, and finally an hereditary nervous diathesis play the etiological rôle.

Symptomatology.—The prodromata consist of weakness in the upper, sometimes lower, extremities; slight awkwardness and tremor in the fingers; and mild subjective disturbance of sensibility in the arms and legs. The characteristic symptoms develop very slowly and vary in intensity. Intention tremor is the most pathognomonic sign of the disease, and gradually increases to such an extent that the patient is, *e.g.*, unable to drink, write, etc., and finally to make use of his hands and legs. There are also disturbances of vocal articulation, such as slow, hesitating, scanning speech; very often disturbances in the eyes—diminution of reaction to light and accommodation, myosis, nystagmus, disturbance of vision, often narrowing of the field of vision and not rarely irregularity of the pupils; tremor of the tongue; listless, stupid expression of the face; weakness of memory, easy changeability of disposition (laughing and crying without apparent cause; irritability). A spastic

paretic condition of the extremities gradually appears, the tremor becomes stronger and speech less intelligible. Sometimes objective disturbances of sensibility—anesthesia or hyperesthesia—now appear; also paralysis of the eye muscles, apoplectic attacks, atrophy of the muscles, and alteration of electric irritability. Disturbances of the bladder and rectum are absent. The symptomatology is very variable, which is rather not surprising, considering the anatomical basis of the disease—multiple sclerotic lesions in the brain and often also in the spinal cord.

Errors in diagnosis are frequent. It may be mistaken for (1) myelitis, which is not rare in children; (2) congenital spastic paraplegia; (3) hereditary tremor; (4) hysteria, and (5) paralysis agitans. In *myelitis* there is a very acute implication of the bladder and often disturbance of sensibility. *Congenital spastic paraplegia* appears very early and is free from the chief symptoms of disseminated sclerosis. *Hereditary tremor* gives rise to no further symptoms even after prolonged observation. *Hysteria* almost never presents nystagmus, scanning speech, or intention tremor, but frequently anomalies of sensibility. *Paralysis agitans* is extremely rare in children.

Disseminated sclerosis is incurable, but is not fatal *per se*. It may last years and be interrupted by short or long remissions or remain stationary. Death follows intercurrent diseases.

The symptoms are alleviated by continued rest in bed, lukewarm baths, with cool spinal douches, galvanic current, and massage; internally, perhaps, silver nitrate.

Tabes Dorsalis [Locomotor Ataxia] very rarely occurs in children. There is usually a history of hereditary syphilis. Specific medication is sometimes very effective. The symptomatology is identical with that observed in adults.

Progressive Muscular Dystrophy.—Under this name are embraced the four pathological states which were formerly considered separate diseases—namely, *pseudohypertrophy, juvenile muscular atrophy, infantile muscular atrophy* with *primary involvement* of the *face,* and *hereditary muscular atrophy.* These affections are now recognized as merely four types of the same disorder presenting the characteristics of a pure original myopathy. The etiology is as yet entirely obscure.

This disease, which is always hereditary, is transmitted from generation to generation, with or without skipping single generations or individuals, or affects several brothers or sisters of healthy parents of the same family. It chiefly affects boys, and consists anatomically in atrophy and gradual disappearance of fibers of certain muscles, which are at times replaced by an extraordinary increase of connective and adipose tissue, so that the muscles, as a whole, appear to be thickened and pseudo-hypertrophic (often also quite hard). As a rule, it begins between the fifth and tenth years of life, progresses very slowly, is sometimes interrupted by a standstill or even apparent improvement, and usually does not end fatally until after the expiration of years.

At first there is a peculiar weakness in the lower extremities. The patients easily tire, especially in mounting stairs, walk with the legs apart, are shaky, and to a certain extent balance the trunk upon the legs, and later present (in standing) a lordosis of the vertebral column. Certain muscles, especially those of the calves and the glutei, increase in circumference, while the quadriceps femoris and the peronei muscles usually appear atrophic. The appearance of the atrophy differs in every individual type.

In the scapulo-humeral form (“*juvenile muscular atrophy*” proper) it begins with the pectorals, the anterior serrati, the latissimus dorsi, the rhomboidei, and the trapezius muscles, and then with the triceps, biceps, brachio-radial, and brachial muscles. The deltoid is usually strongly hypertrophied! In the fully developed stage such a patient presents a very characteristic appearance: with conspicuously thin (only the deltoid muscles remain quite prominent) arms (the forearms are as yet more or less normal, and the hands entirely so), sunken chest, anteriorly rotated shoulders,—scapulæ standing out like wings,—marked kyphosis of the dorsal vertebræ, lordosis of the lumbar vertebræ (saddle-shaped lordosis), prominent abdomen, markedly prominent buttocks, and emaciated lower extremities (only the calves are abnormally thick); the patient waddles with slightly rotated legs, the toes frequently barely touching the ground. The gait at times resembles that observed in bilateral luxation of the hip. Very characteristic also is the manner in

which the patient rises from a horizontal position on the floor: with difficulty and awkwardly, with the aid of the hands, he lifts himself upon the knees and then "he climbs upon himself," *i.e.*, he gradually assumes the erect position by supporting himself with his hands successively on the tibiæ, knees, thighs, etc. In the later stages he is unable to lift himself at all. There are cases in which the pseudohypertrophy remains entirely in abeyance, but also such in which the pseudohypertrophy is very conspicuous in other parts of the body. In these cases the apparent thickening is either limited to individual muscles or involves the entire musculature. Sometimes also the muscles of the face are involved.

Indeed, in the "*facio-scapulo-humeral*" form (Landouzie-Déjérine) it is especially in the orbicularis oris and oculorum and the lips that atrophy begins. Thus, the muscles of the forehead and chin and the face appear stiff, resembling that of a wax figure. This is particularly the case if the eye muscles cannot be closed. Otherwise its course is identical with that already described. Lipomatosis also sets in, except in the "*hereditary*" form, which usually develops in later years. Generally it is impossible to distinguish the various forms. For example, the muscles of the pelvis, loins, and thighs may begin to atrophy first and the shoulders and arms, etc., next. With the advance of the atrophy there is in all forms a corresponding diminution of the tendon and electric reflex irritability. There is never a diminution of the reaction of degeneration or a disturbance of the central nervous system. Sometimes there are fibrillary twitchings in the atrophic portions of the upper part of the body and a marblelike aspect and coldness in those of the lower part. Occasionally there is enlargement and fibrillar twitchings of the tongue.

The PROGNOSIS is unfavorable. A few recoveries, especially in the early stages, are on record—perhaps only improvements, as is common in this affection! As a rule, however, there are no means to check the further progress of the atrophy.

Of course, an attempt to arrest the progress by systematic faradization, massage, gymnastics, "sool" and "moor" baths must always be made. The adipose tissue gradually disappears and the patients finally succumb after the disease has lasted from ten to twenty years without much change in the general health.

Syringomyelia is a very rare disease of childhood and is due to cavity formation in the spinal cord. It is either congenital or caused by gliomatous processes. Syringomyelia usually begins in the cervical region, where it remains most marked, although it may extend downward and also upward to the oblongata. The symptoms, which partly suggest a tumor of the spinal cord and partly amyotrophic lateral sclerosis and progressive muscular atrophy, are therefore usually limited to the upper extremities and shoulders. It is manifested first by trophic disturbances in the skin, subcutaneous tissue, and bones —namely, glossy skin, especially in the fingers; rhagades; panaritia (sometimes painless!); necrosis of the phalanges; sensation of burning, pricking, and numbness. Partial disturbance of sensibility (diminished or abolished sense of pain and temperature, while the tactile and muscular senses are intact) and signs of muscular atrophy, beginning with a small muscle of the hand and gradually extending to the muscles of the forearm, arm, and shoulder, are also observed. With extension of the cavity into the gray substance anteriorly there is also atonic atrophy and paralysis, disturbance of electric irritability, and diminution of the reflexes. Corresponding symptoms arise also with extension of the disease upward and downward.

Tremor is rare in children. Tremor senilis, alcoholicus [may occur], mercurialis, etc., is naturally entirely unknown in childhood. Tremor is equally rarely seen as a symptom of diseases of the central organ (paralysis agitans, spinal sclerosis). Henoch saw it only in typhoid and other infectious diseases, particularly in paralyzed and contracted limbs, also in tuberculosis of the brain, basilar meningitis, and other brain affections. He once observed a general tremor, of obscure etiology, with severe accompanying symptoms and favorable termination in a child 15 months old.

Athetosis rarely occurs independently (congenital?), as a purely functional disease. It is sometimes observed after acute infections, *e.g.*, diphtheria, typhoid, and more frequently in brain diseases, such as multiple sclerosis, atrophy, and especially cerebral infantile paralysis. Unilateral athetosis sometimes occurs as a symptom of "posthemiplegic" irritation.

The PROGNOSIS is bad. Recovery never occurs, but improvement sometimes takes place through the use of galvanism, arsenic, and potassium bromid.

Convulsions (Eclampsia Infantilis, Spasms, Fits) are very frequent in children, especially under 3 years of age, owing to the great tendency of the infantile organism to spasmodic conditions, which are caused reflexly by even the slightest irritations. Such attacks begin usually with staring, rolling of the eyes upward or to one side, rapid loss of consciousness, and spasms of the facial muscles, which are sometimes unilateral, with distortion of the angle of the mouth. The jaws are locked by trismus or shift back and forth, causing grinding of the teeth and sometimes also movements of mastication. The face is distorted and cyanotic. Often foam escapes from the mouth and is sometimes bloody in older children from biting of the tongue. The extremities are either tetanic and rigid or twitch with great rapidity. The fingers are usually strongly flexed and difficult of extension. The feet are in dorsal flexion or pes equinus position. The head is retroverted or thrown from side to side. The respiratory muscles are contracted, giving rise to very rapid superficial breathing, alternating with complete respiratory pauses. Involuntary evacuation of urine and feces is often present. As a rule, the attacks last but a few seconds or minutes and then the symptoms abate gradually, but another attack may occur before the child has fully recovered from the coma of the preceding attack, etc. These phenomena occur three, four, or more times, while loss of consciousness and of sensation persists during the intervals. Sensation is sometimes abolished, but if present it is not always a fatal sign (many children recover).

More important from a prognostic point of view is the duration of the convulsions and of the individual paroxysms. If they continue for hours they threaten life by obstruction to respiration, passive congestion of the brain, and exhaustion. Some patients, however, survive even if the convulsions have lasted for days or weeks. Often the convulsions cease with one attack, and when the physician arrives he finds the child in a soporous condition, in a quiet sleep, with which the attacks usually end. The child may wake up from the sleep apparently

well. Caution as to the prognosis is, however, commended. One attack is rare; on the contrary, the attacks are apt to return the next hour or day, and even after weeks or months.

During the convulsive attacks, the chief aim should be to arrest them immediately irrespective of their etiology. It is the moment for action and not for questioning. Immediate chloroform anesthesia (1 teaspoonful poured on a handkerchief and held before the child's nose so that an access of air is allowed) is a sovereign remedy—very seldom fails—in all severe attacks. It may be used even in children but a few months old, until the convulsions cease (always watching the pulse and respiration!) and be repeated upon return of the paroxysms. If the convulsions continue for days the anesthesia may be intrusted to a reliable nurse or the parents. Cyanotic discoloration of the face, as a result of the convulsions, and bronchopneumonia form no contra-indication, but existing collapse—very small, rapid pulse, and cold extremities—does so. In milder attacks enemas of chloral hydrate [trional by mouth] or cool vinegar, or lukewarm baths with cold douches, may be tried. As soon as the attack has subsided, inquiry should be made into the possible causes in order to prevent recurrence of the convulsions by removal of the causes and to reach a conclusion in regard to the prognosis. First of all, rachitis should be looked for. The presence of this condition greatly predisposes to convulsions, and justifies the expectation of recurrences. Indeed, there are often simultaneous attacks of spasms of the glottis which either inaugurate the convulsions or alternate with them. Difficult dentition surely plays a rôle in the production of convulsions, but very rarely without rachitis. The latter is usually present, and is more responsible for the convulsions than is dentition. Next in frequency in the etiology of convulsions are gastro-intestinal disturbances, especially sudden overfeeding or partaking of articles of food which are difficult of digestion, such as salads, fruit, and fresh bread; also prolonged faulty feeding in the suckling, excesses in this direction on the part of the nurse or mother, and abuse of alcohol or mental excitement. Here the convulsions may be very severe in nature and the sopor last several hours, so that meningitis may be suspected. Sometimes the convulsions are absent and only somno-

lence, aphasia, etc., present. Sometimes, again, only aphasia without abolition of consciousness; so that here it is probably less a question of auto-intoxication from the bowels than of simple reflex action from the alimentary tract. Also other irritations, although more rarely, may cause convulsions. Thus, worms, foreign bodies, *e.g.*, in the ear, in the nose; also nasal polyps, adenoid vegetations, etc.; irritations of the skin, such as a burn, a painful eczema, vaccination, even opening of an abscess or furuncle; anomalies of the genitalia, such as phimosis, adhesion of the prepuce to the glans, and of other organs; fissura ani and prolapsus recti; also concretions such as kidney and bladder stones.

Febrile diseases often begin with convulsions, which in young children usually replace the chill. Thus, pneumonia, pleuritis, and even angina not rarely begin with convulsions. Acute infectious diseases (morbilli, scarlatina, and variola) are sometimes ushered in with convulsions; and intermittent fever, especially the first attack, may manifest itself by convulsions. Finally, intoxication, uremia, and psychical causes, such as sudden fright, are at times etiological factors. Cases of severe fall or blow upon the head are not rarely followed by convulsions, and the history of trauma is often of more importance etiologically than the real lesions. Sometimes the convulsions are the beginning of true epilepsy, which may later, possibly not until years after, follow in typical form. It must be determined whether hysteria does not now and then play a rôle, especially if it is more a question of delirium, ecstatic conditions, or fainting spells, sometimes manifesting themselves after or during the intervals of the convulsive attacks. At all events, everything must carefully be looked into and all circumstances weighed, even from the point of view of prognosis, since the prognosis in convulsions due to single reflex causes, *e.g.*, overfeeding, worms, or phimosis, is naturally better than in conditions of a chronic nature (nervous diseases, etc.).

First of all, an anatomical lesion of the brain must be excluded. The latter is indicated, above all, by unilateral convulsions, notably when the same side is affected not only in the first, but in all subsequent attacks. It must, of course, be borne in mind that this sign is not absolutely positive, for, on

the one hand, bilateral convulsions may appear in unilateral brain disease (*e.g.*, tubercles), and, on the other, unilateral convulsions are not always dependent upon true cerebral disease. Finally, the convulsions may be unilateral during the first attack and bilateral in those following. Unilateral convulsions, however, always remain an important factor and demand careful examination of the child during the intervals of the attacks. Some brain diseases (*e.g.*, tubercles and tumors) manifest themselves even for months by nothing else than periodical convulsions, while the other symptoms do not develop until later. It must be remembered, however, that not all symptoms appearing during the intervals, such as pallor, apathy, shrieking with terror, febrile attacks, etc., are immediately to be looked upon with suspicion, for they are apt to follow all kinds of convulsions in children, without any grave underlying cause. The prognosis must therefore always be guarded, and a precise opinion should be ventured only after prolonged observation of the patient.

From a therapeutic standpoint inquiry into the causation is an important matter, since further attacks may often be prevented by removal of the cause. Thus, in cases due to intestinal irritation surprisingly good results are often obtained merely by thoroughly cleansing the alimentary canal (by emetics, purgatives, and enemas). Sometimes surgical interference (in phimosis, nasal polyps, etc.) is necessary, at other times (in rachitis, renal calculi, etc.), prolonged treatment. By treating the causes the convulsions will sooner or later be mastered and new attacks prevented. Until then, if the cause cannot be detected or if the paroxysms become so frequent as to threaten life, every effort should be made to prevent recurrences and to combat the simple attacks as already mentioned. This is best accomplished by ice applications to the head, in strong children, by a few leeches and by prolonged administration of bromids or chloral (or both combined). The diet should be regulated, all alcoholic beverages interdicted, and rest in every respect insisted upon. The patient should, if possible, be sent to the woods or mountains. Such after-treatment is important in every case, regardless of age, even if but one attack occurred, for one can never foretell what the future will bring forth.

Tetanus.—Traumatic tetanus in children agrees in all particulars with tetanus of adults. Tetanus serum has frequently been used in this condition with partial success. Following the method advocated in France, Kocher recently successfully employed intracerebral serum injections in a child 12 years of age. [Several successful cases of this nature have recently been reported in this country.—SHEFFIELD.]

Tetany.—Tetany in children is characterized by attacks of tonic spasm limited to certain groups of muscles (usually bilateral), which almost always develop spontaneously. The attacks usually appear without loss of consciousness, but are almost regularly associated with exaggeration of mechanical and galvanic irritability, and last from a few minutes to several hours. The frequency of the attacks varies from several a day to a few a week. These characteristic, intermittent, often apparently painful contractures affect chiefly the upper extremities, preferably the small muscles of the hand, giving rise to the shape of hand known as that holding a pen or of an *accoucheur*. The first phalanges of the fingers are strongly flexed, while the middle and terminal phalanges are extended. The four fingers are firmly pressed together, while the thumb is strongly abducted and turned in against the palmar surface of the fingers. Not infrequently the lower extremities are likewise affected. The legs are adducted and the plantar surface of the foot is strongly arched (carpopedal spasm) with a tendency to an equino-varus position. Occasionally also the muscles of the neck and back are involved. Escherich speaks of it as pseudotetanus *(q.v.)*. Cases also occur in which the spasms are entirely absent, but may mechanically be induced by *Trousseau's phenomenon—i.e.,* if in such "latent" tetany the main nerve-trunks or vessels of the arm are pressed upon in the region of sulcus bicipitalis internus to such an extent as to arrest arterial or venous circulation, tetanic spasms are produced. This phenomenon is an "obligate sign of latent tetany," for it is not observed in any other affection. In addition to the spasm, tetany is recognized by two more positive signs: so-called "triad of tetany":—

1. Exaggeration of the mechanical irritability of the motor nerves *(Chvostek's phenomenon)*, particularly of the facial region

(facialis phenomenon). If percussion is practiced with the fingers or a hammer upon a branch of the facial plexus while the child keeps its face still, lightninglike contractions ensue.

2. Exaggeration of the electric irritability of the motor nerves *(Erb's sign):* even a very slight electric current produces KaS_2[1]; upon slightly increasing the current the contraction changes into *KaSTe;* sometimes also *AnOeTe* and sometimes *KaOeTe.*

Both of these symptoms are, of course, very difficult of demonstration, and are not always found in tetany. But, if they can be demonstrated in cases in which the spasm is absent, they certainly prove a valuable diagnostic aid in addition to Trousseau's sign. Tetany is very often combined with laryngospasm, or signs of tetany are sometimes detected in children suffering from laryngospasm. This is of such frequent occurrence that Escherich and Loos look upon laryngospasm as a *syndrome* of tetany, and Henoch goes so far as to deny the existence of tetany as a special disease and recognizes laryngospasm only. Equally disputed is the relationship of tetany to rachitis. Very often signs of rachitis are found in children suffering from tetany, and, as both affections grow worse in number and intensity in the spring months and are usually met in children of a certain age (3 months to 3 years), some authorities, *e.g.,* Kassowitz, consider tetany a direct symptom of rachitis, while others—as Escherich—believe that rachitis is merely a very frequent complication of tetany, its simultaneous appearance being due to some injurious influences (noxious exhalations of human beings living crowded together—"poor-man's odor," deficiency of light, exercise, etc.). However, tetany also occurs in perfectly healthy, particularly artificially fed, children. Quite frequently tetany also appears abruptly after intestinal disturbances, dyspepsia, and acute indigestion; so that here an auto-intoxication must necessarily be thought of. A nervous disposition apparently predisposes to tetany, and this disease is sometimes found in several members of the same family. Also acute infectious diseases may give rise to an attack of tetany.

[1] [*Ka* signifies cathode; *An*, anode; *S*, closure; *Oe*, opening; *z*, weak contracture; *Te*, tetanus.—SHEFFIELD.]

The PROGNOSIS of tetany is generally favorable. In the majority of cases recovery usually takes place after a few weeks or months, nay, even days, *e.g.*, in tetany following acute indigestion. The prognosis is rendered more gloomy by simultaneous presence of laryngospasm, and still more so by general eclampsia, which often complicates tetany. In both of these conditions tetany may end fatally.

The TREATMENT of tetany consists in attention to etiological factors, *e.g.*, disturbance of the stomach and bowels; also to the rachitis, when phosphorus [and proper diet] is very effective. In frequently recurring attacks the administration of large doses of the bromids [and trional] and enemas of chloral are indicated. [Hot baths and galvanism and also a vermifuge should be tried.—SHEFFIELD.]

Spasmus Glottidis (Laryngospasmus, Laryngismus Stridulus), called also by the laity "swooning," or "internal convulsions," is a temporary constriction of the glottis by a tense spasm of the laryngeal muscles on the part of the recurrent nerve. It manifests itself by a sudden condition of apnea of a few seconds' duration and usually affects children from 6 to 24 months of age. It occurs also, but more rarely, in younger children, even in those only a few days old (congenital?). Sometimes in the midst of perfect repose, *e.g.*, during the night when waking up, or during a fit of crying, anger, or fright, etc., they completely lose their breath for a short time, struggle fearfully, turn pale and often somewhat cyanotic, and with staring look gasp for air. Respiration is not established until the conclusion of the attack, and is preceded by a few sighing, wheezing inspirations.

Spasmus glottidis is generally due, as Kassowitz justly maintains, to rachitis, and not to craniotabes *per se*, as asserted by Elsässer. Kassowitz's view that it is caused by an irritation of certain nerve-centers following hyperemia of the cranial bones has so far proved to be a mere hypothesis. The same may be said of all the other explanations as, *e.g.*, that of Rehn, that spasmus glottidis is always attributable to deficient nutrition and that it abates under proper feeding. Neither is the theory advanced by Escherich and Loos true that spasmus glottidis is always a symptom of tetany which may be demonstrated in every case by existing overirritability of other nerve groups, etc. In

presence of a predisposition (rachitis!) attacks of spasmus glottidis may set in immediately as a consequence, *e.g.*, of catching cold (catarrh of the upper air-passages), reflex irritations (dentition, diarrhea, constipation, etc.).

The attacks repeat themselves often during the day (from two to twenty or thirty times), and usually continue to recur, with short intervals of improvement, for weeks or months, when they finally disappear, particularly under proper treatment. The prognosis in general is therefore good. Still, death from exhaustion may sometimes follow repeated attacks of the disease. The danger lies, however, more frequently in extension of the disorder, during the attacks or their intervals, to other regions of the body, *e.g.*, to the pectoral muscles and diaphragm (irregularities of breathing), to the ocular nerves (rolling of the bulbi upward), or to the extremities (contraction of the fingers and toes, etc.). It unfortunately frequently terminates in, or is complicated by, general eclampsia and convulsions. Finally, sudden—as quick as lightning—death occurs, sometimes during a simple attack of spasmus glottidis, owing to asphyxia following prolonged apnea. In such cases death is, according to Escherich, sometimes due to *status lymphaticus*—a condition that so often affects children suffering from spasmus glottidis. The physician should therefore never give an absolutely favorable prognosis, for after weeks of mild attacks a sudden fatal attack may supervene unexpectedly.

The TREATMENT is chiefly antirachitic. Phosphorus is usually very effective, the opinions of Escherich and Loos to the contrary notwithstanding. Removal of exciting causes, attention to rational feeding, regulation of the bowels, avoidance of colds, etc., are of course, of great importance in cases with a predisposition and for the prevention of recurrences.

For the attack itself, which, owing to its brevity, is rarely witnessed by the physician, the attendant of the patient is instructed to dash cold water, excite choking motions by pressure upon the root of the tongue, and use eventually artificial respiration [in very severe attacks intubation, if possible—SHEFFIELD]; also to introduce the bearded end of a quill in the nose to excite sneezing; remove tight clothes. In very frequent attacks the administration of morphin, bromids, musk [sulphonal] (see

"Potassium Bromid"), and camphor monobromate is indicated. That state of swooning, which occurs as a result of overexertion in angry, spoiled children during crying, whenever their wish is not gratified, must not be mistaken for spasm of the glottis. That condition manifests itself also by apnea during a fit of crying, cyanosis, then deep wheezing inspiration, followed by renewal of crying and raging. Such attacks are not at all dangerous, and are remedied by severity and dashing of a glass of water in the face.

Idiopathic Contractures, *e.g.,* of the fingers and toes, are not infrequently observed during attacks of spasm of the glottis, at times also in the intervals. The conditions under which they otherwise occur are the same as in eclampsia. The contractures not infrequently alternate with the latter and with spasmus glottidis. They may be either transient in nature or persist for hours or even days. In the latter event edema or cyanotic discoloration of the contracted parts often occurs from pressure of the strong muscles against the blood-vessels, and occasionally true ecchymosis is observed. The contractures usually relax during sleep.

Brain disease, especially tuberculosis, must be suspected as the cause of unilateral contractures, but bilateral contractures also may occasionally have the same origin. According to Henoch, the contractures are identical in nature with convulsions (representing merely an abortive form) and occur under the same conditions, *i.e.,* chiefly in dyspepsia, meteorism, etc., in tapeworm, dentition, reflexly from the genitalia, etc. They are most frequently found in rachitis, which explains their frequent association with spasm of the glottis. There is sometimes an intermittent type.

Pseudotetanus.—This term is used by Escherich to designate a disease which belongs to the domain of tetany *(q.v.).* It is distinguished from the latter, however, by its predilection for the muscles of the trunk. Escherich relates the clinical histories of three boys—6, 9, and 9 $^1/_2$ years old, respectively—which agree in all details. The patient, who was previously entirely healthy, wide awake, and free from any hereditary predisposition, suddenly complains of a sensation of stiffness in the bones, which so hinders walking that he must take to bed.

The stiffness rapidly extends upward and involves the back and head; so that the patient lies stretched out motionless, like a log. The muscles of the body, neck, and legs are contracted to their highest extent, strongly prominent, and as hard as marble. The facial muscles also are in a state of tonic spasm; the teeth are firmly pressed together and can barely be separated even by force. Nevertheless, there is little difficulty in nourishing the patient; indeed, he is usually able to feed himself. The rigidity ceases to a great extent, but not completely, during rest and sleep. Chilling, noise, manipulation, and psychical excitement usually produce severe paroxysms, which excite more severe contractions, pain, opisthotonos, spasm of the diaphragm, dyspnea, etc. During the acme of the disease such paroxysms may occur spontaneously several times a day. After such a paroxysm the patient is always bathed in perspiration. While the body is rigid and resembles carved wood, the arms, legs, and eyes are freely movable. All other organs and functions are normal. This condition persists almost unchanged for from three to eight weeks, whereupon the contractures gradually cease and the patient is induced again to use his legs (usually after much persuasion). Complete recovery takes place from two to four weeks later.

The first case was primarily mistaken for hysteria and then for cryptogenic tetanus, and, as it was also impossible to find the characteristic symptoms of tetany, except exaggerated tendon-reflexes and increased mechanical irritability of the muscles, which could readily be evoked by tapping the orbicularis oris, the condition was finally recognized as "essential contracture," which, among all diseased conditions, most resembled tetany.

This affection appeared in a similar manner in two infants 9 and 12 days old, respectively. It began with trismus and general rigidity; the arms also were involved, and the fingers were clinched over the thumb. Tetanus was suspected (navel!), and pseudotetany was not recognized until after the expected exaggeration of the symptoms failed to appear and the rigidity, without any other symptoms, continued for weeks and finally gradually abated. Both patients succumbed to exhaustion at the age of 7 and 8 weeks, respectively. Postmortem examination proved negative.

Hysteria occurs quite often in children regardless of age, but especially in school children and in girls at puberty. With the exception of a few peculiarities it appears in children in the same manner as in adults. Thus, the monosymptomatic form *(forme fruste)* predominates, *i.e.,* only one manifestation of hysteria is observed (paralysis, contracture, etc.), while the other signs of hysteria, especially stigmata, anesthesias, hysterogenic points, etc., are absent. It is therefore very important to recognize the various hysterical manifestations as such. Paralyses, either atonic or associated with contractures, are especially common and develop very rapidly. Paraplegia of the legs is particularly frequent, and more rarely that of the arms. Hemiplegias also (face is usually unaffected) are met and very often also monoplegia of single limbs or a portion of a limb. The tendon-reflexes are not as often exaggerated as in adults, and disturbances of sensibility are less frequent. The contractures may involve any joint, but preferably the tapering extremities. At times all the articulations of one extremity are involved and the contractures are usually very strong and quite painful. Certain contractures, *e.g.,* of the neck and back, are apt to be mistaken for other diseases, such as caries of the vertebral column, torticollis, etc. Very often *abasia-astasia* is met—a condition in which the muscles can be used for all purposes except standing and walking. If the patient attempts to stand or walk he immediately falls to the ground or begins violently to tremble and topples over, or he manifests ataxic symptoms (cerebellar type). Abasia-astasia is either continuous or intermittent. Sometimes difficulty in walking becomes manifest when the patient takes the first few steps, while he walks well afterward. Aphasia, which is sometimes associated with coughing or singing and mutism or stuttering are also often present. Blepharospasm is very frequent and, as a rule, very obstinate. It generally follows closure of the eye resulting from inflammations or foreign bodies.

Of motor symptoms, the following may be mentioned: Tremor, choreic and athetotic movements, pronounced chorea; and also hemichorea, *chorea electrica* (Henoch), and *chorea rhythmica* (Charcot), which is characterized by regular movements of the extremities resembling certain professional athletic exercises, such as rowing, swimming, and hammering, and is

often associated with psychical disturbances (delirium). The latter is more often the case in *chorea magna*, a specific hysterical affection in which the patients turn a somersault, climb walls, and jump. The patient is like one crazed, and often manifests enormous muscular strength. Sometimes grimacing and conditions resembling "tic convulsiv," etc., occur. Furthermore, hysteria sometimes gives rise to epileptiform and true epileptic attacks *(hystero-epilepsy)*; cataleptic conditions; sudden transient attacks of somnolence lasting seconds, minutes, or hours, and varying from brief sinking spells to a state of trance; well-developed somnambulism; hallucinations; delirium; mania; and, finally, *pavor nocturnus*. Not infrequently there are also convulsive conditions, such as spasmodic cough *(chorea laryngis)* and screaming, singultus, tachypnea, and asthma.

There may be neuralgia, *e.g.*, of the articulations; amblyopia; amaurosis; dysphagia; anorexia; total abstinence from food (up to starving); vomiting; tympanitis; retention of urine; trophic disturbances (edema, etc.); cutaneous affections, such as herpes, pemphigus, gangrene, etc., which are artificially produced (*e.g.*, through burns). Like adults, hysterical children injure themselves purposely, *e.g.*, cut off their braids and at times manifest great desire to imitate diseases—in order to excite pity, attract attention, to be operated upon, etc. The most diverse combinations of the symptoms just mentioned are observed. Their rapid variation is characteristic.

Heredity plays an important rôle in the ETIOLOGY. In this connection it is well to remember that hysterical parents often train their children badly, spoil them by making them the central figure of their household, by laying entirely too much stress upon every little indisposition, etc., and besides by giving them opportunity to observe and study hysteria. Indeed, imitation is one of the chief factors in the causation of hysteria, and is quite frequently happens that, *e.g.*, real organic diseases are imitated after their removal and give rise to outbursts of hysteria. For example, aphonia after recovery from laryngitis; articular neuralgias after rheumatism; scoliosis after pleuritic pain. Furthermore, one case of hysteria in a school, boarding house, etc., may cause epidemics of it. Anemia, puberty, and onanism are also important predisposing causes, and psychical factors, such as

fright and fear of punishment in school (therefore sudden development of symptoms just before going to school) also give rise to attacks of hysteria. Simulation, therefore, must always be borne in mind.

Organic diseases are often mistaken for hysteria, even by good authorities. Indeed, both may frequently coexist. In order, therefore, to make a correct diagnosis, aside from careful examination, the history must very minutely be considered. The etiological factors, the whole environment in which the child grew up, etc., must be carefully studied, and the physician should be on the alert not to be deceived. He must remember that in hysteria not only are several symptoms imitated and purposely introduced, but diseases (*e.g.*, tuberculous meningitis!) as well. In cases difficult of differentiation the physician must be guided by the symptoms just enumerated—sudden onset, rapid change of symptoms, etc.,—and also by the exaggeration of the manifestations, for example, hysterical patients often act like insane subjects during pain, the contractures are very firm, etc.

The PROGNOSIS of hysteria in children is generally better than in adults.

The TREATMENT, which must be begun energetically at the earliest inception of the disease, can do much, especially in young children. Children can more easily be influenced, impressed, and intimidated. They are more accustomed to obey, more credulous, etc. The older the child and the more chronic the hysteria, the more difficult the treatment, which is, of course, chiefly psychical in nature. First of all, the patient must be removed from the usual surroundings—*e.g.*, to a hospital. Moreover, a strange physician has more influence over the malady than the family physician, the "Uncle Doctor." Taking by surprise, as firmly commanding the paralytic to walk, or indifference,—disregarding the complaints and suffering,—will often cause the hysterical symptoms rapidly to disappear. Sometimes it requires disagreeable procedures (electricity, douches). Good results are also obtained by hypnotism in conjunction with attention to anemia, etc., if present. Recurrences are, unfortunately, not rare.

Catalepsy (Flexibilitas Cerea) occurs comparatively frequently in children. Sometimes after psychical effects, such as

fright, anger, etc., a cataleptic attack suddenly develops, and in the midst of the excitement the child stands with staring look as though rooted to the spot and remains undisturbed by his surroundings as though in a dream. If the body is artificially placed in another position, the patient retains this new attitude as though terror-stricken, and acts like a jointed doll. The attack may disappear in a few seconds or minutes, but may last hours and days. Sometimes the disease terminates with this one attack. Usually, however, the attacks return sooner or later, for in catalepsy an hysterical condition is at play and not rarely also a combination of chorea and epilepsy. The prognosis is gloomy.

The TREATMENT is the same as in the diseases just mentioned.

Epilepsy is not a rare disease of childhood. It is quite frequently congenital and manifests itself in a typical form, even at an early age. In young infants, however, it more frequently appears in a rudimentary form, and the characteristic attacks do not develop until later. An hereditary tendency plays an important rôle, and syphilis, particularly alcoholism, and nervous diseases in the parents are predisposing causes. The parents or grandparents are not necessarily epileptic, but often simply hysterical, neurasthenic, or show other mental anomalies. In children thus predisposed epilepsy occurs spontaneously or after some exciting cause, such as severe infectious diseases, premature use of alcohol, dentition, masturbation, fright or excitement, slight traumatism of the skull (blow or fall), overexertion, acute gastro-intestinal disturbances, foreign bodies in any organ, calculi, worms, painful scars, carious teeth, nose affections, adenoid vegetations, phimosis, strictures, cryptorchidism, imitation after watching an epileptic attack, etc.

"Genuine" epilepsy is to be distinguished from the cases in which epileptiform attacks appear either as a symptom of some brain disease or anomaly—such as tumors, encephalitis, arrest of development, etc.—or as a result of severe trauma of the skull. Bone depressions, bone-thickening, and scars, beneath which small cysts, hemorrhages, or abscesses may be found, may exert pressure on some portion of the brain cortex and give rise to epileptic attacks—*cortical,* or *Jacksonian, epilepsy.* Here, as in the adult, the convulsions correspond with the seat of the

anomaly, begin first unilaterally only in one limb, or in circumscribed groups of muscles, but during the attacks usually extend to other parts of the body. In every other respect epilepsy in children resembles that in adults.

Like in the latter, epilepsy, begins either with severe complete [*grand mal*] or slight incomplete [*petit mal*] attacks. In the former prodromata are rare, but the aura is usually present and motor, sensory, or vasomotor in nature. In small children only the motor aura is noticed,—slight twitching of the limbs, eyes, and head; spasm; tremor—and very rarely also the vasomotor aura, while older children usually tell of sensory prodromata such as a vague sensation in the stomach, a feeling of numbness or of pricking in the limbs, etc. The aura is sometimes connected with the sphere of hearing—hearing of noises; vision—seeing of colors and sparks; and more rarely with the olfactory system—disagreeable odors. Furthermore it gives rise to marked restlessness, irritability, hallucinations, delirium, and somnolence. As such manifestations may recur for years without the occurrence of true epileptic attacks, they should be very carefully observed, especially in otherwise healthy children and regarded and treated as prodromata of epilepsy.

Also those slight, mild, rudimentary attacks seen in adults are met in children. They are manifested by sudden attacks of fainting and pallor. Often in the midst of play the children stand for minutes with staring, absent-minded expression, and then resume their play as though nothing had happened, or they sink down feebly and suddenly. Instead of the typical convulsive seizures, momentary states of mental confusion, catalepsy, and acute mania may occur. The so-called *postepileptic* mental disturbances and severe delirium, which may be associated with acts of violence, lasting for hours or even weeks, and possibly terminate in total imbecility, are also occasionally observed in children. During the intervals of the attacks the children are usually quite normal. In some children, however, slight disturbances, *e.g.*, of speech and vision, and weakness of memory, are noticeable. Others, again, especially children with an hereditary diathesis or in whom the attacks are very frequent, retain moral defects, fail in intelligence, and sink into a state of idiocy or complete imbecility.

The frequency and time of recurrence of the epileptic attack cannot be predicted, as these vary greatly in different persons or even in the same individual, and depend partly upon exciting causes, such as faulty diet, excitement, fright, helminthiasis, etc., capable of exciting a new attack. Therefore, before inaugurating a method of treatment with the view of either preventing new attacks or curing the disease, it is important first to investigate and weigh all the etiological factors. Recovery is more apt to occur in children than in adults, but such a termination is extremely rare. Indeed, a cure can really never be spoken of, as new attacks may occasionally occur even after intervals of ten or twenty years. However, considerable improvement can be obtained by removing the etiological factors and avoiding, in the mode of life and occupation, everything that tends to produce new seizures. As prophylactic measures, there may be mentioned: avoidance of irritating food, alcoholics, constipation, overexertion, psychical effects, and interdiction of school attendance. In addition, bromids [bromipin] should be administered. These usually act quite favorably or with more certainty than zinc preparations or silver nitrate. Mild hydropathic procedures, change of air, etc., are also of value. Sometimes it is desirable to send the patient to an institution for epileptics [*e.g.*, the Craig colony for epileptics].

[In administering bromids it is always advisable to begin with the smallest dose that will control the seizures. Epileptic attacks with a distinct aura are sometimes successfully aborted by the inhalation of amyl nitrite. To avoid biting the tongue a spool or cork should be placed between the patient's teeth. Very violent attacks may be mitigated by chloroform inhalation.—SHEFFIELD.]

In Jacksonian epilepsy surgical procedures have given good results, either simple trephining or simultaneous removal of scars and impacted sequestra; also opening of abscesses, extirpation of cysts, and even removal of small portions of the brain-cortex.

Idiocy is an impairment of intellect varying in degree from slight weakness of the mind *(imbecility)* to total dementia and complete loss of mental activity. The affected individual is like an animal—is unable to obtain an impression of the outer world

or to realize it normally or to form a conception of anything. The functions of the higher senses are very deficient, the power of speech is undeveloped, etc. In contradistinction to these cases, in whom every expression of psychical activity is lost, there are numerous others whose mental activity is more or less developed or capable of development, some who are able to form some conceptions and to speak a few words, and others who are only "slightly gifted" and whose lack of mental development in comparison with other children of the same age is not discovered until they go to school. In severer degrees of idiocy the difference between these and healthy children of the same age does not escape observation even in children but a few weeks old.

Idiocy may be congenital, inasmuch as diseases during intrauterine life may leave a permanent defect in the brain. This form not infrequently occurs especially in strongly neurotic families, where the parents are often subject to hysteria, epilepsy, chorea, and the like. Alcoholism and syphilis also play an important rôle, and intermarriage between near relatives exerts an especially deleterious influence if both sides of the families are disposed to nervous diseases. More rarely traumatism during pregnancy is the cause of congenital idiocy. Some of the latter cases present either large anatomical defects in the brain and total deficiency of larger or smaller regions, or partial defects *(porencephalia);* also microcephalus, encephalitic processes, thrombi, and hemorrhages which give rise to atrophy or sclerosis.

Sometimes idiocy develops later in life and marks important stages of development, *e.g.,* teething or puberty. Not infrequently idiocy is acquired as a result of trauma during birth. Tedious labor especially acts as an etiological factor, and many children born badly asphyxiated are apt to contract idiocy later. Subsequent trauma (fall from the cradle, from the chair, etc.) may also produce idiocy.

Quite frequently it results from convulsions of such mild degree as to receive but little attention—*e.g.,* from intestinal disturbances and during the onset of infectious diseases. The latter are often followed by idiocy even without convulsions. Meningeal, encephalitic, and thrombotic processes and hemorrhages with consequent sclerosis or atrophy of the brain form the anatomical basis also of acquired idiocy. Idiocy develops espe-

cially in children who suffered from acute meningitis early in childhood and often also secondarily to hydrocephalus. There is also a close relationship between epilepsy and idiocy, and not a few epileptic children gradually develop into idiots. Idiocy should not, however, be mistaken for cretinism, myxedema, or dwarfism. These are conditions which not rarely betray a close resemblance to idiocy, but, nevertheless, possess nothing in common with true idiocy.

The PROGNOSIS of idiocy is bad. Nothing can be done therapeutically. If the idiocy is due to syphilis, some cures are occasionally obtained by means of specific medication. A few good results are also attributed to the use of thyroid gland substance [iodothyrin], but only mild cases yield to it. Excellent results can hardly be expected from operative interference (microcephalus). Pedagogical influence is usually the only measure left in the treatment of idiocy, and in milder cases, if properly instituted (idiocy institutions), it is frequently productive of benefit. If the dementia is severe, all hope of ever improving the condition must be abandoned.

There is another special degenerate variety of idiocy,—the *Mongolian type* (Calmuck type of the English),—so called because the children who usually die young possess from birth an expression of countenance strikingly resembling that of this race; so that all of them resemble one another like brothers and sisters, and it is at once apparent that all of them will become idiots. The face is flat; the nose short, flat, and very broad, and bound laterally toward the eyes by distinct vertical folds; the eyes and, at times, also the mouth are very small, narrow, and oblique. The tongue protrudes from the usually open mouth. The skull is rounded; the occiput runs quite parallel with the plane of the face. The circumference of the head is smaller than normal. Other malformations or anomalies, aside from those mentioned, are often observed: thus, atresias; congenital heart disease; congenital weakness of the articulations; also marble-like appearance, dryness, and roughness of the skin; arrest of growth in length; plumpness of the hands and feet, and large abdomen. The latter symptom occurs also in all other varieties of idiocy. From the first mental backwardness is the chief characteristic symptom of idiocy. Aside from physical defects,—

e.g., they begin to walk later, teeth slowly, etc.,—the cause of this arrest of development is still very obscure.

This is true also of the other degenerate variety known as *family* or *amaurotic idiocy*, which was first observed a few years ago by Sachs and subsequently by several others. This variety occurs especially in Jewish families, in whom, as a rule, several members of the family are affected. It usually begins when the (normally born) children are from 3 to 8 months old, and becomes manifest by gradually increasing debility and atony of the whole muscular system; this is soon followed by diplegia; mental debility, which terminates in total idiocy; and gradual diminution of vision up to total blindness [and of hearing in a case under my care]. Ophthalmoscopic examination reveals a grayish-white cloudiness of the macula lutea with a central cherry-red spot, usually a degeneration of the papilla; later optic atrophy, which is, as a rule, complete when the child reaches 1 year of age. Marasmus and death usually occur in the course of two years. Severe disturbances and degenerative processes in the brain, spinal cord, and retina form the anatomical basis of this rapidly terminating etiologically obscure disease.

Neurasthenia in children, especially school children, is not at all rare. Mental and physical overexertion is the chief cause (often also onanism!). Weakness of memory, absent-mindedness, change in behavior, abnormal sensations, timidity up to true phobia, headache, dizziness, cardiac palpitation, tremor, disturbance of sleep and nutrition, etc., constitute the symptomatology. Neurasthenia is often combined with organic nervous disease, such as paralysis and chorea.

The PROGNOSIS is favorable. With good care, roborants, dietetic treatment, and hydriatic procedures the neurasthenia usually disappears.

Melancholy is one of the most frequent psychical disturbances of childhood, and is observed particularly in children from 8 to 15 years of age. A child suffering from melancholy shows, in contradistinction to mania *(q.v.)*, retardation of every physical and mental activity. Without cause it is depressed and sad, neither seeks nor finds pleasure anywhere, does not play, retires to a lonesome corner, broods, and speaks little or not at all. Self-accusation and self-underestimation are not rare, and hallucina-

tions may lead to excitement and paroxysms of rage. Suicide is not infrequently a result of melancholy. Melancholy frequently progresses up to true stupor. The patient lies motionless and apathetic, reacts to nothing, and even voids urine and feces while in this condition.

The PROGNOSIS is generally favorable. As a rule, improvement and recovery take place, after months or sometimes weeks. Sometimes, however, it is followed by mania or even dementia. Some patients succumb to exhaustion, others to suicide. Careful supervision and nursing, therefore, constitute the chief treatment.

Dementia.—*Acute dementia (acquired imbecility)* is rare in children. At the earliest it occurs at and after puberty, exceptionally before. It appears after severe sicknesses (typhoid, scarlatina, etc.) and occasionally after severe emotion, precocious worry, overexertion, and masturbation. It is met in two forms, one of stupor and one of agitation, both manifested by considerable deficiency of intellect. The patients resemble idiots for some time, but after weeks or months the intellect gradually returns and the dementia disappears. It rarely terminates in permanent imbecility. *Paralytic dementia* almost never occurs in small children and is extremely rare in older ones. At times it is due to hereditary syphilis.

Circular Insanity is a very exceptional, periodical, usually hereditary, mental disease of childhood, occurring at puberty or even later. The attacks consist of mania and stages of exaltation and delirium, which sooner or later terminate in melancholia (or *vice versa*). The attacks last for days or weeks and are followed by lucid intervals of months' or even years' duration. As a rule, the lucid intervals gradually become shorter.

The PROGNOSIS is quite unfavorable, and the children must be under constant supervision or committed to an institution.

Mania manifests itself chiefly by a striking acceleration of all cerebral and bodily functions. In children suffering from this disease an overhastiness of speech and action is always noticeable. Thoughts and impulses follow one another with unusual rapidity. Mania also manifests itself by a wide range of ideas, great activity without resulting exhaustion, and a craving on the part of the patient to destroy everything that he can

see and reach—even his clothes or his person. The patient is unable to combat his desires or to moderate anything. He abandons himself to his desires and passions; is usually in an irritable, exalted mood; is wild, bold, also shameless, and without sense of decency. He is frequently tormented by hallucinations; he screams, cries, and raves. On the other hand, he may, nevertheless, retain his mental power for smart ideas and possess actual brilliancy of thought. As his sleep and appetite are usually very poor, he is soon exhausted physically.

The PROGNOSIS is, nevertheless, quite favorable. After a slow or sudden onset the disease remains stationary at its acme for several weeks, and then usually shows signs of improvement. The latter is usually first manifested by more restful sleep.

Febrile diseases, overexertion, emotion, and, in girls, sometimes menstruation are the usual etiological factors. It is occasionally preceded by a stage of depression and melancholy. The duration varies from five to twelve months. Careful supervision and nursing (also in an institution) are of primary importance, in addition to administration of hyoscin hydrobromate (0.0003 to 0.0006 [gr. $^1/_{100}$ to $^1/_{200}$] three times a day) sulphonal and trional, and prolonged cold douches, etc., which serve as adjuvants.

Delirium Tremens is extremely rare in children. The case of a boy of 5 years who was an habitual drinker of brandy was reported by Cohn (1888).

Simulation is extensively observed in children and must always be borne in mind whenever confronted with a case of convulsions, tremor, paralysis, etc., with an indefinite etiology. Vomiting, pain, dyspnea, and even hematuria (coloring with carmin!) may be simulated. Dread of school, punishment, etc., or, as often happens in hysteria, the desire to excite interest, drive to simulation. In fact, simulation may be due to hysteria and nervousness. An experienced physician is well able to detect simulation; of course, this is best accomplished in hospitals. The patient should be made to understand that he is "faking," or a confession should be elicited by kind persuasion, application of electricity, or by threatening an operation, etc.

Chorea (St. Vitus's Dance).—Chorea is the most frequent of all neuroses of children, especially in girls from the beginning

of the second dentition up to puberty. It is observed also in children under 3 years of age, and occasionally even in those under 1 year. Children of "nervous" temperament are more predisposed to it, and masturbation and abuse of alcohol act also as predisposing causes. Chorea is probably due to an irritable condition of the center of co-ordination, but it is most frequently looked upon as an infectious disease—the same infectious agent as in articular rheumatism *(q.v.)*. The frequent occurrence of epidemics of chorea in public and boarding schools, although an increase of cases after "taking cold" is well known, is no proof of its infectious origin, for here it is a question of hysteria spread by imitation. Anatomical alterations of the central organs are absent—a fact strikingly verified by the general favorable prognosis of the disease. Chorealike movements in brain disease, postparalytic hemichorea, etc., do not belong here.

The cause of the neurosis is as yet unknown. It not infrequently becomes manifest after fright and is sometimes produced reflexly by worms, anal fissure, phimosis, difficult dentition, and caries dentium, and disappears after the removal of the cause. It is also observed in infectious diseases, such as measles, scarlet fever, diphtheria, typhoid, and particularly after articular rheumatism, with which it evidently is closely related. Rheumatism and chorea often appear together. Chorea sets in either during the decline or convalescence or more rarely during the height of the rheumatic attack. Indeed, it may occur in apparently mild attacks of rheumatism, manifesting itself by pain without fever or swelling or in very restricted rheumatic affections, such as caput obstipum *(q.v.)*. On the other hand, both sometimes alternate (more rarely chorea begins first and rheumatism later), and very often chorea is complicated by valvular diseases, especially mitral insufficiency and also by acute endocarditis. It is therefore always important to examine the heart of a choreic patient. It is well to remember, however, that not every murmur indicates heart disease, for such may be due to frequently coexisting anemia or to functional insufficiency from slight dilatation of the ventricles.

The cardinal symptoms of chorea are irregular, uneven, involuntary muscular movements. The movements are the same as in the normal condition,—flexion, extension, adduction, and

abduction,—but they are hasty and beyond control. They involve various sets of muscles intermittently, but usually those of the upper extremities and face, which do not remain quiet for a moment, but continue to make grotesque movements. The shoulders are raised or dropped; the fingers are bent, extended, or shoved one over the other; the head is drawn down laterally; the forehead is wrinkled; the eyes open and close; the angles of the mouth are distorted; the patient seems to be crying or laughing, etc. In severe cases the whole body participates in the movements, so that the patients are unable to stand, sit, or lie still; they fall, stumble, are thrown out of bed and injured. The tongue performs wormlike motions which causes stammering, indistinct speech, and even aphasia, and interfere with eating and drinking. The eyes roll. [The iris was involved in a case under my care.—SHEFFIELD.]

The intensity of all these motions is subject to variations and often marked by temporary improvement. The movements at once become exaggerated if the patient attempts to make a voluntary motion (write, drink, etc.), or if he is being observed. The movements cease entirely during sound sleep and only partially if the patient sleeps restlessly. Sometimes only half of the body is affected *(hemichorea);* this form is more serious than ordinary chorea. Notwithstanding the intensity of the motions, there is almost never a sense of fatigue. The patellar reflexes are often exaggerated. All other symptoms occurring with chorea are not characteristic (*e.g.,* sensitiveness to pressure over the spinous processes of a few, especially the upper cervical, vertebræ; possibility to exaggerate the movements by compression of certain nerve groups, such as the brachial plexus and cruralis nerve). Except the symptoms just mentioned there is perfect health (often anemia). Sensation is almost never disturbed (the contrary would indicate hysteria); pareses, especially of one arm, are rare, while there are often changes in the psychical condition; thus, the patient is irritable, inclined to weep, to be impatient, but real psychical disturbances are rare (at most ecstatic delirium).

The most dangerous complication of chorea is endocarditis *(q.v.),* which is here sometimes fatal, particularly in delicate patients. Otherwise the prognosis of chorea is generally good.

Recovery usually takes place, although the course is very protracted—from four to ten weeks or several months.

The onset of chorea is usually slow and unnoticeable. Rarely, *e.g.*, after fright, the whole clinical picture appears at once. As a rule, the child twitches slightly, now and then snaps the eyes, draws the mouth, blots in writing, is awkward in sewing, and makes mistakes in music. The unfortunate patient is therefore considered impatient and careless and is punished. Gradually the disease becomes more distinct. Cases of slow development and moderate intensity generally tend to run a chronic course, while violent and intense cases are sometimes cured in a few weeks. In cases of several years' duration there is always a suspicion of some other trouble. There is a marked tendency to relapses, after weeks, months, or years, which, as a rule, run a milder and quicker course, but sometimes as severe or even more severe a course than the first attack. In children who once suffered from chorea, slight disturbances, such as overexertion, fright, thunderstorm, reprimand, are sufficient to bring back an attack. At times these patients become epileptics.

Treatment often considerably abbreviates the course of the attacks, but rarely prevents recurrences. The treatment consists, first of all, of perfect rest. The child is kept from school, if for no other purpose than to avoid ridicule by comrades, which may harm the child mentally. In severe cases rest in bed for several weeks, which often acts admirably, or strict avoidance of mental fatigue, psychical excitement, and also interdiction of alcohol. Change of residence — to a distance from relatives (country, woods). Bland, nourishing food, such as milk, eggs, cocoa [ferrosomatose], etc.; regular mode of life, lukewarm baths with cool douches on the head, and careful sponging of the body. Medicinally, arsenic *(q.v.)*, especially Fowler's solution, is the best. [Arsenic, in the form of Fowler's solution, should be given in large, gradually increased doses (from 4 to 20 drops) well diluted in water, three times a day, after meals, until constitutional effects of arsenic (a disturbance of the stomach or bowels or puffiness of the eyelids) are produced, whereupon the dose is diminished.—Sheffield.] If the latter preparation proves ineffectual, arsenous acid is, according to Henoch, often decidedly beneficial. Also aquæ Levico, Roncegno,

and Guber (1 teaspoonful to 1 tablespoonful three times a day). The use of physostigmin *(q.v.)* or zinc oxid *(q.v.)* is often of advantage. In rheumatic complications, sodium salicylate, combined with sodium bromid or antipyrin, often acts surprisingly well. Analgen, lactophenin, and sulphonal are also highly recommended, the latter especially in insomnia, where bromid or chloral hydrate is indicated.

A rare disease affecting especially very young infants is CHOREA PARALYTICA (CHOREA MOLLIS), a general or partial (monoplegia—one arm!) atonic paralysis, with retained tendon-reflexes, which appears after the choreiform movements have disappeared. The latter may be very slight or entirely absent; so that the paralysis is the only manifestation of the chorea. It is, perhaps, due to an intoxication (with rheumatic virus?). The prognosis is good.

Something entirely different is presented by the affection designated by Henoch as CHOREA ELECTRICA, undoubtedly identical with "paramyoclonus," which occurs at times in children of 9 to 15 years, and in which those violent, co-ordinated movements, exaggerated by intentional muscular action observed in true chorea, are never found, but rather appear now and then, at variable intervals (seconds to minutes) as lightning-like spasms, especially in the neck, shoulders, but also in other parts, as though produced by an induced current. The symptoms are rather indistinct and last but a moment. Speech and power of writing, etc., are unaltered. The treatment consists of the administration of potassium bromid and the galvanic current.

SPASMODIC MOVEMENTS [HABIT-SPASM] of the face, fingers, and hands are sometimes seen in children from 7 to 12 years of age who are of a nervous temperament. They persist sometimes for weeks, but never develop into true chorea. They usually disappear on strict discipline.

Spasmus Nutans.—Spasmodic nodding of the head, anteroposteriorly, is due to irritation in the region of the accessory nerve of Willis. It is usually associated with rotatory motions of the head, the latter sometimes even predominating; also with bilateral spasmodic motions of the ocular muscles—as a rule, nystagmus, and more rarely strabismus and rolling motions of

the eyes. The trunk muscles are occasionally also involved. The oscillations are usually permanent, but more rarely paroxysmal. They cease during sleep and sometimes also on exciting attention or firm holding of the head, whereby the nystagmus is aggravated or started. The affection is frequently reflex in nature, *e.g.*, during teething, after which the nodding and other irritations disappear.

According to Kassowitz, spasmus nutans is always due to rachitis. [A case observed by the editor, affecting a colored baby 5 months old, was apparently idiopathic in nature.—SHEFFIELD.] This view is refuted by Henoch, since it usually occurs in young infants, rarely in older children. There is, however, a severer form of spasmus nutans of central origin which is frequently associated with disturbance of intellect, epilepsy, idiocy, etc. The prognosis of this form is bad. Henoch often found a peculiar rocking motion of the body, which is voluntary and has nothing in common with spasmus nutans, in masturbating children; and in three cases he observed fits of laughing as a result of gastro-intestinal irritation. The partial spasms of the neck, extremities, and face,—the latter are often reflex, associated with eye disorders—are identical with those in adults.

The TREATMENT is usually expectant, in addition to removal of the exciting causes and administration of bromids, arsenic, etc., if desirable.

Pavor Nocturnus [Night Terrors] is a form of mild momentary disturbance of the mind. During sleep the child (probably frightened by bad dreams) suddenly jumps up and screams, and looks around staringly and anxiously. He sometimes grasps at the air, trembles, and utters incoherent words; fails to recognize those about him, and is quieted only after some time. This scene is sometimes repeated several times in from one-half to one hour, when the child again falls asleep. He then passes the rest of the night quietly and remembers nothing the next morning. Such attacks occur singly or recur at shorter or longer intervals, sometimes every night, and ultimately disappear after weeks, months, or occasionally years (or not until puberty). The consequences are not bad. The patients, who are usually from 4 to 8 years of age, are generally entirely well

during the day. Pavor nocturnus is usually met in children of neurotic antecedents or in those who have an excited imagination as a result of horrible stories, nursery tales, etc., or are accustomed to the use of alcohol, tea, or coffee, or to masturbation. These children are sometimes affected by adenoid vegetations, hypertrophy of the tonsils, nasal polyps, rhinitis, otitis, and digestive disturbances [helminthiasis].

The TREATMENT consists of removal of the causes, avoidance of alcohol, tea, coffee, exciting stories, etc. Outdoor exercise during the day; light, nonirritating food at night; and administration of bromids and trional. In anemic, irritable children iron, quinin, and Fowler's solution usually effect a cure. The patients should sleep in a quiet, well-aired and slightly illuminated (by a night-light) room on a hair mattress, not too warmly covered, and free from tightly fitting clothes. The evening meal should not be given too near bedtime. Attention should be paid to regular movements of the bowels.

Hemicrania is as frequent in children as in adults and usually gives rise to the same symptoms. It affects especially school children, in whom mental exertion probably plays the chief rôle. Heredity also is deserving of consideration as an etiological factor, for a predisposition to hemicrania is often found in very young children. Anemia greatly favors the development of hemicrania. More rarely affections of the eye, such as asthenopia and hypermetropia, and of the nose—hypertrophy, etc.—act as etiological factors. Occasionally it is also caused by helminthiasis and more rarely by diseased conditions of the genital system, *e.g.*, leucorrhea, which, however, like the hemicrania itself, may be a result of onanism. Headache is quite often localized in the center of the forehead. It is usually, but not always, accompanied by vomiting. On the other hand, typical attacks of hemicrania are occasionally manifested by periodical vomiting, without headache; often also by dizziness, tinnitus, manifold disturbances of the eye, such as muscæ volitantes ("flimmerskotom"), photophobia, seeing of fireballs, lightning, etc., temporary loss of vision; disturbances of sensibility, sensation of stinging and of pricking with pins; deafness, etc.; also general tremor and clonic twitching. It is sometimes associated with epilepsy, to which, by the way, hemicrania is

closely allied, and also with temporary aphasia and perhaps with hysteria.

All these symptoms may precede the actual attack. The attack lasts a few hours, but possibly several days, and is sometimes accompanied by marked restlessness, sensation of heat, etc., during the night. The intervals between attacks last a few days, but may continue many weeks. Mental overexertion (school), distress (scolding, fear of punishment, etc.), and dyspepsia frequently form the exciting causes of an attack. The attacks sometimes cease as soon as the patient is placed in other and more quiet environment and in a healthier locality.

The DIAGNOSIS of hemicrania is not always easy, for protracted headache is sometimes the only apparent symptom of a tumor or tubercle of the brain. Prolonged observation and careful attention to all etiological factors usually clear up the diagnosis.

To a great extent the TREATMENT is based upon removal of the etiological factors, especially upon avoidance of mental overexertion (private instruction, boarding school in the country; sojourn in the mountains, or seashore, at least during vacation). Proper utilization of leisure time by physical and outdoor exercise, swimming, gymnastics, etc. Attention to anemia (iron, arsenic) or to organic disease if present. Also cautious use of the cold-water treatment is at times quite useful. During an attack: rest in bed in a dark room, and bland diet. Medicinally caffein,—often a small cup of strong black coffee is to be preferred,—quinin, phenacetin, antipyrin, bromids, etc.

Neuralgias are, aside from hemicrania *(q.v.)*, rare in children. They are, nevertheless, observed, *e.g.*, in hysteria and malaria (intermittent). They do not differ in any way from neuralgias in adults.

Multiple Neuritis (Polyneuritis) may develop during or after acute and chronic infectious diseases, such as diphtheria, variola, typhoid, parotitis, tuberculosis, or syphilis; or may result from poisoning with arsenic, lead, alcohol, mercury, phosphorus, and carbonic oxid; or, finally, may occur after injuries. There is also a form of simple rheumatic neuritis which is caused by cold. Some cases are etiologically obscure. The association of motor and sensory disturbances in certain nerve regions is

characteristic of neuritis. The motor symptoms usually manifest themselves by atonic paralysis of symmetrical regions, either of the upper or lower or of all four extremities. It generally begins with the lower and later affects the upper extremities, with especial predilection first for the distal portions, and next the extensors of the foot and hand. Gradually other portions of the body may become involved, most rarely the facial nerve, the eye muscles, and the diaphragm; the trunk often remains intact. With the gradually increasing paralysis there is a slow development of continued pain along the nerve-trunks. In the beginning the latter are also sensitive to pressure. The onset of this affection is usually gradual; but it may exceptionally be acute even with fever, chills, convulsions, etc., and progress very rapidly. As a rule, it is a chronic, slowly progressing affection.

Before the appearance of paralysis the patient first complains of numbness, pricking, and chilliness of the parts later to become affected. Symptoms of inco-ordination may also precede that stage. When the paralysis is developed, the reflexes are almost always diminished or lost; the electric excitability is variously changed, and every kind of reaction of degeneration is present. Contractures and deformities are the usual sequels of this process. The sensory disturbances are manifested by a more or less marked alteration of the sensibilities (tactile, pain, temperature, and muscular sense, etc.). In the beginning there is usually hyperesthesia, which later gives way to anesthesia. Vasomotor disturbances (*e.g.*, edema) may also occur in neuritis.

The DIAGNOSIS is generally not difficult. It is apt to be mistaken for poliomyelitis, Landry's paralysis, and hysteria. In *poliomyelitis* the initial symptoms are much more acute; there is no pain in the nerve-tracts, and no such symmetrical involvement as seen in neuritis. In *Landry's paralysis* the paralysis ascends from the lower to the upper extremities without involving the trunk, as it generally occurs with neuritis. In *hysteria* the reflexes are intact and the anesthesia is more regional.

The PROGNOSIS of neuritis is not bad. In most cases improvement takes place after a shorter or longer period. Recovery is frequent. Cases are met, however, in which paralysis or deformities may persist for life. Danger to life occurs only

when the respiratory or cardiac muscles, the vagus, etc., are involved. Intercurrent diseases also, especially bronchitis and pneumonia, may prove fatal.

The TREATMENT consists of mitigation of pain (heat, prolonged baths, or narcotics), and assistance of Nature's curative efforts by electricity (galvanic current), administration of roborants, codliver-oil, iron, quinin, and small doses of strychnin.

Progressive Facial Hemiatrophy is a rare affection which frequently begins in childhood and generally involves only one side of the face. At times it spreads to the chest and the whole part of the body. It is first manifested by atrophy of the skin, beginning with one spot turning white, thin, and later wrinkled, etc. It then gradually spreads over the surface, and also affects the deeper structures—adipose tissue, muscles, and bones; so that a progressive and distinct disfigurement results. Sometimes there are also anomalies of pigment, baldness, etc. Otherwise the disease causes no disturbances. As a rule, motion, sensibility, and the special senses remain intact.

The ETIOLOGY and nature of hemiatrophy is as yet quite obscure. It is probably a trophoneurosis. Anatomically, neuritis of the trigeminus has been found. A predisposition to hemiatrophy is almost always inherited, while external causes, such as traumatism of the face (burns, contusions, etc.), acute infectious diseases, etc., form the exciting cause. Hemiatrophy is sometimes associated with scleroderma, migraine, and Basedow's disease.

Therapeutic measures are of no value except, perhaps, the administration of thyroid gland substance if the disease is associated with exophthalmic goiter. The disease progresses uninterruptedly, and finally reaches a permanent stage.

Facial Paralysis occurs in earliest childhood, even at birth as a result of pressure of the obstetrical forceps. In the crying newborn the mouth is drawn to the healthy side and the paralyzed eye is often only partially closed. As a rule, recovery takes place in a few weeks after absorption of the extravasated blood and the nerve has recuperated. More rarely the paralysis is permanent, owing to too intense pressure and consequent degeneration of the facial nerve. *Congenital* facial paralysis, which is not due to forceps pressure, but which develops spontaneously without any

known cause, is occasionally met. *Peripheral* facial paralysis in older children is due to the same causes that are operative in the adults. During rest nothing is noticeable, but when the child cries, etc., attention is directed to the asymmetry of the face. *"Rheumatic"* facial paralysis, which is due to draughts or colds, is more frequent. It rarely occurs in children under 3 years of age. Sachs saw it in a child 9 months old.

The PROGNOSIS is generally favorable. There are, however, moderately severe and grave cases in which the prognosis depends upon the electric reaction in the first and second weeks. Sachs offers the following prognostic hints:—

"1. If at the end of the first week, or, still better, at the end of the second week, the nerve responds at all to the faradic or galvanic current, prompt recovery in about four weeks may be expected.

"2. If at about the same time the nerve fails to respond, but the muscles show a diminished or altered galvanic response, the disease is likely to run a course anywhere between one and three months.

"3. If the muscles respond but feebly to strong currents, if the galvanic formula is altered, and if the contractions are extremely slow, the disease may run a course anywhere between six months and a year or even longer. If after a period of two months no electric reaction can be observed, the degeneration is very complete, and a paralysis lasting at least a year, if not longer, may safely be predicted."

Mild facial paralysis requires no TREATMENT, as the patient recovers spontaneously. In severe cases electricity is the only effective remedy. A moderate galvanic current very often hastens recovery.

Facial paralysis is sometimes due to pressure exerted upon the nerve by scars resulting from abscesses or glandular swellings behind and beneath the ear in the region of the stylo-mastoid [I observed a case in connection with parotitis—SHEFFIELD]. The most frequent cause of facial paralysis is destruction of the nerve-trunk in the Fallopian canal as a result of caries of the petrous portion of the temporal bone. Henoch almost always found paralysis of all the branches of the facial nerve, but not always unilateral paralysis of the velum palati. "On the con-

trary, the uvula often remained perfectly straight and the mobility of the palate was the same on both sides. Destruction of the facial nerve manifests itself by deflection of the uvula, immobility of one-half of the velum during breathing and phonation, and deviation of the velum to the other side. In absence of this symptom it may be concluded that destruction of the Fallopian canal has taken place only at the distal end of the greater superficial petrosal nerve after its passage through the canal." Otorrhea is usually present, and often discharge of bone sequestra and also of auditory ossicles. Perceptible swelling behind the ear, redness, and fistulous openings may indicate the presence of the deep destructive process, which is not rarely established in earliest infancy (first few months of life), and often rapidly leads to tuberculous atrophy (most of these children are tuberculous) and death; or the patient lingers for years and finally succumbs to complications, such as meningitis, sinus-thrombosis, etc. The longer the duration of the paralysis, the more the facial muscles atrophy. Otitis scarlatinosa also is often the cause of facial paralysis. In this disease caries of the petrous portion of the temporal bone sometimes develops very rapidly, and often facial paralysis is found only a few weeks after termination of the scarlatina.

The PROGNOSIS of this *(otic)* facial paralysis is always dubious. An early operation may sometimes prove curative. On the other hand, just such operations as are performed for the cure of ear affections are often instrumental in bringing about an *artificial* facial paralysis. This occurs as a result of perforation of the fine bone lamellæ which separate the structures of the middle ear from the facial nerve. *Central* facial paralysis, which is caused by meningitis, traumatism, tumors, etc., and generally associated with paralysis of other nerves, acts similarly to that in adults.

XVII.

Diseases of the Bones and Muscles.

Spondylitis (Spondylarthrocace, Caries of the Vertebral Column, Pott's Disease) is a tuberculous ostitis of the vertebral column involving one or more vertebræ. It is usually manifested by an ulcerative and suppurative destruction of the bone. The ulceration begins in or near the middle of the vertebral body and gradually extends. As tubercle-bacilli are prone to settle in slightly injured bones and joints, traumatism, falls, blows, etc., are the most frequent exciting causes. Hence, spondylitis usually affects children up to 4 years of age, who are particularly prone to fall and injure themselves. The suppuration manifests itself pre-eminently by the pus making its way by gravity from its primary focus to distant locations and by the establishment of metastatic abscesses.

In spondylitis of the cervical vertebræ the pus commonly appears as a retropharyngeal abscess. It may, however, also emerge from some external part of the neck, or, as often occurs in spondylitis of the upper dorsal vertebræ, it settles in the anterior mediastinum and from there invades internal organs.

In spondylitis of the lower dorsal (the most frequent seat of the disease) and lumbar vertebræ the pus usually travels downward along the anterior surface of the vertebral column in the sheath of the psoas muscle and emerges from the anterior surface of the thigh, above or more frequently below the groin. More rarely it advances to the back and enters the vertebral canal. While suppuration does not always take place, even if the carious process has progressed considerably, it always leads to a posterior curvature of the vertebral column whenever one or more of the vertebræ have been more or less destroyed. A pointed, so-called Pott's hump *(kyphosis, gibbus)* develops, usually slowly, rarely rapidly, and often also lateral curvature *(kyphoscoliosis)*. During the course of spondylitis an affection of the spinal cord

frequently develops from compression arising either as a result of this curvature or chiefly as a result of inflammatory products formed between the dura and the bones (see "Compression Myelitis"). An early diagnosis is very important for the eventual cure of spondylitis and for the prevention of the complications mentioned.

The first symptoms of spondylitis are painful sensations which originate in the vertebral column. Small children are restless and cry when handled or when the spine is moved rapidly. Larger children avoid the latter as much as possible, hesitate to walk or stand, and cry vehemently on the slightest pressure against the spinous processes of the diseased vertebræ. Such symptoms are observed also without local disease—for example, in hysteria and neurasthenia. First, however, the latter diseases rarely occur in young children; secondly, hysterical children do not always designate with precision the painful vertebræ; and, thirdly, posterior displacement of one or more spinous processes and broadening of the lateral masses of the vertebræ, which render the diagnosis of spondylitis certain, are often detected at a very early stage of the disease. Furthermore, spondylitis is accompanied by fever, particularly with the development of pus, anorexia, insomnia, and emaciation. In spondylitis of the cervical vertebræ there are usually disturbance of deglutition and voice; pain in moving the head (it is therefore kept stiff); headache, particularly occipital neuralgia; and, finally, sensory and motor disturbance within the brachial plexus. If the uppermost cervical vertebræ are diseased, there is danger of anterior displacement of the head between the atlas and epistropheus, more rarely between the occiput and atlas, and death from pressure of the separated dens epistrophei upon the spinal marrow.

In thoracic spondylitis there are often tickling and pain in the legs and a sense of pressure in the pit of the stomach. In lumbar spondylitis, also sciatica, etc., may be observed.

Owing to the importance of an early DIAGNOSIS, the remarks of Hoffa will here be quoted in detail: "In the beginning spondylitis is frequently diagnosticated with difficulty. It is apt to be mistaken for rheumatic affections, neuralgias, gastro-intestinal diseases, affections of the female genitalia, etc. The prognosis

of every case depends, however, upon the earliest possible diagnosis and treatment. To obtain this, the chief two symptoms which are present from the beginning of spondylitis must particularly be dwelt upon—viz.: pain and location of the contractures.

"In the beginning pain is almost never localized in the vertebral column, but, on the contrary, is usually perceived as a 'girdle-pain' and a pain radiating toward the lower extremities. The pain is described as a dull, deeply seated pressure, which increases with the pulse-beat, particularly after meals, and is less tormenting by its intensity than by its permanency. Very small children indicate pain by suffering expression of the face, by refusal to take nourishment, by crying whenever moved about or when washed, bathed, etc. Older children usually complain of pain in the abdomen, chest, and limbs, which is increased by coughing, sneezing, laughing, and all other expiratory movements. Pain radiating to the point of the penis and to the bladder and lancinating pain as in tabes dorsalis also occur. It usually occurs at night and causes sleeplessness, or the children awake suddenly with loud crying soon after having gone to sleep ['starting pain'] and again fall asleep. The pain is sometimes so severe that even pressure exerted by the blanket cannot be tolerated. In the initial stage of spondylitis of the lumbar region the patient suffers pain only while sitting, since in sitting the lumbar vertebral region is curved backward so that the diseased vertebræ are exposed to greater encumbrance. Pain of this character must always receive immediate attention. Whenever a child is unable to walk or stand at the usual time; or refuses to walk after previously having done so; or becomes fretful and refuses to play, etc., after having been lively and playful; or complains of 'girdle,' abdominal, and lumbar pain without apparent cause, it should immediately be thoroughly examined while undressed.

"In the presence of spondylitis a peculiar attitude of the trunk—the second cardinal symptom—will be found, which results from the desire of the patient to fix the diseased portion of the vertebral column in order to avoid all possible motion. Children who are as yet unable to walk lie quietly in bed, and cry whenever they are moved about or picked up. If set up in

bed they turn on the side, lean on one arm, and grasp the bedside with the other arm in order gradually to raise themselves. Older children suffering from spondylitis endeavor reflexly to relieve the burden from the region of the vertebral column by contraction of certain muscles, and thus acquire characteristic attitudes. If the seat of the disease is in the cervical region they hold the head to the front or to the side, so that the clinical picture of torticollis is produced; if in the lower dorsal, the whole upper body deviates to the side, so that an actual scoliosis, elevation of one shoulder and displacement of the body, results; if the lumbar region is involved they preferably bend backward, appearing as though the trunk were falling over backward. The vertebral column is at the same time kept as rigid as possible, so that the gait is rather stiff, and all movements that might produce pain are timidly avoided. If active motion is urged, the patient performs it with the back in an extremely rigid posture. In this respect, stooping is particularly characteristic. The patient strongly flexes the knee- and hip- joints, while the vertebral column is held straight. In this position he endeavors, for example, to reach an article that has been dropped to the ground, and then raise himself by first keeping the knees strongly flexed, resting the hands upon the thighs, and then, with alternating supporting motions along the thighs, he elevates his body and finally extends the knee-joints.

"If the children are induced to bend the vertebral column forward, then motility is not, as is usually the case, participated in by the entire vertebral column by divergence of the spinous processes, but motion takes place in the healthy sections only, while the spinous processes of the diseased vertebræ remain fixed against one another. This rigid muscular fixation of the body often suffices for the diagnosis of cases in which pain is sometimes absent. The pain can readily be produced artificially by the physician, naturally in the most careful manner. Gentle touching of the spinous processes with the fingers or with a sponge dipped in hot water often suffices. A fine diagnostic means is also the electric current. The cathode is placed upon the epigastrium, while a large, soft sponge electrode, as the anode, is passed slowly and uniformly over the spinous processes, when distinct pain is elicited over the diseased spots. A mild current

should be used. The utmost that should ever be attempted in eliciting pain is sharply to percuss with the finger-tips over the suspicious spots.

"By observing these rules spondylitis can without difficulty be recognized even in its earliest stage. It is to be *differentiated* from, for example, simple '*growing pain*' by the absence of spinal fixation and by the subsidence of the pain after light gymnastics of the vertebral column. It may be mistaken also for *rheumatic arthritis* of the small articulations of the vertebræ, which often attacks children, but in this disease the pain usually sets in suddenly with fever, is generally unilateral, leads to sloping of the body, and, finally, is located at the level of the articular processes, but not in the spinous processes. It can be differentiated also from painful *rachitic kyphosis,* inasmuch as the latter is usually an arched curvature, while that of lumbar spondylitis is angular. If a child with spondylitis be placed upon the abdomen, its legs grasped with the hand and gently elevated, the whole body rises; if the same manipulation is carried out in rachitis, the trunk remains stationary, while the pelvis ascends, thus permitting the production of lumbar lordosis."

The PROGNOSIS of spondylitis is not very brilliant, because it is impossible to predict with any degree of certainty whether the course of the case in question will be arrested or not. It generally depends upon heredity, which plays an important part in the etiology of spondylitis. In patients whose parents were tuberculous, spondylitis usually appears in grave form. It also depends upon the general condition of the child. If the condition is good in the beginning and if the disease is limited to the vertebræ, the prognosis is more favorable. The prognosis depends chiefly upon the stage in which the disease is found on inauguration of the treatment. The earlier the treatment, the better the prognosis. In the presence of abscesses, fistulæ, and symptoms in the spinal cord the prognosis gradually grows worse, although even then surprisingly good results are sometimes obtained under suitable treatment.

The TREATMENT must embrace, aside from general attention to the underlying disease (good air and nutrition, codliver-oil, iron, etc.), rest and fixation of the vertebral column and relief from body-pressure. These indications are usually satis-

factorily met by the so-called plaster-of-Paris bed *(q.v.)*, which is at present generally employed and preferable to the former methods of treatment (Sayre's corset, Rauchfuss's suspension apparatus, Phelps's extension bed, etc.), as it is simple and convenient. Furthermore, the child is not compelled to remain indoors all the time, but, on the contrary, is afforded ample opportunity to enjoy outdoor air. While the child is in the plaster-of-Paris bed the pain is considerably mitigated, the vertebral column fixed and unburdened, and sleep and nutrition improved. In this manner improvements and cures are obtained in a great number of cases. The question as to how long the child should remain in the plaster-of-Paris bed depends entirely upon the individual case. The period of time should be at least several weeks, followed by wearing of a supporting corset made of stiff material, such as starched muslin or cellulose. Metastatic abscesses are best left untouched, as they often disappear spontaneously with improvement of the underlying disease. If this is not the case, puncture should be made, followed by injection of from 30 to 50 grams of iodoform-glycerin solution (1 to 15). If they recur, Billroth's method should be resorted to: the abscess is freely incised, its walls are well cleansed with iodoform tampons, washed with boric acid solution, and filled with from 30 to 50 grams of iodoform-glycerin. The wound is then sewed up and protected by a pressure bandage. As a last resort, since it is difficult to keep the wound sterile, and septic processes are not rare, recourse should be had to free incision and iodoform packing. At the present day no one hesitates to attack even the diseased focus itself and to resect and curette it. In this manner good results are sometimes obtained if the seat of spondylitis is superficial. Until Calot recently ventured this hazardous task (see "Gibbus"), the gibbus was considered as *noli me tangere.*

Gibbus, Pott's Hump [Kyphosis].—In every case of spondylitis *(q.v.)* a gibbus develops as a result of crumbling of the carious vertebræ. Its formation is sometimes obviated by early and careful treatment (see "Plaster-of-Paris Bed"); but preventive treatment is generally too late, for the gibbus is there. Until recently no one ventured energetically to attack it even in the later stages, under the impression that any surgical interference would prove hazardous. It was left to the courage of

Calot to remove the gibbus by *brusques redressement* by directly breaking the spinal column. After forcible extension of the spinal column he powerfully pushed the gibbus directly inward, and endeavored to retain the corrected position by a very carefully applied circular plaster bandage which inclosed the body from the head to the pelvis. The bandage was left in place for several months, so that the gap produced by the *redressement* could ossify in the meantime, and in order sufficiently to support the straightened vertebral column. Calot was successful. German [and other surgeons] also tried the method and obtained (Hoffa, Vulpius [among others]) very good results in fresh and as yet yielding cases. Calot succeeded even in cases of from four to eight years' standing.

Failures, accidents, and even fatal results (fourteen or more patients died during narcosis, from shock, compression of the spinal cord, or rupture of blood-vessels, pleura, and lungs, etc.) were soon reported here and there. The resulting dangers, such as aggravation of old abscesses, generalization of the tuberculosis, decubitus owing to deficient attention to the skin and the like, that are associated with such *redressement* and the consecutive bandaging, became better known. The defects produced in the bone proved very large, and failed to close by ossification in so short a time (especially as tuberculosis is such an eminently destructive process), and recurrences were found to take place. Doubt then arose as to the permanency of Calot's result, the original enthusiasm gradually abated, and the method finally had but few followers. Calot's great merit, even though he exaggerated it, is in having shown that there is no need of such extreme timidity in attempting to reduce the gibbus. Indeed, he gave impetus to apparatus and methods constructed and evolved with the object forcibly to combat the gibbus even though not so briskly as Calot. Thus, Wolff claims (as yet uncertain) to have obtained very favorable results by means of his *"Etappenverband" (q.v.)*. Furthermore, by means of Calot's circular bandage the gibbus can at present be more successfully prevented than was formerly the case.

Plaster-of-Paris Bed.—The plaster-of-Paris bed is employed in the treatment of spondylitis *(q.v.)*, and is at present considered the best therapeutic measure in this condition. It not only

immediately relieves pain, but it often prevents the development of suppuration and gibbus and also aids in bringing about numerous improvements and cures even in advanced stages of the disease. The plaster bed not only suitably fixes, extends, and relieves the spinal cord, but also permits the patient to enjoy the very much needed fresh air, sleep, and appetite; so that his nutrition and general conditions improve.

The construction of this cheap apparatus is as follows: The patient is placed with the abdomen upon a table and is so supported with pads that the spinal gibbus hangs free and is thereby forced in a position resembling lordosis. The whole spine is now covered with a thick layer of wadding (the gibbus receives an extra padding), and this again with a piece of gauze free from folds. The smoothed plaster bandages, which run longitudinally and diverge from the vertex, are first made to cover the dorsal surface. This is followed by transverse turns, and between these layers (from ten to twelve) is placed a frame of chips of wood, which decussate diagonally and are thoroughly saturated with plaster of Paris. The framework serves as a support, which is especially needed at the points of transition from the head to the spine. After the plaster has hardened the trough is lifted, well smoothed, padded with cellular texture and wadding, and covered by a sheet or diaper. The child is put in this trough and fixed with a broad bandage like a mummy. To facilitate transportation and insure better fixation Vulpius envelops also the somewhat straddled legs (by additional bandages). The patient can thus be carried or driven outdoors. He sleeps in the plaster bed without pain, and the treatment continues day and night.

Often, particularly in diseases of the neck and upper portion of the dorsal vertebræ, where the trough alone is not sufficient to fix and support (as in compression myelitis), a special arrangement for extension is required for some time. It can easily be constructed so that the patient is placed in a semi-upright position, enabling him to look around, play, etc. To Glisson's loop, which is attached to the head, a weight of from three to six kilograms [six to twelve pounds] is fastened and the child is placed obliquely upon a hard mattress in such a manner that the body-weight provides the necessary counterextension. The children

soon learn the advantages of this position and almost without exception rapidly grow accustomed to it. If they become impatient and desire to be kept permanently in an upright position it tends to show that the pain has entirely subsided and that recovery has so far advanced that the time for ambulatory treatment by means of a supporting corset has arrived and that the patient may at least temporarily be relieved of his dungeon.

In disease of the dorsal vertebræ (from the seventh upward) another apparatus must be added which raises the head and extends the vertebral column. The same can be adjusted, *e.g.*, to the starch-corset, as the so-called jury-mast, in the shape of a posterior splint, the lower portion of which, modeled in accordance with the cast of the plaster jacket, is intwined between the layers of the starch bandage. Clean, double-striped starched cotton gauze folded in five or six layers forms a firm and at the same time very elastic and light mass. These very inexpensive corsets remain intact for from eight to ten months. The upper portion of the splint projects in the form of an arch from five to six centimeters beyond the top of the head. To this arch is attached the loop which encircles the head of the child under the chin and occiput and pulls the head upward. In caries of the cervical vertebræ a strong cravat of pasteboard or plastic felt is applied which is supported on the anterior portion of the chest and shoulders and presses the chin and occiput strongly upward.

Etappenverband [Bandaging at Interrupted Sittings].—J. Wolff demonstrated the feasibility of gradually correcting bone-deformities by means of "functional orthopedics" instead of application of force. In this procedure the bony portions are spared at the expense of the soft structures. Every effort is made to place the deformed bones in as correct and static position possible in relation one to another, to the surface of the deformed structures, to its neighboring limbs, and to the rest of the body. This is accomplished without injury to the bones and without excessive pressure, crushing, or breaking, by overcoming the rigidity of the soft structures or reflex muscular spasm, and by utilization of the normal position of the adjacent parts of the body. Of course, in severe cases this cannot be accomplished at one sitting, but requires several successive and gradually more

forcible attempts at short intervals, by means of the so-called *"Etappenverband."* Wolff has successfully employed this method in very severe deformities of the foot, *e.g.,* pes varus, in spondylitis, etc.

Soap Inunctions in the treatment of tuberculosis were first recommended by Kapesser and Kollman. In the last twelve years Hoffa has employed it with very satisfactory results in over two hundred cases, particularly in spondylitis; tuberculosis of the hip-, knee-, foot-, and elbow- joints; glandular and cutaneous tuberculosis. He found that these affections yield more readily if the soap inunctions are used (in conjunction with other therapeutic measures). The general condition and appetite rapidly improved and the articular swellings subsided more readily, the fistulæ closed earlier, etc. Excellent results were seen by Hoffa, particularly in multiple tuberculous affections of the bones and joints in greatly debilitated children. Hoffa saw the severest processes—*e.g.,* very severe involvement of the tarsal bones—heal completely under this treatment. Of course, the results depend greatly upon the preparation used. Soft green soap, which is kept on hand in drug-stores, is best. Hoffa usually employs transparent sapo kalinus (superfine oil-soap manufactured by Duvernoy, of Stuttgart), from 25 to 40 grams to be rubbed in with a sponge or the palm of the hand two or three times a week in the evening,—no oftener for fear of eczema, etc. The neck, back, thighs, and, if indicated, also along the flexors down to and in the popliteal space are the best places for the inunctions. If an extremity is fixed in a bandage the latter should be protected against wetting during rubbing by rubber tissue.

In spondylitis the corset is removed, the child placed upon the abdomen, the soap inunction employed, and the corset reapplied. The soap is left in place for half an hour and then removed with a sponge and water. The patient should remain in bed during the night and be allowed to get up the following day.

Opinions differ as to the mode of action of soap inunctions. Kollman believes that the obnoxious lactic acid of the body is neutralized, the alkalescence of the blood improved, and in consequence metabolism increased. Furthermore the latter is im-

proved also by the massage. At any rate, the good effect obtained is beyond dispute. This method of treatment, in conjunction with other therapeutic measures, is also exceedingly useful in scrofula.

Scoliosis is a lateral curvature of the spinal column. It is a very frequent anomaly, which may be due to various etiological factors. *Congenital* scoliosis is very rare, and, as a rule, is associated with other deformities. Quite rare also are *traumatic* scoliosis, caused by injuries to the vertebral column or by paralyses; *cicatricial* scoliosis, which is due to retraction of pleuritic cicatrices; *spondylitic* scoliosis (kyphoscoliosis); and *static* scoliosis, which is observed in congenital shortening of one lower extremity. *Rachitic* scoliosis, on the other hand, is of more frequent occurrence. The latter deformity is usually encountered in children from 2 to 3 years of age, and becomes rapidly pronounced and fixed, offering a very bad prognosis. As a result of sitting up too early or by being constantly carried on one side, a deviation of the soft bones from the straight position is produced. The so-called *habitual* scoliosis, which usually develops in school children, is most frequent.

An inherited or acquired disposition manifested by atony of the tissues, muscles, bones, etc., is the fundamental cause of the extremely frequent disease, while the injurious influences in school—faulty construction of the shelving seats, bad illumination, improper style of writing (rectangular current handwriting), uncorrected eye-defects, too little exercise—are contributory causes. This is especially the case with girls, who make up the greater number of the cases of scoliosis, inasmuch as they, in addition to those enumerated, furnish still more etiological factors—*e.g.*, needlework and fancywork.

Three degrees of scoliosis are usually observed: 1. Faulty posture. This curvature can easily be corrected. 2. A higher degree of scoliosis which can at least partially be corrected by suspension. 3. Fixed scoliosis, where the damage done is irreparable. Furthermore, the scoliosis may be total or partial (dorsal scoliosis, lumbar scoliosis). There may be one, two, or three spinal curvatures in one patient. In advanced cases of scoliosis there is naturally a simultaneous presence of considerable deformity of the thorax, which may cause compression, dis-

placement, or deformity of the internal organs,—heart and lungs,—with its detrimental consequences.

TREATMENT can accomplish but little as long as the unequal faulty burdening during school life continues. The progress of the curvature can, however, effectively be impeded if the scoliosis is detected early. The school physician here finds a wide field of useful activity. Correct construction of the shelving seats, suitable style of writing (perpendicular writing), early correction of eye-defects, etc., are the prophylactic factors deserving of special consideration. In the beginning a great deal can be accomplished by massage, practice in gymnastics, use of a suitable corset, etc. But even in already fixed cases of scoliosis good results, at least partial removal of the deformity, are at present obtained by orthopedic measures. The treatment must, of course, be very energetic and if possible carried out in an orthopedic institution.

Coxitis (Morbus Coxarius, Hip-joint Disease) is a very frequent disease in children, and, as a rule, is tuberculous in nature. It is extremely important to recognize the origin of the disease, as by timely interference recovery is still possible, while later, even if the process is successfully removed, recovery takes place only after a very tedious course, and the leg, owing to the destructive process, loses more or less of its functions. Indeed, even this is rather a very satisfactory result, for quite frequently the disease ends fatally.

Rarely coxitis begins as an acute disease, with fever, severe pain, and rapid development of the characteristic abnormal position and function. As a rule, it develops slowly. In the beginning the child pulls or drags the leg along but slightly, complains of weakness and stiffness, easily tires, and the gait becomes uncertain after prolonged walking. At times the children play quite actively, when all at once they stop and "voluntary limping" begins. Sometimes pain may be absent for months, even after the leg has become shorter; so that the child is able to attend school without apparent discomfort. As a rule, there is only slight and vague pain, chiefly in the evening, although quite severe pain is sometimes present. Rarely pain in the knee is complained of. Sometimes also slight rise of temperature, especially in the evenings, may occur; but nothing abnormal is as yet found in the leg.

Thus months and even years may pass—with exacerbations and remissions — before the following symptoms are noticed, although in some cases the course is much quicker: The patient complains of severe pain in the knee, which is not exaggerated by pressure. Many hypotheses have been advanced to explain the localization of the pain in the knee, and one of them attributes it to irritation of the obturator nerve. The gait becomes gradually worse and more fatiguing, the limping is more distinct, and the diseased leg is held very rigid. By an exudation into the joint the leg assumes a pathognomonic position—*i.e.,* flexion, adduction, and supination. The extremity is fixed in this position by muscular contraction; so that it yields only under narcosis. Sometimes one of these positions predominates, while the others are less marked. Later, when the actual destructive processes in the joint and surrounding portions begin, just the opposite occurs, *i.e.,* adduction and pronation, a position which is met with in rare cases at the beginning. Lengthening of the leg is also soon detected, but this elongation is only apparent, and is caused by displacement of the pelvis. The patient instinctively attempts to equalize the abnormal position by displacing the pelvis, and by lordosis of the lumbar vertebræ, to bring it so far that the leg, which is fixed at the hip-joint, rests upon the bed. The muscles relax during sleep, the leg assumes of itself another position, thus giving rise to twitching ["starting pain"] of the diseased leg, which so often greatly disturbs sleep. If the patient is placed on a level bed, the lordosis removed, and the pelvis directed so that both anterior superior spines rest in a horizontal line, the pathognomonic position previously spoken of immediately returns and the elongation of the leg disappears.

Now the diseased process in the joint continuously progresses. Sometimes the bones—head, neck, acetabulum (which latter gradually becomes wider, "wanders")—undergo a simple carious destruction, usually associated with more or less suppuration. By gradual enlargement of the parts, these processes become soon noticeable from the outside, sometimes as early as the first few months, but sometimes not for years. The swelling is at first very diffuse and pasty; later it is circumscribed, forming an elastic, fluctuating tumor. This process is usually accom-

panied by fever, but not necessarily so, for even large abscesses may develop without any rise in temperature. The abscess or abscesses enlarge rapidly or more frequently very slowly, so that no progress is noticeable for months; they open, and one or more fistulæ develop upon the thigh, buttocks, and deep in the pelvis (after perforation of the acetabulum), which may also prove extremely refractory to treatment and break repeatedly for years.

After the disease has reached this stage a fatal issue from exhaustion, amyloid degeneration, phthisis, or miliary tuberculosis can no longer be prevented. Through the "wandering" of the acetabulum and destruction of the other bony portions, also through the distension of the joint-capsule by an enormous exudation, displacements within the joints are bound to follow, resulting in true luxation, and, depending upon their kind, also shortening—the destruction of the hip-joint is not manifest by crepitation or abnormal mobility, but chiefly by this shortening—and abnormal positions of the joint and the extremity. Even in this stage of the disease recovery is possible, but, in view of the gradual shrinking of the surrounding soft structures, only with deformities—as a rule, ankylosis in flexed position. This, however, is the most favorable issue of the disease. Even this is entirely unnecessary if timely treatment is resorted to.

Indeed, if the disease is immediately and energetically attacked from the beginning,—four to six weeks' perfect rest in bed, with fixation of the parts with plaster of Paris,—further spreading of the process can usually be arrested. Also later absolute fixation of the joint is of primary importance in effecting a cure. If objective changes are already discernible in the diseased member, then, of course, extension (four to five pounds' weight) must be resorted to, and its effect is very soon evident by cessation of the pain, fever, and the muscular twitchings at night, and improvement in sleep, appetite, nutrition, etc. The question as to how long extension is to be continued depends upon the condition of the case. At any rate, it is to be employed for weeks or even for months until the patient is able to walk about to a certain extent, and even then extension should be continued by means of an apparatus (Taylor's is the best, as it simultaneously fixes and extends). If ambulatory treatment must be resorted to from the beginning, a plaster-of-Paris cast from the

toes to the chest serves best. With such measures even aggravated cases do well, especially if the general health (nutritious diet, fresh air, roborants, guaiacol carbonate, ichthalbin, etc.) is not neglected and if medicinal local treatment, by iodoform injections, is instituted.[1] In fungous neoplasms the injection is made usually over the greater trochanter by means of a cannula from seven to nine centimeters long, with 20 to 30 grams [℥v-℥j] of a 10-per-cent. iodoform emulsion (see "Iodoform"). In small children only from 5 to 10 grams [℥i-ij] should be injected, and, therefore, a 20-per-cent. emulsion must be used. Opened abscesses (only such as are very acute, large, and give a great deal of annoyance, etc., are to be opened) are filled with from 20 to 40 grams [℥v-x] of the former emulsion. Fistulæ must be dilated and curetted, and iodoform or balsam of Peru *(q.v.)* employed to hasten healing. Radical operations (resection) are nowadays, since the conservative method has warm advocates, rarely resorted to; at times, however, they are unavoidable in very protracted suppuration and extensive destruction.

Luxatio Coxæ Congenita [Congenital Dislocation of the Hip] is a malformation the etiology of which is as yet obscure. The anomaly consists of the acetabulum being either barely indicated (on one or, not rarely, on both sides) or, at most, developed in rudimentary form, so that the head of the femur rests neither in nor upon it, but is dislocated backward and upward. The extremity itself is perfectly capable of performing its functions, has no pathognomonic position, is free from pain, but ap-

[1] Recently Hahn, of Mainz, obtained better results than from iodoform by the use of formalin-glycerin (1 to 3 per cent.) in surgical tuberculosis—especially coxitis and gonitis, notably after formation of abscess cavities—and abscesses (hypostatic abscesses). After evacuating the pus by means of an aspirating syringe and cleansing the abscess cavity with boric acid solution (withdrawing the same again) a quantity of freshly prepared formalin-glycerin equal to one-third or one-half of the amount of evacuated pus is injected. The joint is then fixed. A more or less severe reaction follows, consisting of swelling and often fever, which, however, disappears, within a few days. This procedure is repeated in two weeks, if the exudation has not disappeared in the meantime (which often occurs after one injection!). Recovery often takes place rapidly with faultless function.

pears shorter than the other. The patient limps and inclines the body toward the diseased side. In bilateral congenital dislocation the gait is waddling—the so-called "duck gait." On standing there is marked lordosis of the lumbar region (in the unilateral variety also scoliosis) and increased inclination of the pelvis. Both symptoms are more marked in bilateral dislocation. The buttocks project prominently backward and appear broadened on the top. Under the crests of the ilium roundish protuberances are seen. In unilateral dislocation the buttocks are flat on the diseased side. The abdomen hangs prominently forward. The diagnosis is therefore usually not difficult. In order to confirm the diagnosis it must be established that the head of the femur is actually outside of the acetabulum. The patient is placed on the back; the leg is bent rectangularly, strongly abducted, and then rolled inwardly, while the head of the femur is felt deeply beneath the gluteal muscles. On rolling the leg the round, smooth head of the femur is felt to roll with it. Early recognition of the disease is very important, because the treatment is much more simple and effective, the earlier it is begun.

Congenital luxation of the hip was generally considered an incurable disease. And it is only recently that a successful beginning with a bloody or bloodless method of treatment was made. For some time the bloody method as practiced especially by Lorenz was much used, and, indeed, often with excellent results. It consists of opening the joint by a very small incision (care being taken to spare all muscular insertions) and fixation of the replaced head of the femur in the artificially deepened acetabulum. As this method has not proved free from danger and has several disadvantages, it was sought to obtain better results by a bloodless method. Nowadays the methods of Schede, Mikulicz, Hoffa, and Lorenz have, especially in young children (see further), proved so effective that it is possible to cure a great number of cases of unilateral and also of bilateral luxation. While Hoffa and Lorenz endeavor to bring the femoral head into the *niveau* of the acetabulum with great force, Schede and Mikulicz prefer to do it gradually. Schede has invented an apparatus by means of which it is possible gradually to bring down the femoral head, and recently Mikulicz

perfected his method of treatment so that it is also effective in bilateral dislocation. By means of an apparatus the leg is fixed in an extended, abducted, and outwardly rotated position and gradually brought in front of the entrance of the acetabulum and then, after the existing resistances have gradually subsided, the head of the femur is pushed into the rudimentary acetabulum. The treatment lasts from eight to twelve months. In children under 3 years of age this method is sufficient. The patients remain in the apparatus from eight to ten hours out of twenty-four, and are able to be about during the day. In older children the treatment is aided by other orthopedic measures.

[With these procedures Lorenz's "*functional weight-bearing method*" is at present strongly competing.

Limits of Age.—With the experience of over one thousand cases, Lorenz has arrived at the conclusion that in unilateral cases the average age-limit for successful treatment is from 9 to 10 years, and in bilateral cases from 6 to 7 years. These limits have frequently been exceeded, and after prolonged treatment by weight-extension and tenotomies cases that at first appear to be unpromising may sometimes be successfully dealt with.

The Operation.—Manipulation and manual force only are used.

Stage 1.—The first step after the patient is anesthetized is to overcome the resistance of the adductor muscles of the thigh. For this purpose the operator forcibly abducts the limb while an assistant steadies the pelvis; this causes the inner edge and tendon of the adductor longus to stand out like a bowstring close under the skin. Keeping the parts thus on the stretch, the operator, by repeated "hacking" strokes made with the ulnar border of the hand at a point a little below the attachment of the muscles to the pelvis, produces a subcutaneous division, not only of the whole of the adductor longus, but also of parts of the deeper-lying adductors. At the completion of this stage of the operation the adductors no longer project under the skin; even in complete abduction there is no longer any muscular ridge, but, instead of this, a flat surface of muscle over which a loose fold of skin can readily be pinched up.

Stage 2.—The contracted muscles on the posterior aspect of the joint are stretched by forcibly flexing the hip. In doing this the knee is kept extended, and the limb is bent upon the trunk with intermittent movements of a swinging character, until the foot can be carried up to the shoulder.

Stage 3.—The patient is now turned over and the muscles on the front of the hip-joint are forcibly stretched by producing successive movements of hyperextension of the hip with the knee fully flexed. At the end of this stage the heel can be made to touch the buttocks. All these movements are repeated in turn until complete flaccidity of the muscles is effected. In order to test when sufficient stretching has been produced, downward traction is made on the limb to see whether the head of the bone comes down, as evidenced by the trochanter being brought to the level of, or below, Nélaton's line. In older children this part of the operation is facilitated by preliminary manipulations of the same kind made a few days before, aided, if necessary, by subcutaneous section of the muscles (tensor fasciæ femoris, anterior part of the gluteus medius, etc.) springing from the neighborhood of the anterior superior spine of the ilium and by subcutaneous section of the hamstrings.

Stage 4. Reduction of the Dislocation. — This important step, for which the previous stages are preparatory, is begun by completely flexing the hip, the knee being bent to a right angle, and the thigh slightly rotated inward. A padded wedge may now be placed behind the pelvis. The flexed limb is then fully abducted—*i.e.*, so that the thigh forms nearly a right angle with the side of the trunk, and the knee and foot are in a frontal plane posterior to the mesial frontal plane. As this movement is being concluded, the head of the bone can be felt by the operator to clear an obstacle; this is the movement of "reduction" when the head passes forward over the posterior border of the acetabulum. A sound of reduction of varying loudness is also usually heard. Before the reduction there is an unnatural hollowness of Scarpa's triangle, but as soon as reduction has been accomplished the head of the femur occupies its normal position and pushes forward the psoas and other soft parts, thus filling up the hollow. Another valuable sign of this reduction is demonstrated by Lorenz; this consists in a rigid

flexion of the knee, which appears when the head of the bone passes into or over the acetabulum, and disappears when the dislocation is reproduced by adducting the limb. The actual reduction is brought about by forced abduction.

Stage 5.—The next procedure aims at stretching the anterior fibers of the capsular ligament. For this purpose the pelvis is raised on a support—*e.g.*, a sandbag or a padded wedge—and held firm, while the operator intermittently strains the abducted limb into a marked degree of hyperextension. When once the reduction has been effected, the tension of the muscles and other soft parts assists in retaining the head of the femur in its place and in promoting functionally the deepening of the acetabulum.

Stage 6.—The application of the plaster-of-Paris apparatus follows: The first step is to raise the patient, the sacrum resting on a small padded plate supported on a crutch about seven inches high fixed at the end of the table, while the shoulders rest on a padded box or other support of about the same height. The limb or, if both joints have been operated on, limbs are held. A pair of woven woolen drawers without buttons are put on and an ordinary calico bandage is drawn between the skin and the drawers on each side that has been operated on. Next, an ample covering of common (dressmakers') wadding, cut into bandages, is applied, so as to envelop the lower part of the abdomen and the whole of the pelvic region, and to cover the thigh (or thighs, if both hips have been operated on) to a point just below the knee. Separate additional pads of wadding are placed below each anterior superior spine and above each internal femoral condyle. This investment of wadding is then completely and evenly covered in with several layers of calico bandages. The plaster-of-Paris bandages are then applied over the whole area previously covered by the wadding, etc. A considerable number (about twenty-five) bandages are used for a case of double, and about fourteen for a single, dislocation. When the plaster is dry the drawers are cut and turned back to cover the plaster case. The bandages that were placed between the patient's skin and the drawers are used for daily friction of the skin, which can be thus kept clean and healthy for a long time. A thin towel is placed between the skin and the plaster case in front and behind.

The New Features in the Operation.—The most important is the complete severance of the adductor longus, etc. This is produced not by any rude violence, but by systematic hand strokes. A very remarkable phenomenon to witness is the complete disappearance of the adductor ridge. Without this the hyperextended position of the limbs cannot be produced.

The extent of the area covered by the plaster-of-Paris apparatus is much smaller than formerly, when it was thought necessary to envelop the trunk as high as the lower ribs and to include the knee and even the leg and foot.

The Effect upon the Patients.—The limb is lengthened so that the skin of the groins often shows superficial cracks. The alteration in the relation of the parts is so great that for some days after the operation the muscular sense is at fault, and if requested to put the hand upon the knees the child puts the hands where the knees "ought to be"—*i.e.*, in the middle line.

The After-treatment.—Lorenz now recommends that the plaster casing be left untouched for six months. Where only one hip has been operated upon the patient is allowed to walk, the boot on the side of the operation being raised from one and one-half to two inches. Where both hips are involved, the patient can stand by holding a staff in the hand and can hop sideways in either direction, or can sit on a small wheeled seat, which is moved by the feet. In both unilateral and bilateral cases daily passive and active extension movements are practiced at the knees to overcome the rigid flexion of the knee mentioned before as a sign of reduction of the dislocation. After the plaster casing is removed at the end of six months the glutei muscles are considerably wasted and require daily massage until they have sufficiently recovered. It is after removal of the plaster case that the really anxious part of the after-treatment begins. Passive and active movements at the hip are to be carried out. For some time these must be limited to adduction and abduction, with rotation, flexion, and extension being avoided until all danger of redislocation is passed. At night a square cushion should be placed between the legs to maintain the position of abduction. In unilateral cases, after removal of the plaster casing, abduction

during walking is maintained by raising the boot on the sound side. The whole course of treatment varies from one to two years.[1]—SHEFFIELD.]

Lorenz believed that these favorable results were due to actual gradual shaping of the acetabulum, which permanently retained the femoral head. The Roentgen rays, however, now prove that this is but rarely the case, and that the head is later reluxated, but anteriorly instead of posteriorly, where it seeks and finds a firm support in the pelvis. An anatomical cure, as Lorenz hoped for, does not, as a rule, take place. But this is immaterial, for the functional results usually meet all expectations. Hoffa proceeds almost in the same manner, but he fixes with internal instead of external rotation, keeps the patients in plaster of Paris only a few weeks and then in a modified Mikulicz apparatus. Lorenz has entirely given up his bloody operation, which carries with it considerable danger of sepsis and is apt to give rise to ankylosis (which latter is a very unfortunate occurrence in bilateral congenital dislocation of the hip) and to arrest the growth of the pelvis owing to injury to the cartilage.

Unfortunately, however, even the bloodless operation is free from danger only up to a certain age. In cases operated upon above the age-limit contusions of the soft structures, fractures at the femoral neck, paralysis of the sciatic and crural nerves, and even gangrene of the legs are observed. If the children are too old for this method, the bloody method is the only thing left. But even here Lorenz deprecates the bloody method of deepening the acetabulum, and presently experiments with a combination of both: opening of the joint, and the "functional weight-bearing method of reduction." It is to be hoped that this combination will prove successful and free from danger also in older patients. The latter procedure will also have to be employed in cases where, owing to anatomical impediments (*e.g.*, thickening of the ligamentum teres), the bloodless method alone fails.

Coxa Vara is a peculiar alteration in the hip-joint consisting of a curvature of the neck of the femur downward, with diminution of the angle of inclination. Objective signs: elevation and prominence of the trochanter, shortening of the leg,

[1]Abbreviated from J. J. Clarke, of London.

abolition of abduction, and limitation of rotation (especially outward). The patients usually between 13 and 18 years of age, more rarely between 2 and 12 years, limp and complain of pain in the hip and at times also in the knee. Owing to this pain and limping and to shortening of the leg, the condition is frequently mistaken for coxitis. It is apparently a "weight-bearing" deformity that is dealt with here, due to a pathological yielding of the bones (late rachitis?).

The treatment, which in the beginning consists of rest in bed and of extension of the limb, is quite powerless. In severe cases operative interference (osteotomy, resection) must be resorted to. There seems to be also a congenital form of coxa vara. Kredel observed two such cases (one unilateral and one bilateral). Both were associated with other deformities (genu valgum and clubfoot of the same side or of both sides). He believes that the trouble develops within the uterus (perhaps owing to lack of space) through forced and prolonged abduction of the extremities independently of rachitis. At all events this condition is not identical with rachitic curvatures of the neck of the femur observed in sucklings, the chief group of which is sketched by Schede in the following manner: "The children lie in bed like decapitated frogs with the legs rotated outward. All or a great number of them are unable to rotate the legs inward or to place the patella anteriorly, but maintain some power of rotation outward. When they sit down they do it like Turks, with crossed legs." In the majority of rachitic infants Kredel found limited internal rotation, increased external rotation, and, in contradistinction to coxa vara, increased power of abduction. In his two cases there was pronounced limitation of the power of abduction. He thinks that the deformity in young infants is frequently overlooked, owing to the coexistence of other more important deformities.

Genu Valgum (Knock-knees, "X-" or "Baeckerbein").—That deformity of the knee-joint which is visible on extension and disappears on flexion and in which the bones at the knee form an angle opening outward, while those at the ankle of the leg and foot are simultaneously turned outward [the legs diverge] is due to the fact that the genu epiphyses of the femur and tibia are set obliquely upon the diaphyses. The abnormal

obliquity is located at the diaphyseal ends. The fault lies in the disproportionate growth of the bone: the latter grows longer centrally, and, therefore, becomes oblique at the epiphysis. The real cause of this process, however, usually is rachitis, and genu valgum develops as soon as the children make the first attempt to walk. Sometimes the deformity does not develop until longitudinal growth is strongest and new exuberances have established themselves at the epiphyseal cartilages—*e.g.*, in half-grown children, especially in baker and waiter apprentices, store clerks, etc., young people who must stand long upon their feet, when the continuous burdening contributes toward the full development of the deformity. Much can yet be accomplished, especially in small children, toward gradually straightening the bones by means of orthopedic apparatus (Mikulicz's plaster-of-Paris bandage with elastic pulleys). Good results are later obtained by "*brisement forcé*" by means of Lorenz's osteoclasts. It is very rarely necessary to resort to bloody operations, such as linear osteotomy, after Macewen. [In mild, rickety cases, keeping the child entirely off its legs, the application of light splints, and the internal use of appropriate antirachitic food and drugs will generally effect a cure.—SHEFFIELD.]

Genu Varum (Bowlegs, "O-Bein") is a deformity the opposite to genu valgum and always rachitic in nature. The anomaly is caused by a curvature of the epiphysis of the tibia, and may be corrected in a manner similar to that employed in genu valgum.

Pes [Talipes] Varus (Clubfoot) is one of the most frequent congenital malformations. It is usually bilateral. The foot appears inverted, the inner side is directed upward, the external downward, the dorsal side anteriorly, and the plantar backward. The foot is fixed in this position and can be corrected only with force—by operative interference. Quite extensive operations have been performed for this purpose (keilosteotomy, talus extirpation, etc.). Phelps's operation, which has the majority of adherents, is based upon free division of the soft structures. Phelps divides the skin of the edge of the foot and then one after another all tense structures, the points of resistance of which are rendered visible by correction. It was gradually

learned from experience that all operations are useless unless followed by careful orthopedic after-treatment, that the latter is the essential part of the treatment, and that strictly orthopedic treatment is sufficient, even in the oldest and worst cases of clubfoot. Thus, in the last ten years, Hoffa has cured every case of pes varus by orthopedic measures without operation. At the present day Hoffa's method of treatment is probably the most generally practiced; it will therefore be described in detail. The treatment should be undertaken as early as possible.

As soon as the newly born child is found to be viable, gradual correction of the clubfoot should be inaugurated—*i.e.*, first the abduction, next supination, and last plantar flexion position. This orthopedic procedure consists chiefly of systematic reduction movements. The lower part of the leg is fixed with one hand and the foot pronated and abducted with the other; or, if the tarsus is strongly bent, the ankle and the calcaneus are grasped with one hand and the toes with the other, and the foot bent upward. The flexed foot is finally forced as much as possible into dorsal flexion position. This is done twice daily, followed by light massage of the muscles of the upper and lower part of the leg. During the time when the leg is neither massaged nor manipulated the foot must be kept in as normal a position possible. The end of an ordinary cambric bandage, the width of the foot, is applied to the outer edge of the foot and carried several times over the inner edge, so that a fixed point is obtained. The foot is now placed in correct position and the bandage is carried around the sole from the external to the internal edge of the foot and then upward along the external side of the extended leg to the lumbar region. If the bandage is now drawn tight,—after protecting the inner border of the foot from too strong pressure by padding with cotton batting,—the varus, as well as the equinus, position (the latter is generally associated with pes varus) may be corrected and correction maintained by fastening the loosely drawn bandage to the leg by a figure-of-8 bandage. As the circular bandage approaches the foot the latter is gradually raised to its correct position. Good fixation is usually obtained by about three circular turns. The distal ends of the bandage at the thigh are turned in and fastened with pins. After the child has grown a few months older

under this method of treatment a splint may be employed to assist the treatment. Beely's splint is especially to be recommended. It is applied to the child's leg by means of flannel bandages.

By the time the child begins to walk, it will usually be found that restoration of the foot to its normal shape has advanced so far under this plan of treatment that the wearing of a clubfoot shoe is all that will be necessary to complete the cure. With every step the weight of the body presses the foot in the right position, provided sufficient progress has been made for the child to tread perfectly upon the sole of the abducted foot. This good result, however, should not lead to discontinuance of the treatment. On the contrary, while the shoe is worn the treatment should be continued for at least one year by the practice of gymnastics, resisting motions, and massage. A patient with pes varus can be considered cured only when he is able actively to raise himself and bend and stretch his knees while standing on the toes.

The question now arises: How treat cases of pes varus which have been neglected for months and years after birth and which present shortening of the soft structures and marked curvatures of the bones. In such cases the forced "clubfoot reduction" *(q.v.)* of Koenig, Lorenz, or Wolff is employed. The latter accomplishes the reduction gradually, at interrupted sittings (see "*Etappenverband*"), while the former two do it usually, but not always, at one sitting. The surgeon, however, is earnestly warned against the application of brutal force. If the first attempt is unsuccessful, it is better to be satisfied with the partial result and to repeat the procedure several times, after the method of Wolff. Too active application of force is sometimes followed by severe, fatty embolism and pronounced edema. The act of reduction is considered complete if the pes varus is corrected entirely—*i.e.*, if the foot can be flexed dorsally, pronated, and abducted. A plaster-of-Paris bandage is then applied; its technique demands some practice.

Hoffa proceeds as follows: The foot and lower part of the leg are well wrapped in several layers of cotton, then carefully covered by three or four layers of the plaster bandage. During this time the foot is maintained in its corrected position by an

assistant. The chief act of correction occurs during hardening of the plaster, when the surgeon places the foot, dorsum up, upon a firm board, flexes the corresponding hip and knee-joint as much as possible, and, beginning at the knee, forcibly presses downward in the direction of the axis of the lower part of the leg. The necessary dorsal flexion and pronation are thus obtained and the foot may easily be kept in the desired position. The shape of the foot after hardening of the plaster conforms to that of the normal bandaged foot. The whole bandage is now cut in the middle line, and the edges are separated so as to relieve the foot from pressure arising from the swelling which always follows and to prevent decubitus. In the first few days the foot is held high and then gradually placed in the suspended position. After from six to eight days the patient may be allowed to get out of bed and walk about with the bandage. J. Wolff, Lorenz, Vulpius, and others leave the bandages in position for many months until the pes varus is cured. A shoe is fitted over the plaster-of-Paris bandage, which is made as light as possible by removal of all superfluous parts.

Very good results are obtained in this manner, but the muscles become atrophic and useless. Hoffa, therefore, is averse to the use of such bandages for months. He replaces them, after from four to six weeks, by a clubfoot shoe. Before reducing the clubfoot he first obtains of it a plaster-of-Paris mold and has a shoe made that fits over it. The shoe is ready by the time the plaster-of-Paris bandage is removed. This apparatus suffices. If there is still a tendency to internal rotation, a simple pelvic girdle is attached to the shoe, and by corresponding rotation of the external splint the desirable external rotation position of the leg is readily attained. In bilateral pes varus Hoffa generally makes use of the pelvic girdle, as it greatly facilitates perfect correction of the foot. The apparatus is removed daily, the musculature of the whole leg massaged, the foot manually corrected, and active dorso-flexion and pronation are practiced. The results are all that can be wished for, and the patients retain a strong musculature.

Pes varus may develop also from paralysis. Here, again, tendon transplantation is very successful. Active transplantation is performed: 1. Of a part of the tendo Achillis on *(a)*

the paralyzed peroneus longus: or *(b)* the paralyzed extensor digitorum communis longus; or *(c)* the paralyzed extensor digitorum communis brevis. 2. Of the extensor hallucis on *(a)* the peronei muscles; or *(b)* the extensor digitorum communis longus; also with shortening of the tibialis anticus or lengthening of the tendo Achillis.

Clubfoot Reduction in older children is carried out forcibly in one sitting, after the methods of Koenig and Lorenz. In regard to the former Hoffa writes: "As a preliminary operation Koenig performs tenotomy of the tendo Achillis in order to facilitate dorsal flexion of the foot. It is also frequently necessary to divide the plantar aponeurosis subcutaneously, if it offers great resistance to reduction. After this is done the patient, who lies on the table, is turned on the side. While an assistant fixes the knee, the surgeon supports the clubfoot with its most convex portion toward the outer side, on a triangular wooden wedge, padded to avoid pressure. The surgeon now grasps the foot in such a manner that the toes are held with one hand from the inner side, while the other hand holds the os calcis and the ankle-joint. At the same time uniform pressure is exerted upon both hands by the weight of the operator's body. Under certain circumstances a 'jerking' pressure, particularly upon the toes, is especially effective. In this manner the foot is converted into a double arm of a lever, one being the toes, the other the heel, while the center lies on the outer side of the foot, at a point where the latter rests upon its outer edge. This procedure is accompanied by cracking, which is due to tearing of bands and crushing of bones.

"The second stage now follows: The patient is placed on his back and the knee fixed in an extended position, or dorsal flexion and abduction of the foot are now secured by means of pulleys. These manipulations are now readily made, owing to the flexibility obtained in the first stage. This method is quite useful, but it has the disadvantage in that it is difficult to obtain a good grasp of the small and often fat foot of the child. This may, however, be remedied by means of Thomas's 'reduction instrument' (Thomas's wrench). It is a very useful apparatus, consisting of two firm blades, which by a spiral movement of the handle may be widened or narrowed at will. The manipulation

is extremely simple. In order to correct the inward rotation, the leg is seized with one hand while the wrench grasps the clubfoot at about the center of the inner side. The upper blade must press against the ankle. By the action of the screw both blades are now approximated so that the foot is held firmly. The hand holding the leg is now pressed firmly against the lower end of the fibula, and the foot forcibly rotated outward by means of the wrench. In order to correct the equinus position the wrench is applied in the same manner and dorsal flexion made. The adduction position is corrected by forcible abduction, the upper blade of the wrench being against the os cuboides and the lower blade behind the metatarso-phalangeal articulation." This method generally suffices in children.

In patients over 14 years the osteoclast (Lorenz) must be resorted to—a screw-apparatus which is more suitable to overcome bony resistance. Lorenz's method is the modeling reduction, by means of which he endeavors, under a single narcosis, to bring the foot into a normal or rather somewhat overcorrected position. In small children this can be done manually. Vulpius, who uses this method and obtained with it very good results, speaks of it as follows: "The foot is first molded as though consisting of clay or wax. The several components making up the total of the clubfoot are separated and handled in regular rotation. The fork-shaped hand, which grasps the sole and dorsum of the foot, from the inner edge of the foot outward, gradually pushes the adducted foot into the most extremely abducted position, while the other hand supports the knuckles to prevent fractures. In rigid clubfoot this correction is more rapidly enforced by placing the foot with the convexity of its external edge upon a padded wedge, and pressing the heel and toes downward against the lateral surfaces of the wedge with both hands. This procedure is considered finished if the external edge of the foot shows marked concavity and the inner originally concave position convexity. The second manipulation is applicable in talipes varus, which is usually quite pronounced in older individuals. The shortened cords of the plantar aponeurosis are gradually stretched by fixing the tarsus with one hand and pushing the front of the foot upward with the other hand. It is evident that the correction of talipes

varus would hardly be possible were it not for the fixation of the heel by the tendo Achillis. Achillotenotomy, which is usually necessary for correction of talipes equinus, forms, therefore, the third stage of reduction. After subcutaneous division of the tendon the calcaneus is pulled downward by hooking the fingers over both sides of its posterior processes. There now remains the correction of supination position, which is accomplished by converting it into pronation of the tarsus as well as metatarsus." After this is completed it is usually easy, by gentle pulling of a toe, to transform an equinus position into a pes calcaneo-valgus position. Reduction is followed by fixation in plaster of Paris (see "Pes Varus").

Clubfoot Splint.—Hoffa recommends Beely's splint as the best (see "Pes Varus"). It is composed of a hollow blade made of sheets of steel for the external side of the upper leg, a second one for the outer side of the lower leg, and a sandal for the foot. These three parts are united by strong, flexible steel rods. The sandal permits of free rotation, inward and outward, and is fastened by screws. At the inner edge of the sandal there are two vertical plates ("tongues"). An angular position of the upper leg to the lower leg is important for the action of the splint, for in this way only is it possible permanently to influence rotation and flexion of the foot. The apparatus is lined with felt. It is fastened to the leg by bandages, and the whole is surrounded by a watertight material to keep it very dry.

Pes [Talipes] Valgus (Flat-foot) is a deviation of the foot to the outside—an eversion outward. This altered position is also associated with marked alteration in form. The anterior end of the talus sinks downward and forward and projects into the physiological hollow of the foot. The dorsum of the foot does not appear convex, but flattened, sometimes even concave; the hollow of the foot is obliterated; the entire sole of the foot, including its inner edge, rests upon the ground. The external edge is sometimes elevated. Pes valgus is often congenital, under which circumstances the tendo Achillis is either shortened or weak.

The anomaly is sometimes readily corrected by manual pressure; more rarely fixation in an abnormal position takes

place as a result of tendinous tension. In cases due to atony the foot is fixed against a board, to which a rectangular splint running along the inner part of the leg is attached. On tightening the splint to the leg the sole of the foot is drawn downward. In tense muscles tenotomy is often indicated (chiefly of the peronei, rarely of the extensor digitorum longus). After the flat-foot has been reduced, systematic motions, massage, electricity, and, as an after-treatment, a shoe which has a somewhat elevated heel and a pad on the inner side to support the arch of the foot must be resorted to.

Flat-foot is frequently acquired. It develops in the first few years of life, in rachitic children, when they begin to walk, the weight-bearing ability of the soft bones being small. Under antirachitic treatment the anomaly can either be prevented or corrected by keeping the child from standing and walking or by means of a suitable shoe. Pes valgus sometimes develops as a result of paralysis—*e.g.*, poliomyelitis. In these cases an effort must be made to obtain active dorsal flexion, abduction and supination of the foot, or fixation of the same in a rectangular median position. This is accomplished by active transplantation (see pages 419 *et seq.*) of a part of the tendo Achillis on the tibialis posticus or tibialis anticus muscle, or active transplantation of the tendon of the peroneus on the tibialis anticus or posticus, or transplantation of the extensor longus hallucis on the paralyzed tibialis anticus, combined, if necessary, with shortening of the tibialis anticus or lengthening of the tendo Achillis.

Flat-foot very frequently develops at about the time of puberty in young people who have to stand much (*e.g.*, young waiters, porters, locksmith apprentices, nurse-girls, etc.), as a result of overburdening the dorsum of the foot, which gradually leads to contractures of the pronators. In the beginning of the disease the patients usually complain of becoming very easily tired. This variety of pes valgus is sometimes called "static," or "inflammatory," pes valgus, because it is often accompanied by very severe pain, which originates from an inflammatory condition of the bone resulting from pathological displacement. Albert recommends a shoe with a small convex pad on the inner side of the sole, so that the hollow of the foot

is gradually developed by pressure and an external splint extending along the leg. The splint is permanently fixed to the sole of the shoe and has a strap above on a level with the upper portion of the leg by means of which it can be fastened to the leg. By tightening the strap on the tibial side the lower end of the leg is drawn to the outside—*i.e.*, it forces the foot into supination. In higher degrees of pes valgus (fixation by contracture) recourse must be had to reduction under narcosis and fixation by plaster-of-Paris bandage.

Pes [Talipes] Calcaneus is a deviation of the foot from its normal position toward the dorsal side. It is manifested by lowering of the heel and elevation of the dorsum of the foot; so that the patient steps only upon the heel. Pes calcaneus is usually associated with slight valgus position. This deformity, especially the congenital variety, is rare. The latter, like the deformities of the foot spoken of before, is a result of intra-uterine pressure, especially due to a deficiency of liquor amnii. Paralytic pes calcaneus is of more frequent occurrence, and, like the deformity of the foot to be spoken of later, a sequel of infantile paralysis due to paralysis of the sural muscles (the tendo Achillis is flabby and thin). Congenital pes calcaneus of moderate severity usually disappears spontaneously, while in severer forms bandaging, which pulls the foot toward the sole, usually suffices. Rarely tenotomies of the tendons of the tibialis anticus, extensor pollicis longus, extensor digitorium longus, and peroneous tertius must be resorted to. Paralytic pes calcaneus is at the present day remedied by tendon transplantation. In order to obtain active plantar flexion of the foot or fixation of the foot in the center, one peroneus muscle or the flexor digitorum communis longus is transplanted on the sural muscles, sometimes with shortening of the tendo Achillis.

Pes [Talipes] Equinus is a deviation of the foot to the plantar side with elevation of the heel and extension of the foot; so that the patient stands and walks upon the toes. It is exceptionally congenital (as a rule, combined with pes varus as congenital pes equino-varus), but is often acquired as a result of paralysis. The correction of the deformity is accomplished surgically by endeavoring to obtain active dorsal flexion in the

ankle-joint, or, if this is impossible, fixation of the foot at a right angle. For this purpose the tibialis anticus or extensor digitorum communis longus or extensor hallucis longus is shortened (see "Tendon Shortening") or the tendo Achillis is lengthened. In severe forms these procedures are combined with tendon transplantation of the paralyzed tibialis anticus on the normal extensor digitorum communis or a portion of the tendo Achillis upon the tibialis anticus. The foot is then placed in a walking apparatus, consisting of a shoe with a splint attached to the sole, which extends upward along the lower leg and is interrupted at the level of the ankle by a hinge-joint to prevent plantar flexion. A dorsal strap presses the dorsum of the foot against the sole.

Tendon Transplantation is an operation employed with much success in the treatment of infantile paralyses, particularly of those resulting in pes varus, varo-equinus, valgus, and calcaneo-valgus; also in paralytic lameness of the thigh and the upper extremities, and finally also in Little's disease. Its object is partially to transplant the innervation of healthy muscles to those that are paralyzed—*i.e.*, to replace the abolished activity of paralyzed muscles, by the union of the peripheral part of a paralyzed tendon with the central part of another sound tendon. The tendon selected for transplantation is split longitudinally, and the portion remaining with the muscle is united with that of the badly functionating antagonist; or the latter is fitted into a slit of the healthy tendon and allowed to heal together. Good results may be obtained by suitable selection of the muscles. This method is now being gradually improved.

Hoffa distinguishes three methods of tendon transplantation:—

1. The tendon of a perfectly functionating muscle is divided *in toto* in order to embody its central stump in the tendon of the paralyzed muscle and to supply new power to the latter. This method is only exceptionally used—that is, if the original function of the healthy muscle in question can readily be disposed of, and the activity of the limb is not injured by it. Example: transplantation of the healthy flexor carpi ulnaris to the paralyzed extensor digitorum communis.

2. The tendon of the paralyzed muscle is divided, the central end is left entirely intact, while the peripheral end is united as much centrally as possible with the muscle which is to supply the power. Example: paralytic pes equinus, in which the tibialis anticus muscle is paralyzed and the extensor digitorum communis longus intact. The tendon of the tibialis anticus is divided, the foot is brought in strongest dorsal flexion, and the peripheral end of the tibialis anticus is sutured as much centrally as possible to the tendon of the extensor digitorum communis longus. The results thus obtained are: first, the ankle-joint is mechanically kept in dorsal flexion position by the existing tension; and, second, after the tendons have grown together, every contraction of the extensor digitorum pulls the peripheral part of the tibialis forward and causes effects resembling those obtained from tibialis contraction.

3. From the tendon of a perfectly preserved muscle a part, about half, is branched off and firmly sutured to the tendon of the paralyzed muscle, while the joint is held in the properly corrected position. In order to engage the power of the sural muscles for the activity of the paralyzed muscles (peronei, tibialis anticus, extensor digitorum) a portion of the tendo Achillis is most frequently employed.

Vulpius speaks of "ascending" tendon transplantation whenever a part or the whole of the tendon of the paralyzed muscle is united with the tendon of the functionating muscle; and of "descending," tendon transplantation whenever the functionating tendon or a part of it is transplanted to the paralyzed tendon. Hoffa prefers to speak of it as "passive" tendon transplantation.

After transplantation, the limb is fixed in the corrected position by means of a plaster-of-Paris bandage, and the sutures are removed after from three to five days, through a fenestrum left in the bandage. The bandage is left in place for from four to eight weeks, and its removal is followed by massage, gymnastics, and electricity, for a few weeks longer. Occasionally success is apparent after removal of the bandage; in other cases improvement takes place by degrees, inasmuch as the muscles supplying the power to some extent become gradually accustomed to the new motion. In other cases one must be

satisfied with abolition of the abnormal position of the joint and permanent correction of the deformity.

"The question in what manner the muscle supplying the power is stimulated to its new activity is physiologically very interesting, but not as yet definitely decided. As a result of transplantation a new individual muscle probably develops which gradually acquires some independent innervation and function by an adjustment on the part of the cortical substance of the brain. It is undoubtedly highly interesting to know that for the transmission of power not only can such muscles be used which, by virtue of their function, greatly resemble the paralyzed muscle, but, moreover, that entirely antagonistic muscles may be resorted to for the same purpose without obtaining a bad result." (Hoffa.)

Furthermore, this method is now also being employed after peripheral traumatic paralysis—*e.g.*, radial paralysis in fracture of the upper arm and in traumatic destructions of tendons and muscles.

Tendon Shortening or Lengthening is sometimes carried out in conjunction with tendon transplantation *(q.v.)*, and, according to Hoffa, it is with just this combination that the best results are obtained. Example: Paralytic pes valgus in which there is passive lengthening of the tibialis anticus muscle. Considerable shortening of the tibialis anticus is obtained by dividing the tendon of the tibialis anticus, placing the foot in dorsal flexion and supination position and the ends of the tendons of the tibialis anticus in apposition and suturing them, while both divided ends are kept in greatest extension. Furthermore, the muscle is given the best opportunity to resume its function that it was previously unable to carry out owing to its passive lengthening.

Tendon lengthening, according to Bayer, is accomplished in such a manner that the tendon is split in the form of a Z, both ends are displaced longitudinally, and the transverse sections are sewed together.

Osteomyelitis, Ostitis, and Periostitis almost always affect certain bones more or less simultaneously or one after another, inasmuch as the process gradually progresses from within out or *vice versa*. The course may be acute or chronic. In acute cases

the symptoms may be very violent and be mistaken for a pyemic or typhoidal process and end in death within a few days. In small children who are unable to localize the pain many cases in which the swelling is overlooked are incorrectly diagnosed. Consequently the osteomyelitis remains undetected, is designated as "hyperpyrexia" and the like, and receives no treatment. Therefore, in all febrile conditions without apparent source a careful examination of the bony system is very important. Many an obscure affection may reveal itself as an inflammation of the bone and possibly be cured under proper treatment. As to the other symptoms, termination, etc., of the various diseases of the bone, they deviate very slightly from those observed in the adult. It may be emphasized that in children, especially sucklings, the bone affection is prone to be multiple. Osteomyelitis, which is caused by the entrance of micro-organisms into the blood from without, affects with predilection the newly born and the suckling, in view of the fact that the navel wound, eczema and other skin eruptions, the pathological condition of the alimentary canal, etc., frequently serve as portals of invasion for pathogenic micro-organisms. Thus, for instance, osteomyelitis of the jaw often originates in the nose, ear, etc. Staphylococci especially play a rôle here; streptococci also are frequently active and occasionally also pneumococci, the bacterium coli, etc. Furthermore, the bony system is very prone to become affected during and after infectious diseases, such as scarlatina, measles, pertussis, pneumonia, typhoid, and variola. Bone affections in children are very frequently caused by scrofula (*e.g.*, spina ventosa), tuberculosis, and syphilis (periostitis), and occasionally, also, by diabetes.

The TREATMENT of osteomyelitis in children corresponds with that in adults [rest, antiphlogosis, and surgical interference].

Caput Obstipum (Stiff-neck [Wryneck], Torticollis) is a crooked position of the head usually due to shortening of one sterno-cleido-mastoid muscle. The head is turned to the diseased side, with the face to the opposite side. As a rule, it is unilateral; sometimes also bilateral. In the latter event the head is drawn backward. Caput obstipum may be *congenital* in nature, namely, may have developed during fetal life as a

result of an incorrect position of the head in the uterus. More frequently, however, it is produced by injury during birth (see "Hematoma of the Sterno-cleido-mastoid").

The trauma is undoubtedly associated with an as yet unknown factor which acts as the exciting cause. According to Kader, small micro-organisms from the intestine migrate with the blood-current into such small muscle injuries produce a myositis from which the caput obstipum develops. This condition is usually not noticed in the first four or five years of life until the development of asymmetry of both halves of the face (due to atrophy). This deformity manifests itself by contortion of the eyes, nose, and mouth, and involves at times, aside from the soft structures, also the bones (become narrow and distorted). In that event it can usually be remedied by operative interference only (subcutaneous tenotomy), or open myotomy is resorted to, followed by orthopedic after-treatment, which acts favorably also upon the atrophies.

Caput obstipum is often *acquired*. Spondylitis of the vertebral column and injuries to the latter may form a cause, as also frequent "catching cold." This "rheumatic torticollis" yields quickly to sodium salicylate, cataplasms, massage, electricity, and unguentum potassii iodidi. It is furthermore caused by nervous contractures of the sterno-cleido-mastoid, instead of or in combination with convulsions; occasionally also by tumors in the muscles (sarcoma); cicatricial contractures (from burns); working with one and the same side only (carrying heavy weights); forced maintenance of the head in one position in order to avoid double vision (in paralysis of eye muscles); and, finally, by painful rigidity of muscles (meningitis). Reflexly, torticollis is sometimes produced by intestinal worms or carious teeth, and is curable by removal of the cause. Phocas saw three cases of rachitis in which caput obstipum formed the first symptom and disappeared on antirachitic treatment. The condition was probably due to the abnormal softening of the vertebræ of the neck, with atony of the muscles. There is also an intermittent kind of caput obstipum due to malaria and controlled by quinin.

The TREATMENT is based, therefore, upon the original disease, and only in severe cases does it require surgical or orthopedic interference.

Myositis is manifested by pain, swelling, thickening, and loss of function of the affected muscles. In protracted cases it leads to contractures. Myositis may be traumatic in nature (caput obstipum) or develop in the course of an attack of scarlatina. If the swelling remains in the background, the pain caused by myositis may readily lead to errors of diagnosis. For example, myositis of the muscles of the chest and back may be mistaken for pleuritis; myositis of the abdominal muscles, for peritonitis, etc. Myositis is not infrequently observed in syphilis, either as a result of a diffuse affection of the muscles or as gummata. In this condition myositis is sometimes associated with suppuration. Tuberculous myositis, which may lead to abscess cavities in the muscles without involving the bones and articulations, is of rarer occurrence.

Of special interest is *myositis ossificans*, which usually begins in childhood—as a rule, about puberty. It occasionally occurs much sooner and may appear even in sucklings. This affection is characterized by progressive interstitial connective tissue proliferation, with consecutive ossification. It usually begins in the muscles of the neck and back, spreading from here to the shoulders and the rest of the body. It begins with fever and a soft, painful swelling of a section of a muscle, over which the skin appears reddened and edematous. The acute inflammatory symptoms soon abate, but the swelling remains. In the course of time the latter becomes firmer, and finally so hard as to resemble a bone plate or a raphé of bony hardness. Other muscles of the body gradually become involved (in one child every slight contusion was immediately followed by the formation of an osseous focus), leading to considerable deformities and disturbances of motion. In severe cases the body finally becomes rigid, hard, and immobile. If the muscles of mastication or respiration are involved, life is endangered. Otherwise the affected person may reach old age, since the disease runs a very chronic course, with remissions and exacerbations. The causes of the disease are yet obscure. Henoch frequently found a relationship between myositis and the rheumatic diathesis.

TREATMENT is futile.

Exostoses in children are sometimes a sequel of acute articular rheumatism. They consist of products of an inflammatory

process in aponeuroses and tendons and are usually situated around joints in the form of small, hard nodules. By retrogressive metamorphosis (fatty degeneration) these nodules may again disappear, or after undergoing calcification leave behind bonelike growths. Such are also found upon the periosteum and perichondrium as hard nodes which firmly adhere to the bone *(rheumatic osteoma)*. Sometimes multiple exostoses (hereditary disposition) also occur without rheumatism, and sometimes in connection with it there may also be met ossification of tendons and muscles—a process which may reach such a high degree of severity as to subject a large portion of the body to the transformation *(myositis ossificans)*. Cases are recorded in which, *e.g.*, every contusion produced such an ossification with fever and pain. Also *congenital exostoses*, usually at the transition of the diaphysis to the epiphysis, exist, but are at times unrecognized until the first few years of life, when, if not extirpated early, they may give rise to disturbances of growth in the affected limb.

Arthritis Deformans is very rare in children. Its localization, symptoms, etc., are the same as in adults. It is a nervous, and not a rheumatic affection. Therefore salicylates are without effect. Most benefit was derived by Jacobi from the galvanic current and prolonged use of arsenic. A cure is sometimes effected by these means.

XVIII.

Diseases of the Skin.

Erythema quite frequently occurs in children, especially in the first few years of life. Some children are regularly affected by it in the spring. The etiology of erythema is in most cases uncertain. Erythema in children, as in adults, is distinguishable in several varieties: *Erythema nodosum, papulosum, urticatum, marginatum, and annulare.* It usually appears in the form of red, variously shaped, at times somewhat infiltrated and elevated, small or large spots. Its appearance is sometimes accompanied by constitutional symptoms, such as fever, languor, anorexia, etc., which usually subside with the establishment of the eruption. The erythema, however, usually remains noticeable a few days longer (sometimes severe itching) and finally disappears—not infrequently with slight desquamation. Erythema may be mistaken for measles or scarlatina. This is especially true with the so-called relapses and reinfections which not infrequently develop (sometimes with fever) during the convalescent stage of these exanthemata, but are often nothing else than simple erythema. Henoch frequently observed an erythema nodosum, which appeared in the form of large nodules reddened at the summit. It was generally limited to the lower extremities and disappeared in two to three days, leaving behind a bluish or brownish pigmentation. Erythema is sometimes accompanied by edema of the eyelids and dorsal surfaces of the hands and feet, and sometimes by rheumatic pain in the joints, which improves under sodium salicylate. Otherwise erythema usually requires no special treatment. Erythema may occur also as a complication of other diseases, such as rheumatism, malaria, typhoid, pyemia, and diphtheria, and as a result of the use of drugs [*erythema medicamentosum*], such as quinin, antipyrin, choral, diphtheria antitoxin, etc.;

finally, it may develop in the vicinity of wounds or ulcers—*e.g.*, at the periphery of eczematous cutaneous surfaces or vaccine pustules, whereby the whole arm may become inflamed and infiltrated, and be mistaken for erysipelas. The latter affection, however, is associated with a much higher temperature and is diffuse instead of circumscribed. This [*traumatic*] form of erythema disappears rapidly under lead-water fomentations.

Erythema Neonatorum (see page 46).

Combustio (Burns).—Even superficial and circumscribed burns in children are not rarely followed by violent reaction on the second or third day (also sooner). [In a case of a superficial burn of the neck in a child 15 months old edema glottidis set in within six hours after the accident. The edema gradually subsided within twelve hours.—SHEFFIELD.] This reaction is manifested notably by fever, diarrhea, and—in irritable children—convulsions, aphasia, and other nervous disturbances; finally sometimes by hemoglobinuria, as well as collapse, with fatal issue. Sometimes, again, children survive even severe burns (*e.g.*, Demme's girl, 5 years old, in whom two-thirds of the body was burned).

The TREATMENT of burns is the same as in adults. Aside from washing with boric acid or physiological salt solution and, if possible, emptying of large blisters, the parts are first covered with powder, salve, or carron oil dressings. As iodoform is too dangerous to use in children, dermatol, xeroform, potassium sozoiodolate, airol [europhen], etc., are used; also "cooling ointment" *(q.v.)*. The use of bismuth subnitrate *(q.v.)* in powder form or ointment has always been popular. Of course, in large burns transplantations are later to be taken into consideration. The symptoms of reaction must be combated symptomatically (by antipyretics, nervines, narcotics, and analeptics).

Congelatio (Frostbite).—The treatment of frostbites depends upon the stage of the affection. In perniones *(q.v.)*, for example, the parts may be painted with a solution of nitrate of silver (3 to 5 per cent.) or tincture of iodin, bathed in hot water with chlorid of lime (1 tablespoonful to 1 liter of water), or covered with an ointment of ichthyol (5 to 10 per cent.) or carbolic acid or camphor *(q.v.)*. These also relieve itching. If ulcers develop, silver nitrate or one of the powders or ointments

recommended for combustio may be applied. In very extensive frostbite surgical interference is necessary.

Pernio [Chilblain].—Perniones are treated by hot baths of short duration and application of one of the following remedies:—

℞ Camphoræ ..... 1.0 [gr. xv].
Creosoti,
Balsami Peruviani .....aa 1.0 [*m*xv].
Vaselini ..... 10.0 [3iiss].

℞ Acidi carbolici ..... 0.5 [*m*viij].
Unguenti plumbi,
Lanolin. .....aa 10.0 [3iiss].
Olei amygdalæ dulcis..... 5.0 [3j].

Lichen Strophulus [Miliaria] is unusually frequent in children. It appears suddenly on the face, back, and extremities as discrete, prominent light to dark red pimples, from a pinhead to half a pea in size. The pimples are partly penetrated by a little hair. More rarely lichen appears in groups upon a slightly reddened, infiltrated base. It is often associated with severe itching. It partly disappears spuriously (by absorption) and partly not until the development of small clear, or yellow vesicles at the summit, which dry up and readily exfoliate. Frequently new crops develop; so that weeks or months pass before a positive cure is obtained. If the eruption is severe there is considerable general disturbance (itching, insomnia). Lichen strophulus occurs especially during first dentition (Pfeiffer's "teething eruption"), but probably bears no relation to teething. The etiology is often quite obscure. It is sometimes produced by local irritation such as sunburn [rough flannel underclothing], and sometimes neglect of the skin, dyspeptic disturbances, and scrofula.

The TREATMENT is limited to relieving the itching by bran and soap baths and sponging with a 1- to 2- per-cent. carbolic acid solution. Internally small doses of antipyrin [and calomel].

Urticaria [Hives] in small children may precede prurigo *(q.v.)*; otherwise it develops after partaking of all sorts of food and drinks. Baginsky saw urticaria in a child 9 months old after eating half of the yelk of an egg. Later, eggs agreed well with the child. It occurs also in dyspeptic disturbances, worms,

after chemical irritations (serum injection), and after cold baths. It is sometimes congenital. Baginsky saw a child 1 day old who cried incessantly without any objective symptoms. Later it developed urticaria and prurigo.

The symptoms are the same as in adults. [Sudden appearance (or disappearance) upon any portion of the body of "wheals" of a whitish, pinkish, or reddish color accompanied by stinging, pricking, and tingling and slight constitutional symptoms.

Urticaria annularis occurs in rings.

Urticaria figurata occurs in spirals.

Urticaria vesiculosa has vesicles on the summit of the wheal.

Urticaria bullosa is a bullous development on summit of wheal.

Urticaria papulosa is a wheal combined with a papule.

Urticaria tuberosa are giant wheals.

Urticaria hæmorrhagica is a combination of urticaria with purpura.

Urticaria pigmentosa is a pigmentation following the wheals.

Constitutional symptoms are fever, headache, gastric disorder, etc.—SHEFFIELD].

TREATMENT.—Removal of all etiological factors. To relieve itching: Lanolin [Dobell's solution] or the following *"cooling salves"*:—

℞	Adipis lanæ	5.0 [3j].
	Unguenti zinci benzoati	10.0 [3ij].
	Aquæ rosæ	20.0 [3iv].
	Mentholis.	1.0 [gr. xv].
℞	Lanolini	5.0 [3j].
	Unguenti zinci benzoati	10.0 [3ij].
	Liquoris plumbi subacetatis	10.0 [3ij].

In obstinate urticaria sulphur baths [salicylate of soda].

Eczema may occur in children, as in adults, as an acute or chronic disease. Acute eczema is rare in children, but occasionally such cases are met which last from one to two weeks, and sometimes recur at certain intervals. Very extensive hyperacute eczemas beginning with high fever are sometimes observed. Subacute cases are more frequent, and chronic ones

still more so. These are usually distinguished by their great obstinacy, but otherwise they present the same types as in adults—thus, *eczema squamosum, papulosum,* etc. *Eczema vesiculosum* and *pustulosum* are especially frequent in children. If in the latter form the pimples contain pus, the condition is spoken of as *impetigo,* or *eczema impetiginosum.* Such cases occur even in sucklings, often but a few weeks old, particularly upon the face, forehead, cheeks, nose, upper lips, and chin. This so-called "milk crust" *(crusta lactea)* occurs in the localities just mentioned as more or less coherent scabs of greenish or blackish-brown color, interrupted here and there by intervals of red, excoriated skin. In several places excoriations are observed which are covered by blood-clots, and isolated, still intact, small vesicles or pustules. The neighboring lymph-glands are swollen and there is severe itching of the skin, which more or less impairs the general health of the children, who may otherwise be healthy and well nourished. The duration of eczema ranges between six and eight weeks, but it may persist for months and years. During acute diseases, such as pneumonia, or after great loss of vital fluids, as in profuse diarrhea, there is at times a tendency on the part of the eczema temporarily to heal. The affection sometimes extends over the scalp, into the nose, eyes, and ears.

Opinions differ as to the origin of eczema. Some authorities believe that it is always scrofulous in nature. This is certainly not so, although scrofula often plays a rôle. The mode of feeding, especially overfeeding, is sometimes responsible for it (very fat children are very often affected by eczema), or faulty feeding in general which gives rise to dyspepsias. Eczema is sometimes hereditary in a family. Dentition is also a factor; at any rate, there is a recurrence of an attack before and disappearance after the eruption of a tooth. But in children, as in eczema in adults, there are many other etiological factors which must also be considered. Moreover, the puerile skin is very sensitive, and even the slightest irritation—for example, hydropathic procedures, application of plasters, ointments, etc.; vermin (pediculi), the sun, sweat, frequent wetting by sputum, vomitus, stool, urine, and secretions of the nose and ear; also slight traumatism, such as piercing of ears, vac-

cination, etc.; even wearing of woolens on the bare body—may produce eczema. Obstinate eczema not rarely follows measles, scarlatina, and varicella. That all these etiological factors are especially liable to excite eczema in children of a scrofulous diathesis cannot be disputed. Eczema sometimes seems to be contagious in nature [*eczema parasiticum*]; at any rate, several members of the same family are not infrequently successively attacked by it.

Eczema affecting older children may appear on any portion of the body, although the face and head are the usual locations; the latter, however, may escape and other parts of the skin be affected. The process is usually very tedious, and sometimes lasts for years. Occasionally, perhaps, as a result of scratching, an acute attack, with severe swelling, redness, and pustular formation, may suddenly occur in the course of chronic eczema (*e.g.*, of the face). According to Henoch, these pustules may become very large and umbilicated, and greatly resemble variola. Indeed, some cases of "*generalized vaccinia*" are perhaps nothing more than eczema. Finally, eczema may be accompanied by hemorrhages in the absence of trauma (scratching) as they sometimes occur in children with a hemorrhagic diathesis. The blood oozes continuously and the patient may even bleed to death (Henoch saw three deaths from this cause).

The TREATMENT of eczema is very varied. In the local treatment it is best to follow the directions of Henoch. First of all, the etiological factors must be removed. Scrofula must be treated, irrational feeding changed, vermin destroyed, irritating secretions met with the most scrupulous cleanliness and as soon as possible arrested, etc. Locally cleansing of the affected parts is of primary importance—*i.e.*, removal of scabs, squamæ, etc., by means of applications of codliver-oil; vaselin, pure, or with 1 per cent. of salicylic acid; or fomentations covered with oiled silk or rubber tissue. After loosening the incrustations the parts are washed twice a day with green soap and covered with Hebra's ointment (unguentum plumbi oxidi), or by an ointment of salicylic acid *(q.v.)*, tannic acid *(q.v.)*, or boric acid *(q.v.)*. In severe inflammation this treatment is preceded by an application of lead-water or 2 to 5 per cent. of aluminium acetico-tartrate *(q.v.)*. In local eczema also unguen-

tum hydrargyri præcipitati albi (0.5 to 15.0 [gr. viii-ʒiv]). In *lid eczema* unguentum hydrargyri oxidi flavi (0.1 to 10.0 [gr. iss-ʒiiss]). All these ointments are to be fixed by bandages (face-masks, etc.).

In eczema of the head the hair is first shaved. Scratching must be prevented as much as possible by long sleeves or by severe measures, such as tying the arms together. In the later stages of eczema tar *(q.v.)* must also be resorted to. If the skin is moist, glistening, infiltrated, and painful, painting with nitrate of silver (2 to 5 per cent.) before the application of an ointment is very serviceable. In very chronic cases internal medication is indicated, of which Fowler's solution is best, also Roncegno or Levico water (1 teaspoonful once or twice daily), and in scrofulous children syrup of the iodid of iron. "Sool" baths are too irritating, and, if baths are desirable, bran or rather sulphur baths may be used. In some cases of eczema an entirely expectant method of treatment is often sufficient. Thus, some cases of *facial eczema* of small children sometimes heal with remarkable rapidity by simple codliver-oil applications. Biedert recommends especially an ointment with zinc oxid *(q.v.)*. Lassar's paste (see "acidum salicylicum") also at times acts excellently. Baginsky recommends, especially in dry eczema, a zinc-tar ointment (see "Zinc Oxid") or that of silver nitrate.

℞ Argenti nitratis ..... 4.0 [ʒj].
Balsami Peruviani ..... 40.0 [ʒx].
Vaselini flavi .....ad 100.0 [ʒiij].

In very severe itching that does not disappear under this treatment a *"cooling ointment" (q.v.)* or salicylic alcohol (1 per cent.) must be resorted to.

In very *moist eczema* dusting powders, such as dermatol (1 to 1 or 10), xeroform (pure), or tannoform (1 to 4 or 5) [aristol] may be employed; the same are to be used also in form of an ointment (5 to 10 per cent.). Recently "naftalan" ointment has frequently been lauded and also iodovasogen (6 per cent.), especially in scrofulous eczema. The most recent method of treatment of chronic eczema consists in the use of x-rays. Experience with it is, however, as yet limited.

[The following ointment has proved very effective in the treatment of acute or subacute eczema of children at the baby's ward of the New York Post-graduate Hospital:—

℞ Zinci oxidi,
Pulveris cretæ .....aa 16.0 (℥iv).

Mix and add with constant stirring:—

Oleum lini (hot),
Liq. plumbi subacet. dil. .....aa 8.0 (℥ij).

SHEFFIELD.]

Psoriasis very rarely occurs before the sixth year of life. An hereditary disposition is often demonstrable, and many children of psoriatic parents are attacked by this disease.

In the treatment of psoriasis it is best to avoid the use of pyrogallic acid or naphthol, owing to their toxic qualities, and to employ rather chrysarobin (1 to 10 or 15 parts of vaselin) rubbed in with a hard hair-brush, after previous removal of the scales by means of green soap. Ichthyol ointment (from 5 to 10 per cent.) often acts very well. Internally, arsenic may be tried [should be continued for several months—SHEFFIELD]. Thyroid therapy has proved successful in some cases. In very stubborn cases mineral baths are worthy of consideration.

Herpes.—*Herpes glosso-labialis* appears also in children in the course of various infectious diseases, such as pneumonia, cerebro-spinal meningitis, acute gastro-intestinal affections, angina, diphtheria, etc. *Herpes zoster* is sometimes observed even in infancy, and involves especially the intercostal and pudendal nerves, the brachial plexus, etc. The pain, however, is not as severe as in adults; in fact, it may be absent and usually subsides under ordinary treatment (dusting powders, Unna's plaster). It sometimes leads to pustulation and deep ulceration, which heal slowly. [For "Herpes Tonsurans" see "Tinea."]

Intertrigo is an inflammation of the skin which usually manifests itself by redness and mild swelling of the skin and later by an exudation. The skin at first appears red, dry, and glossy, and soon becomes moist and sticky. Isolated vesicles or papules appear and the epidermis desquamates and macerates. Intertrigo is usually caused by irritation of the skin, such as pressure, friction, action of the sun, and wetting by irritating,

decomposing secretions and excretions,—*e.g.*, sweat, diarrheal stools, sputum, urine,—and irritating ointments. Deficient nutrition and uncleanliness act as predisposing causes. The affection occurs with predilection in regions where opposed surfaces rub against each other, and between folds of the skin, especially in fat children. Children of the poorer classes are particularly prone to this affection, but other children also manifest marked tendency toward intertrigo; so that if extraordinary care is not taken it very often develops and extends over large surfaces. In neglected cases, papules, abscesses, and ulcerations may develop beneath the intertrigo and later lead to the erroneous diagnosis of syphilis.

The TREATMENT of intertrigo should begin with strict cleanliness and removal of the etiological factors. The inflamed portions of the skin should be frequently dusted with zinc or salicylic acid powder (see "Acidum Salicylicum" and "Zinc Oxid") or with the newer antiseptic astringents, such as dermatol, xeroform [aristol, europhen], tannoform, nosophen, etc. Absorbent cotton should be placed between opposed surfaces, or the cotton should be covered with a simple ointment (boric acid or zinc lanolin, etc.). As a rule, intertrigo heals quickly under this method of treatment. The usual baths should be discontinued for a while. If baths are desired, bran baths are to be given, or bolus albus [see "Argilla Pulvis"] (50 to 100 grams) is added. In very extensive intertrigo corrosive sublimate baths (0.5 to 1 gram [gr. viiss to xv]) prove very serviceable. In very obstinate cases painting with silver nitrate (2 per cent.) or corrosive sublimate (0.05 to 100.0 [gr. $^3/_4$ to ℥iij]) is deserving of trial. [The dusting powders and salves are best removed with ordinary sweet oil.]

Prurigo is not rarely observed in children in the first few years of life. The symptoms and course are the same as in adults, except that there is usually less disturbance of the general condition. This disease sometimes begins with urticaria. It is therefore important to pay attention to every obstinate case of urticaria, in order to obviate the development of prurigo.

The ETIOLOGY is obscure. The patients sometimes descend from tuberculous parents. In some cases it is due to dia-

betes. Escherich often found prurigo in conjunction with *status lymphaticus*.

TREATMENT.—Daily warm bath of from one to two hours' duration; also soap and sulphur baths, in addition to hypodermics of pilocarpin (0.002 to 0.02 [gr. $^1/_{30}$ to $^1/_3$] gradually increased), or, in small children, syrup of jaborandi (from 1 to 2 teaspoonfuls a day), to stimulate perspiration. To relieve itching: Washing with an acetic acid solution (from 5 to 10 per cent.), followed by painting with glycerin. The application of ointments of ichthyol (from 5 to 10 per cent.) [or epicarin (Kaposi)] or naphthol *(q.v.)* is also useful. Internally: arsenic; also iodothyrin has frequently been successfully administered. Prurigo sometimes disappears with second dentition (Baginsky).

Pediculi [Capitis] (Head-Lice) are very frequently found in children, especially in public schools. The irritation caused by scratching produces and keeps up obstinate eczematous eruptions on the head and neck, which if neglected may also involve other regions of the body, cause conjunctivitis, glandular enlargement, etc. Under these circumstances the condition may be mistaken for a typical case of scrofula. On removal of the cause, however, the symptoms rapidly disappear. The pediculi are best destroyed by petroleum. After careful cleansing of the scalp, clipping of the hair, washing with soft green soap, etc., and softening of crusts, if present, with oil, the scalp should be washed with petroleum for three successive evenings and covered with a cap fitting snugly to the neck. The next morning the head should be washed with warm water containing a little soda and then thoroughly combed. After removal of the pediculi it is often necessary to treat the remaining eczema.

Scabies [The "Itch"] occurs also in children of better circumstances [but is quite common among poor children]. It is sometimes even observed in very young infants. The mode of infection is often entirely obscure. [The eruption is usually localized in places where the skin is thinnest—viz., between the fingers, on the flexor surfaces of the wrists, the axillæ, etc.—SHEFFIELD.] The localization is, however, not as limited in children as in adults; otherwise scabies runs an identical course.

It is frequently unrecognized in the acute condition, and, therefore, often becomes chronic, when it may be mistaken for chronic eczema.

TREATMENT.—After a warm bath [thorough scrubbing with green soap] for several nights (three usually suffice), balsam of Peru *(q.v.)* or the less expensive styrax *(q.v.)* should be applied. [The following ointment is very useful:—

℞ Epicarini ..... 4.0 (3j).
Ichthyolis ..... 4.0 (3j).
Sulphuris præcipitati ..... 8.0 (3ij).
Unguenti petrolati ..... 30.0 (℥j).
M. Sig.: To be applied after a warm bath.—SHEFFIELD.]

Also naphthol *(q.v.)* and creolin *(q.v.)* are effective. The inunction is followed by warm baths. The patient's clothes and underwear [and bedding] should be disinfected by boiling [or dry heat]; articles which cannot be boiled should be disinfected with sulphur and aired for twelve days. All inmates of the house should be examined [and treated] for scabies, otherwise the scabies may recur through contact.

"Creeping Disease" is a skin disease which is frequently observed in Russia. It is manifested by burning and itching (therefore restlessness and insomnia) and a fine, red, elevated streak, which progresses from day to day in interrupted outbreaks (straight or in zigzag form). It is due to a parasite, probably the larva of a diptera (horse-fly, *Gastrophilus equinus*), which deposits its eggs in the summer on the hair-shaft of horses. From here the desiccated larvæ invade the alimentary canal of the horse, where they remain for from six to seven months, and reach the ground with the feces. A few weeks later they creep out as flies. The parasite infests human beings—*e.g.*, children who play naked on the ground. It begins, therefore, with the nates, more rarely upon other parts, but never with parts covered by clothing. Sometimes several of them infect the skin at once and give rise to several separate foci. Such a case was seen by Kaposi (1898) in a child $2\,^1/_2$ years old. Rille observed (1895) the affection in two children (2 and $2\,^1/_2$ years old, respectively). In one of them a cure was effected by excision of two pieces of skin—the terminal paths of the parasite; the other case recovered spontaneously.

[Tinea Trichophytina (Ringworm) is pre-eminently a disease of young life. It is highly contagious, and often spreads with great rapidity and obstinacy in schools and asylums where the young are congregated.

Ringworm in children may conveniently be studied under two different heads:—

Tinea Trichophytina Capitis (Herpes Tonsurans, Ringworm of the Scalp).—It is manifested by the appearance of ring-shaped, scaly, circumscribed, somewhat elevated, red or gray patches. The hair over the affected spots becomes loose and brittle and gradually falls out, leaving bald, shiny patches. The eruption is at times accompanied by severe local inflammation and exudation of a viscid, gelatinous secretion—*tinea kerion.*

Tinea Trichophytina Corporis (Herpes Circinatus, Ringworm of the Body).—Small, circular, scaly spots, which rapidly spread peripherally and clear in the center. They often attain one-half an inch in diameter. The rings occasionally coalesce, forming serpiginous lesions.

Treatment.—Ringworm of the *body* generally yields rapidly to local destruction of the parasite by means of iodin, mercury, sulphur, salicylic acid, or epicarin. In older children glacial acetic acid will be found of value.

Ringworm of the *scalp* sometimes resists all forms of treatment for years; hence, great efforts should be made to prevent further spread of the disease and to begin an energetic method of treatment as early as possible.

Prevention of further spread of the disease in large institutions where great numbers of inmates are packed in comparatively small rooms often baffles the skill of those in charge. Isolation is, of course, the ideal remedy, but is not always feasible under such conditions. In asylums, etc., the hair-clipper, while an admirable time-saving instrument, is one of the principal means by which contagion is carried. To avoid this the following rules should be observed:—

1. Separate clippers must be used for the healthy and diseased inmates.

2. Before clipping the hair the healthy inmates must be examined for ringworm of the scalp and suspicious cases isolated.

3. At least six clippers must be kept on hand, all thoroughly boiled at first, and those not in use must be placed in a 5-per-cent. solution of carbolic acid while the clipping is going on.

4. Immediately after clipping the hair it is of great service thoroughly to wash the heads of all the healthy inmates with green soap.

Infection among the affected inmates spreads, as with the healthy ones, by means of the clippers and also through the caps, if such are used. Very seldom do the nurses strictly obey the order given by the physician—that one patient should not receive the cap of his comrade; and we find too often that the caps are changed, so that a patient with only one affected spot gets a cap of a patient with numerous infected areas. This fact alone is of sufficient import to deprecate the use of caps and makes the method of treatment to be spoken of much more valuable.

In an epidemic of nearly four hundred cases of ringworm of the scalp I found the following method of treatment very efficient:—

℞ Acidi carbolici,
Olei petrolati crudi.....aa 60.0 (℥ij).
Tincturæ iodi,
Olei ricini .....aa 110.0 (℥iiiss).
Olei rusci (German).....q. s. ad 500.0 (Oj).

After clipping the hair close to the scalp this mixture is applied over the entire scalp—more thickly over the affected spots—by means of a painter's brush, once a day for five successive days. On the sixth day it is wiped off with a rag dipped in plain olive-oil; the hair is again clipped and the scalp washed thoroughly, but gently, with green soap and a soft nail-brush, care being taken that all the scales and loose hair covering the scalp are removed. No epilation is, as a rule, necessary. On the seventh day the mixture is reapplied as thickly as before, and the whole process repeated regularly for three or four successive weeks, the length of time depending upon the severity of the case. New hair now begins to appear, and no trichophyton fungi can be discovered in the hair epilated for microscopical examination.

These procedures are followed by a few days' application of a 10-per-cent. sulphur ointment, and then by the use of the following preparation for about two weeks:—

Resorcini,		
Acidi salicylici	aa	16.0 (℥iv).
Alcoholis		120.0 (℥iv).
Olei ricini		500.0 (Oj).

This mixture considerably hastens the growth of the hair on the bald spots. In cases where isolation is impracticable or impossible, as often happens in private families, this resorcin mixture serves as an excellent substitute. I observed that, when it was superficially applied to the healthy heads coming in direct contact with the ringworm patients, no infection took place.

Recently Kaposi and Van Harlingen, among others, have found in epicarin a very valuable remedy in ringworm of the scalp. According to Van Harlingen, epicarin, used preferably in the form of a tincture of from 10- to 20-per-cent. strength and after epilation, appears to act more rapidly than any of the remedies heretofore employed in restoring the hair to a normal condition.—SHEFFIELD.]

Chloasma.—[*Tinea Versicolor (Liver Spots)* is a fungous *(Microsporon furfur)* disease of the skin characterized by patches of brown color.—SHEFFIELD.] It is removed by the application of alkaline spiritus saponis. The action of unguentum hydrargyri præcipitati albi *(q.v.)* is more energetic. [Or the following:—

℞ Acidi salicylici		1.0 (gr. xv).
Epicarini		1.0 (gr. xv).
Sulphuris præcipitatis		4.0 (℥j).
Lanolini		30.0 (℥j).

SHEFFIELD.]

Acne (Acne Sebacea s. Simplex) is generally observed at puberty and occurs particularly upon the face, back, and shoulders. In mild cases the TREATMENT consists—in addition to the removal of possible causes, such as anemia, chlorosis, etc., and prophylactic expression of comedones, by means of watch-key

or comedo extractor—of frequent rubbing with spiritus saponis. Hebra's sulphur salve (see "Sulphur") also may be applied evenings, after washing with soap and water. Some authorities recommend sponging with acetic acid *(q.v.)*. In severe cases Schael's method is to be used: For three successive days apply a layer (the thickness of the dull edge of a knife-blade) of a paste of naphthol-sulphur (see "Naphthol"), wipe it off after half an hour with a soft cloth, then powder the affected surface. After a few days the salve can be again applied, if necessary. As an adjuvant resorcin salve (see "Resorcin") may be applied in the evening. In very severe cases scarification must be resorted to.

In small children, especially if delicate, ill nourished, and run down through sickness, reddish, livid pimples sometimes develop, especially upon the back, which either subside gradually or degenerate into nodular ulcerations *(acne cachecticorum)* and heal with difficulty.

TREATMENT.—General hygiene, especially rational attention to the skin and feeding. Local bathing with potassium permanganate. Also application of boric acid ointment [still better, 5-per-cent. ichthyol ointment]. In ulcer formation, a 2-per-cent. ointment of silver nitrate locally. Trial with small doses of arsenic. [Th. G. Lusk prefers in acne the following lotion, which is known as "lotio alba composita":—

℞ Zinci sulphatis,
Potassii sulphureti,
Sulphuris præcipitati .....aa 4.0 (3j).
Alcoholis ..... q. s.
Aquæ rosæ .....ad 120.0 (℥iv).

The zinc and potassium are each to be dissolved in half the quantity of rose-water and the potash solution added to the zinc solution with constant stirring; sufficient alcohol is added to the sulphur to make a thin paste, which is then incorporated with the other solution.

The lotion should be thoroughly sopped on the face twice daily. When the stimulation and peeling become too severe, the lotion should be stopped for a while and cold cream or other emollient applied.—SHEFFIELD.]

Ecthyma is classed by some authors with eczema, by others as an independent skin disease. It is characterized by large,—up to the size of a pea,—isolated, or grouped (especially on the nates and thighs) pustules, surrounded by a red zone, and is very often combined with eczema. It occurs also alone, particularly in scrofula, and in healthy, but uncleanly, children.

The TREATMENT is the same as in eczema. The vesicles dry up and form blackish-brown scabs, leaving behind red spots.

Large and soft pustules are sometimes seen in ill-fed, cachectic children whose health has been undermined by acute or chronic diseases *(rupia cachectica)*. After bursting of the pustules deep ulcerations follow, resembling punched-out holes, which enlarge gradually in depth and circumference and heal very slowly with scar-formation. It sometimes ends in gangrene of the skin and death.

Furunculosis often affects small scrofulous or cachectic children debilitated by diseases (profuse diarrhea!). Frequently furunculosis is met in connection with acne, scabies, and eczema [from infection by scratching]. Numerous nodules develop and gradually break spontaneously. They usually contain no hard core, but thick yellow fluid mixed with bloody pus, and may by confluence (negligence) lead to large suppurations of connective tissue, greatly impair nutrition, and give rise to atrophy and death. The treatment consists in early daily incisions of the newly developed furuncles (no matter how many there be), expression of the contents, and packing with a little iodoform gauze. The dressing is held in place by collodion [or adhesive plaster]. With this method of treatment the furuncles gradually diminish in number and finally disappear. In order to remove them earlier, baths containing permanganate of potassium or bichlorid of mercury may be tried, also arsenic [ichthalbin] internally. Furunculosis not infrequently occurs also in larger children and is often due to tuberculosis. Here, as a rule, painless "cold" abscesses develop which are ultimately covered by thin, bluish skin. Some of them break spontaneously, but soon new fistulæ and ulcers are established which greatly undermine the system. Large infiltrations are usually softened by emplastrum hydrargyri or by small Priessnitz compresses with corrosive sublimate (a 0.2-per-cent. subli-

mate solution is covered by rubber tissue, absorbent cotton, and bandage or collodion). Abscesses and fistulæ are freely incised, scraped, and dusted with iodoform [or aristol]. In multiple fistulæ the internal use of ichthalbin is now recommended.

Nevi. — *Nevi Pigmentosi (Pigmented Birth-marks)* are congenital anomalies of the skin-pigment which may appear as yellow, brown, blue, black, or gray spots. They may also develop in later years, sometimes not until puberty. These maculæ are sometimes prominent and their surface coarsely wrinkled and covered by hair [*nevi pilosi*]. The abnormal portions of the skin are sometimes quite large and extend over a large area of the body, or they are at first small and often progress very rapidly. Early removal is therefore indicated. This is accomplished by corrosive sublimate collodion, scarification (see "Angioma"), or excision. (For discussion of nevi flammei see "Angioma.")

Angiomas belong to the congenital circumscribed dilatations of the blood-vessels (capillaries, venules, and arteries) of the skin and of the subcutaneous tissue, with simultaneous increase in their number. To these belong also *nevi flammei (s. vasculosi)* and the telangiectases, which are practically the same as the former and are distinguished only by their dimensions, the number of participating vessels, the mode of distension, etc. *Telangiectases* are usually small, flat, superficial, radiating, pink to bluish-red patches, composed of a fine vascular network. *Nevi* are bluish-red to dark-blue, flat or somewhat elevated neoplasms, as a rule, of larger extent. *Angiomata* are true vascular, spongy tumors, raised above the skin and containing hollow spaces filled with blood. All have a tendency to enlarge rapidly (only rarely spontaneous diminution or involution), and there is danger of ultimate sarcomatous degeneration. Therefore their removal as early as possible is imperative. Unfortunately this is often impossible in nevi, for they are generally of considerable size from the beginning. Small ones are usually rapidly removable by sublimate collodion (1 to 8 or 10) which is applied several days in succession (sometimes one application suffices), after which a crust forms that heals almost without suppuration and falls off within from

two to three weeks, leaving behind a small, barely visible scar. The same is the case with telangiectases. Fuming nitric acid and vaccination (five to ten scarifications) are also good remedies. Vaccination, however, is apt to produce ugly scars, and is more suitable in angioma, but here the thermocautery or galvanocautery, electrolysis, or excision act with more certainty. Blaschko recently recommended injections of tincture of chlorid of iron as painless and effective. He injects every two or three days $^1/_2$ to 1 Pravaz syringeful of the following:—

℞ Liquoris ferri sesquichloridi,
Zinci chloridi .....aa 1.0 [gr. xv].
Cocainæ muriatis ..... 0.1 [gr. iss].
Aquæ destillatæ .....ad 10.0 [3iiss].

Dermoid Cysts occur also in children—*e.g.*, on the neck, as remnants of the brachial ducts, beneath the angle of the lower jaw, or in the supraclavicular space. They may be so tense as to be mistaken for solid glandular tumors. They are also observed on the eye, especially at the inner angle, and may be mistaken for brain herniæ. Sometimes they extend deeply inward and displace the bulb. They occur also on various parts of the skin. The two cases of cysts observed by Trzebicki in two Jewish boys beneath the circumcision cicatrix, must be looked upon as rarities.

Verrucæ [Warts] in children, as in adults, are treated with local applications of nitric or chromic acid, or electrolysis, and arsenic internally. Sometimes they are successfully removed by sympathetic cures. This is not at all miraculous, as verrucæ are often trophoneurotic in nature. There is good reason to believe that [some] warts are contagious, and may be transmitted by contact, inoculation, etc.

Warts are also *congenital* and of *neuropathic nature.* They are often described under different names: nevus papillaris, verrucosus, unius lateris, neuroticus, papilloma neuropathicum, trophic nerve-nevus. They are warty, more or less flat or papillary condylomatous growths (pigmented or nonpigmented moles), and are usually localized on one half of the body and generally along the regions supplied by one or several cutaneous nerves. Nerve alterations have so far not been

observed; neither have any microscopical relations of the nerve-elements been determined.

TREATMENT.—Excision or thermocauterization. Recurrences or malignancy have never been observed. Recovery is occasionally spontaneous.

Gangrene of the Skin may be due to external causes, such as pressure, application of carbolic acid, etc., or form a sequel of infectious diseases. It is occasionally very extensive, especially after measles, scarlatina, or influenza, and may, particularly in the extremities, extend very deeply, so that amputation is the only means of saving the child's life. In scrofulous, tuberculous, and atrophic children abscesses sometimes occur at different points for a long time, which have a tendency to gangrene. Gangrene of the skin is occasionally also congenital and is probably due to abnormal pressure on the part of the uterus (deficiency of liquor amnii).

The PROGNOSIS is bad.

The TREATMENT of gangrene of the skin in children is the same as in adults. Symmetrical gangrene is described under "Raynaud's Disease."

Raynaud's Disease.—Cases of Raynaud's disease in children are on record. This quite obscure affection of trophoneurotic nature is characterized by symmetrical gangrene of certain portions of the body (fingers and toes, and more rarely the ear and nose). Usually it is preceded by a stage of local syncope (the affected parts become pale and cold), hypesthesia; more rarely, hyperesthesia and neuralgiform pain; and later by asphyxia. The affected parts appear livid and cyanotic, and vesicles with sero-purulent contents develop. It is finally followed by mummification, which causes destruction of whole toes, the tip of the nose, etc. The process sometimes pursues an acute course, in two to three weeks, and occasionally even in the manner of an infectious disease with fever, splenic tumor, hemoglobinuria, etc. It sometimes pursues a chronic course.

The ETIOLOGY is yet obscure. Anemic and nervous individuals are more susceptible to Raynaud's disease. Injuries, punctures, colds, loss of vital fluids (habitual epistaxis), and infectious diseases—such as influenza, diphtheria, and malaria—are mentioned as etiological factors. It is seldom dangerous to life.

Tonics may be tried, but are generally of no avail.

Emphysema Cutis occurs in children after tracheotomy or intubation, and also as a result of violent coughing spells (*e.g.*, pertussis, pneumonia, etc.), which lead to rupture of the lung. In one case rupture of the bronchial mucous membrane was observed.

The TREATMENT, in addition to Priessnitz's compresses, must be directed chiefly to the prevention of further attacks of coughing, and is best accomplished by means of morphin or codein [heroin], aqua amygdalæ amaræ, etc.

Edema Cutis occurs in children, not only in heart affections and in nephritis, but sometimes even without either—absence of albumin in the urine does not always indicate absence of kidney lesion! It occurs in exhausting diseases, such as phthisis, diarrhea, dysentery, etc.; in diseases of the blood (leukemia and pseudoleukemia); also after erysipelas, urticaria, or erythema multiforme, which may have passed unnoticed; as a result of compression of veins (*e.g.*, by caseated bronchial glands); and, finally, without any positive causes. Sometimes edema occurs periodically, especially in conjunction with hemoglobinuria.

Scleroderma (Sclerema Adultorum) has nothing in common with sclerema neonatorum. It occurs also in nurslings, but most frequently in older children. It is a rare disease of childhood, particularly of boys. The etiology is as yet obscure, but undoubtedly is neuropathic in nature. Heubner once saw it develop after scarlatina and pertussis. Preceded by an edematous swelling,—*e.g.*, of the face,—some parts of the skin become (sometimes with painful sensations) red and gradually stiff. The face, for example, appears glossy and tense, and the mimic movements are impaired. The alteration of the skin, if not immediately involving large surfaces, gradually spreads in symmetrical or nonsymmetrical patches, which become confluent, and the skin assumes a peculiar consistency resembling paper, is dry and grayish-brown, and exfoliates readily. It can be lifted from the underlying tissue with difficulty, and pits on pressure with the finger. The muscles here and there gradually atrophy; fissures and ulcers gradually develop and motility is hindered. As a rule, the disease does not develop to its full

degree in children, but remains stationary; indeed, it is even curable, particularly if therapeutic measures are employed early. The latter consist of strengthening diet, prolonged baths (from 91° to 95° F.), fat inunctions, and massage.

Elephantiasis is very rare in children; isolated cases, however, do occur—*e.g.*, elephantiasis of the lips in recurrent erysipelas of the face. Congenital elephantiasis has been occasionally observed, probably as a result of invasion by Fehleisen's streptococci from the maternal placenta during fetal life. Under this name also are classed large angiomata, lymphangiomata, or neuromata with hypertrophy of the skin and the subcutaneous connective tissue, which have nothing in common with elephantiasis.

Vitiligo [Leucoderma].—This form of pigment atrophy causes white patches on the skin, often surrounded by dark, pigmented circles. It is of rare occurrence in children. It was observed, *e.g.*, in 1896 by Wladimirove, upon the face, with white discoloration of the eyelashes on the left side. The etiology is sometimes obscure. Vitiligo is said to occur in nervous affections and after typhoid, scarlatina, intermittent fever, and after trauma. Arsenic sometimes acts favorably. Vitiligo is usually incurable.

[**Xeroderma Pigmentosum.** — Under this title Kaposi, in 1870, described a diffuse atrophy of the skin affecting young patients, from the first year to adolescence. It is a family disease, and consanguinity of the parents seems to play an etiological rôle. The skin eruption is manifested by brownish-yellow patches, like freckles, with depressions resembling the cicatrices of small-pox lying between them. The disease usually involves the face, ears, neck, shoulders, upper part of chest, arms, and the back of the hands; sometimes the legs and the dorsum of the feet. In spots the skin is smooth, flaky, friable, cracked, and as stiff as parchment; it gradually becomes eczematous, fissured, and ulcerated; the mouth and nostril become retracted and ectropion occurs. In quite a number of cases tumors develop. The patients usually die young—under 20 years of age.

Treatment is generally futile.—Sheffield.]

XIX.

Diseases of the Eye.

Blepharitis is observed especially in scrofula and eczema of the head and face. The eczema is carried to the eyelids by means of the fingers. Further spreading may be prevented by cleansing the hands, use of the nail-brush, shortening of the nails, and attention to the eczema. Diseases of the nose and throat, of course, must be treated in order to cure the blepharitis. Additional treatment: loosening of crusts with vaselin or a warm 1-per-cent. solution of sodium carbonate, the application of unguentum hydrargyri oxidi flavi, or opening of the little pustules.

[℞ Acidi salicylici ..... 0.3 (gr. v).
Unguenti hydrargyri oxidi flavi..... 4.0 (3j).
Unguenti aquæ rosæ..... 12.0 (3iij).

SHEFFIELD.]

Blepharophimosis is formed during a prolonged attack of (scrofulous) keratitis with photophobia, also with co-operation of rhagades in the external angles. It interferes with healing of the keratitis by severe rubbing of the lids, and possibly also retention of the secretion. The slit in the lid must therefore be enlarged. Biedert recommends the method practiced by him for years, which also proves of benefit to the keratitis. It may eventually be performed unaided and without narcosis. By means of scissors two incisions two millimeters apart at the proximal end and from five to six millimeters at the distal end are made at the outer angle, beginning at the palpebral commissure. This triangular flap, with its base attached externally, is run through by a thread passing from one surface of the wound to the other, and on tightening the thread is fixed at the external angle in such a manner that it stands between both incisions and keeps them apart. The thread is fastened with

collodion to the temples, and an iodoform dressing applied. The flap is firmly healed after from two to three days, at which time the suture is removed. The flap shrinks and the opening in the eyelids becomes normal in form.

Dacryocystitis occurs as frequently in children as in adults. It may be *catarrhal, purulent,*—secondary to conjunctivitis or acute or chronic inflammatory conditions of the nose,—or *phlegmonous* — caused by periostitic processes in the nose, carious teeth, etc. In the first two varieties, if timely and energetic treatment (as in adults) is not instituted, it may lead to stricture of the naso-lacrymal duct; in the third variety to perforation by the pus and the formation of fistulæ.

Conjunctivitis.—The symptoms of conjunctivitis in children are the same as in adults. In *simple catarrhal conjunctivitis,* washing of the eyes, several times daily, with boric acid solution (3 to 4 per cent.), aqua chlori, and instillation, every evening, of a zinc solution (see "Zinc Sulphate") usually suffice. In *simple purulent conjunctivitis* silver nitrate (2 per cent.) must be resorted to. In *phlyctenular conjunctivitis* it is necessary, in addition to the removal of such causes as eczema of the head or face, or nasal affections, regularly to cleanse the eye with bichlorid solution and to dust the phlyctenulæ with calomel. In cases where the phlyctenulæ manifest a tendency to spread to the cornea, and in those beginning to improve, white precipitate ointment is preferable. According to Baginsky, severe photophobia is best relieved by morphin (0.001 to 0.0075 [gr. $^1/_{64}$ to $^1/_8$]) three times a day, the dose depending upon the age of the patient.

Follicular conjunctivitis, which is so frequently epidemic in schools, usually runs a mild course, but it nevertheless calls for certain prophylactic measures. The healthy children should be kept from coming in close contact with diseased comrades, and from using, in common, washing utensils, etc. Strict cleanliness of the hands and face must also be insured. To cure these cases it is usually sufficient to wash the eyes with bichlorid (1 to 4000) and to rub in a bichlorid salve (0.001 to 10.0 [gr. $^1/_{64}$ to ʒiiss]). If redness and swelling are very marked, tannin (0.5-1.0 to 10.0 of water [gr. viii-xv to ʒiiss]) is to be instilled, or the lids are swabbed with lead acetate (2 to 3 per cent.). If the granulations

are large the copper stick is to be applied at first daily and later less often. In the acute stage of *trachoma* it is best to make a daily application of silver nitrate (1 to 2 per cent.). In subacute cases the copper stick is to be applied by the physician and a copper ointment (0.1 to 10.0 [gr. iss-ʒiiss]) should be used at home. Chronic cases of trachoma are best treated by mechanical destruction of the granules by means of the trachoma forceps (or curette).

Diphtheritic conjunctivitis appears either in mild, partial floccular form (one to two insolated, grayish-yellow *plaques* are imbedded in the conjunctiva); in more severe disseminated form (many grayish-yellow infiltrations, between them also red, soft spots); or in very intense confluent form (the whole lid is filled with a yellowish-gray infiltration); there are also swelling of the eye, more rarely high fever, general systemic disturbance, etc. *Croupous conjunctivitis,* which is usually looked upon as an innocent disease of the lids, is very often nothing else but diphtheria. Antitoxin must nowadays be resorted to as soon as the diphtheritic nature of the conjunctivitis has been established. Favorable results are almost always obtained by this treatment so long as the cornea is still intact. In cases where the cornea is involved even antitoxin is powerless to prevent total blindness. In addition to serum-therapy ice applications should be used in the beginning, until suppuration is established, when cataplasms are to be employed. Frequent cleansing of the eye with bichlorid (1 to 4000), or oxycyanate of mercury (1 to 1000) and the application of bichlorid salve (0.001 to 10.0 [gr. $^1/_{64}$ to ʒiiss]) several times a day; in the blennorrheic stage, silver nitrate. The other eye must be protected by cotton collodion. *Gonorrheal conjunctivitis* occurs chiefly in the newly born (see "Ophthalmoblennorrhea"). The same treatment (see pages 43 *et seq.*) is employed also in older children.

Pneumococcus conjunctivitis is a peculiar form of lid disease described by Axenfeld (1890), who observed two small epidemics, which prevailed among school children (rarely in adults). Its course is invariably favorable, and usually very mild. It very often begins with coryza, then slight edema of the lids, lacrymation, with some pus-flakes, diffuse injection of the conjunctiva, and very often also of the conjunctiva bulbi, in which small

hemorrhagic and even phlyctenular spots develop. There are no complications of the cornea or lacrymal sac. The secretion almost always ceases after from three to five days, and is followed by rapid spontaneous recovery. Pneumococci, in pure culture, are found during the secreting stage. The differential diagnosis is made by microscopical examination of cover-glass preparations of the secretion. It differs from the gonococcus by staining with Gram's solution. Inoculation experiments have as yet proved negative. The danger of infection is, however, not very great, and it is, therefore, not imperative to close the schools.

[℞ Acidi borici ..... 2.0 (3ss).
Sodii boratis ..... 2.0 (3ss).
Vini opii ..... gtt. xv.
Aq. rosæ ..... 60.0 (℥ij).
M. Sig.: "Eye-drops."—SHEFFIELD.]

Keratitis.—Children may acquire the same affections of the cornea as adults, and the symptoms, treatment, etc., are also the same. There are, however, two forms of keratitis which are found almost exclusively in childhood, namely:—

1. KERATITIS PHLYCTENULOSA (S. ECZEMATOSA S. PUSTULOSA) usually attacks scrofulous children; more rarely rachitic or ill nourished children. Such children are especially prone to the malady after attacks of infectious diseases, such as measles. The term is derived from the observation that the disease manifests itself first by the appearance of small, gray tubercles or vesicles accompanied by severe symptoms of irritation, such as acute congestion, swelling, pain, and photophobia. The vesicles are usually located on the cornea and are of short duration. They are either absorbed or, what is more frequent, break down and leave behind small, gray facets which, if neglected or infected by scratching with dirty finger-nails, etc., give rise to small, white or yellowish purulent ulcers. If the lesions are centrally situated, they are designated as *central* keratitis; if on the margin, as *marginal* keratitis; or, if the loss of substance gradually advances from the margin to the center, dragging along with it a tuft of blood-vessels, it is then known as *vascular* keratitis [pannus].

If proper *treatment* is not instituted, the affection may persist for weeks and months, and cause perforation of the cornea, prolapse of the iris, atrophy, etc. Keratitis may cause permanent impairment of vision from cicatricial opacities even without such complications. Energetic treatment must therefore be at once inaugurated. Aside from local treatment, attention should also be paid to scrofula *(q.v.)* by special hygienic measures (fresh air, strict cleanliness), and to all possible complications, such as conjunctivitis, blepharitis, eczema of the face and head, and rhinitis,—all of which retard recovery. For the keratitis itself, outdoor life and exclusion of glaring light by a shade (the light in the room should be somewhat darkened). In the acute stage warm compresses moistened with dilute chlorin-water, boric acid (3 per cent.), or corrosive sublimate (1 to 4000) solutions should be applied several times a day. In order to alleviate the pain, palpebral spasm, and itching a cocain ointment (0.2 to 10.0 [gr. iii-℥iiss]) alone, or, if there is severe inflammation, active hyperemia, threatening iritis, etc., in conjunction with atropin (0.05 to 10.0 [gr. $^{3}/_{4}$ to ℥iiss]). In deeper ulcers a protective bandage (sublimate compress) should be applied. After the inflammatory symptoms have disappeared the ulcers should be treated with calomel or iodoform powders, or ointments of yellow oxid of mercury (0.1 to 10.0 [gr. iss-℥iiss]) iodoform (1 to 10), or corrosive sublimate (0.003 to 10.0 [gr. $^{1}/_{20}$ to ℥iiss]). In addition to this, massage should be employed for a long period in order to prevent frequent recurrences and to dissipate the opacities. If the disease continues to extend deeper in spite of these measures, a specialist should be consulted.

2. Keratitis Interstitialis (Parenchymatosa s. Diffusa s. Profunda) attacks 75 per cent. of syphilitic children. It is rarely observed in scrofula, diabetes, and malaria. Both eyes are usually affected, either simultaneously or first one and much later the other. It is a chronic disease which lasts months and years, but ends favorably if treated in time. Under proper treatment the opacities are gradually absorbed and disappear. Otherwise the affection produces severe visual disturbances. This form of keratitis appears with pericorneal congestion at one or more points. It first appears as a cloudy opacity which

gradually becomes thicker, more milky, and advances more toward the center (sometimes it begins there). The cornea is either smooth or indented, and nonvascular or traversed by blood-vessels. This form of keratitis is not infrequently complicated by iritis and choroiditis.

Treatment.—Attention to the underlying disease (principally, of course, syphilis). Locally, in new cases, atropin, warm applications, or warm moist bandages. After disappearance of the inflammatory symptoms: massage and white precipitate ointment.

Choroiditis is rare in children except, perhaps, in the syphilitic. In congenital syphilis it consists, according to Silex, of atrophic foci and pigmentary deposits arising from the pigment of the stroma and epithelium, with involvement of the retina. If this ophthalmoscopic picture (also in case it is unilateral) is seen in a child under 15 years of age, the diagnosis of congenital syphilis is established.

PART II.

Materia Medica and Therapeutics.

[In treating diseases of children it is well to remember that as in adults no one method of treatment suits all cases. Some diseases do best if let alone, others go from bad to worse if not treated early and energetically. Some diseases yield promptly to drugs; others are best managed by change of climate, mode of life, and food, and by the employment of certain remedial measures other than pharmaceutical, such as hydrotherapy, massage, and electricity. The physician, whose duty it is to alleviate suffering, owes it to his patients to keep pace with the advance of the times and to employ every useful method of treatment regardless of its source or character. "The period of exclusiveness is past." While a certain degree of conservatism is always wise and safe, skepticism to well-tried remedies is worse than folly.—Sheffield.]

[HYDROTHERAPY.

A good rule to follow in the treatment of diseases of infancy and childhood is never to give a drug when any other remedial agent may be employed. There is no other therapeutic measure which can be carried out with such ease and advantage as hydrotherapeutics.

The virtue of water as a therapeutic agent varies greatly with the temperature of the water employed, the length of time the patient is exposed to it, the force of the stream applied, and the idiosyncrasy of the individual.

Heat applied to the surface of the body produces a relaxation of the vasomotor system. The cutaneous vessels dilate and become more active, diaphoresis ensues, and effete matter is eliminated. The volume of blood in the deeper structures is diminished, hence congestion is relieved. The temperature of

the body is at first increased, but after free diaphoresis it is considerably lowered.

Cold contracts the terminal blood-vessels and stimulates the internal circulation. It reduces the temperature of the body not only by conduction, but also by inhibition of heat production. Soon after discontinuance of the cold a reaction takes place, respiration becomes deep and full, more carbon dioxid is excreted, and the supply of oxygen is increased. The pulse, which is at first feeble, soon becomes full and strong; the chilliness and rigor disappear, and a sensation of warmth pervades the body-surface. The blood-current in the capillaries becomes gradually accelerated and the internal circulation relieved of its tension.

The External Use of Water.

Neither extreme heat nor extreme cold should be employed in the treatment of diseases of children. Heat should be avoided on account of the severe depression, and cold because of the shock it is apt to produce.

Cold Sponging.—In the employment of cold water in the treatment of diseases of children sponging advantageously supplants the cold bath. The temperature of the water should vary between 70° and 90° F. Three basins of water, one each of 70° F., 80° F., and 90° F., respectively, are placed at the bedside. The child is stripped and laid upon a blanket and by means of cloths the body-surface is sponged for from two to three minutes in the following order of succession: Face, neck, chest, back, abdomen, buttocks, upper and lower extremities. The warmest water (90° F.) is used first and the coldest (70° F.) last. Each part of the body is thoroughly dried immediately after it has been sponged. The indications for the use of the sponge bath are hyperpyrexia and nervous irritability, constitutional disorders,—such as anemia, chlorosis, scrofula, etc.,—and in cases in which general tonic effect is desired. In the latter conditions sponging should be followed by active friction.

Cold Wet Pack.—The child is stripped and blankets are placed over and under it. A small sheet is dipped in water at a temperature of from 70° to 90° F., thoroughly wrung out, and

wrapped closely around the patient. The child's body is then enveloped in the blankets. To reduce high temperature—*e.g.*, in typhoid or pneumonia—ice may be rubbed over the chest. The next pack is applied after an interval of ten minutes and may be repeated from ten to twelve times in twenty-four hours. The feet should be kept warm by artificial heat.

Vapor Pack.—If the cool, wet pack is allowed to remain in position for from one to two hours and loss of body-heat prevented by thoroughly covering the child with woolen blankets, the cold pack is converted into a warm pack, which produces effects similar to those obtained from a vapor bath; namely, free diaphoresis, lowered activity of the nervous system, calm and repose, and equalization of the internal circulation. The vapor pack is therefore invaluable in acute catarrhal conditions of the air-passages, in nephritis, dropsical effusions, muscular rheumatism, eclampsia, hyperesthesias, etc.

Wet Local Compresses (Priessnitz).—Cold Compresses.—These are applied in all forms of local inflammation, to relieve pain, swelling, heat, and redness. In order to obtain good results the temperature of the water should vary between 50° and 60° F., and the compress left in place and kept cold either by frequently sprinkling cold water over it or by the application of an icebag.

Indications: Meningitis, angina, acute pharyngitis and laryngitis, hemoptysis, appendicitis, intestinal hemorrhage, etc.

Warm Compresses.—While cold compresses delay the flow of blood and cell-activity, warm compresses accelerate the blood-current and promote cell-activity. They are applied by means of cloths immersed in water at a temperature of about 100° F., thoroughly wrung out, and then covered with flannel and rubber tissue or oiled silk to prevent rapid evaporation and cooling. The compresses are changed as soon as they become dry.

Indications: Neuralgia of the head; throat affections after subsidence of the acute inflammatory stage, to promote absorption of diseased products; in exudative pleuritis; in bronchitis, to allay severe cough and to promote expectoration; in all spasmodic conditions of the intestines; to hasten suppuration and relieve stasis.

Tepid Bath.—This is a very useful bath in children. The temperature of the tepid bath varies between 85° and 92° F. It is employed in diseased conditions requiring soothing; for example, in eruptive skin diseases and as an antipyretic in infectious diseases.

Warm Bath.—In a general sense, this is the most valuable bath in the treatment of diseases of children. It tranquillizes the nervous system, equalizes the circulation, produces diaphoresis, and reduces temperature.

Indications: All spasmodic conditions; affections of the lungs and kidneys; exanthematous diseases; and nervous affections, such as hysteria, etc. The temperature of the bath should vary between 92° and 98° F. The patient should remain in the bath for from two to five minutes. The warm bath is sometimes employed as a *permanent bath* in extensive burns and wounds and in skin diseases associated with intense itching. The patient is suspended in the bath on a sheet. The water is kept at an equal temperature by proper arrangement of inflow and outflow.

Hot Bath.—The temperature of the hot bath should be carried as high as 108° F. and the patient remain in the bath for from one to three minutes. It is very useful in collapse, convulsions, and chronic rheumatic conditions. It is occasionally administered to break up a "cold" and to produce rapid diaphoresis. While in the bath the patient's head should be kept cool by an icebag.

Shower Bath.—Cold shower baths are generally given for their stimulating effect. Hence they are of great value in nervous affections, such as neurasthesia, enuresis, and as a general tonic. For these purposes one shower (shock) at a time is sufficient. The shower bath should be followed by active friction.

Aspersion Bath.—The value of cold water, dashed suddenly over the frame or directed in a steady, broad stream upon some particular part, is very great. The cases in which such a mode of treatment is beneficial are numerous. The following are a few of the more important: Where the muscular power of a leg or arm is impaired from long inaction as in cases of fracture, dislocation, bandaging, sprains, and partial paralysis. The patient sits in a bath-tub or on the floor and the operator, stand-

ing on a table, directs the stream of cold water on the affected part from a watering-can from which the sprinkler has been removed. This mode of treatment is rendered particularly serviceable if the circulation is quickly restored by vigorous dry friction for several minutes. It is also efficacious in systemic poisoning from drugs and suffocation from noxious gases, etc.

Medicated Baths.

Aside from the natural mineral baths obtained in the celebrated spas, a number of artificial baths are commonly used in the treatment of diseases of infancy and childhood. The efficacy of these baths is, in the majority of instances, due probably to the effects of heat or cold and friction employed with the non-medicated bath.

Aromatic Bath.—About 6 ounces each of chamomile flowers, calamus roots, and peppermint leaves are tied up in a muslin bag and thrown into a warm bath. Aromatic baths are recommended in marasmus, infantile spinal and other forms of paralysis, in sclerema, etc.

Bran Bath.—Two or 3 pounds of wheat bran are boiled for about an hour in about 3 quarts of water. The decanted liquid is added to the bath. It is useful in intertrigo, eczema, pemphigus, lichen strophulus, etc.

Malt Bath.—A few ounces of malt extract are added to the bath. Malt baths are recommended in rachitis, spasmus glottidis, and in general debility.

Mercurial Bath.—This form of bath is employed as an adjuvant in the treatment of syphilis. It is usually prepared by the addition of from 20 to 30 grains of calomel or 0.5 to 1.0 (gr. viiss to xv) of bichlorid of mercury.

Mustard Bath.—Two or 3 ounces of mustard are dissolved in a few pints of tepid water and added to the bath. The temperature of the bath may vary between 100° and 106° F. It may be administered in the form of a sitz bath or full bath. The patient should remain in the bath for from three to ten minutes. Mustard baths are indicated in collapse, shock, or heart-failure from any cause, in sudden congestion of the lungs or brain, etc.

Sea-Salt Bath.—About 2 pounds of sea salt are dissolved in the bath. It is stimulating in its effects and useful in rachitis, various forms of paralysis, etc.

Soap Bath.—It is employed in the treatment of prurigo, lichen strophulus, scabies, etc. It is prepared by the addition of from 3 to 6 ounces of soft green soap.

Sulphur Bath.—One-half to 1 ounce of potassium sulphuret should be added to each bath. In some cases the addition of about 3 ounces of animal gelatin is of advantage. Sulphur baths are deserving of trial in rheumatism, eczema, prurigo, urticaria, lead poisoning, etc.

The Internal Use of Water.

The benefits derived from the internal use of water are manifold, but unfortunately greatly underestimated.

Water taken by mouth in moderate quantities—large amounts weaken digestion—cleanses the alimentary canal, stimulates peristalsis, and produces diuresis and diaphoresis. To a certain extent it also acts as a food. In acute diseases associated with anorexia the free use of water will often sustain life for weeks. In febrile diseases water not only quenches thirst, but aids also in the reduction of temperature. Water stimulates expectoration and in the form of cracked ice checks vomiting. For the latter purpose small sips of hot water are sometimes resorted to.

Lavage.—Stomach washing in children is performed in the same manner as in adults. Its field of usefulness, however, is much wider. It is invaluable in acute simple and toxic gastritis, cholera infantum, chronic indigestion, and difficult feeding. A funnel with a few feet of rubber tubing to which a small, soft, rubber catheter (No. 12 or 14) is joined, by means of a glass cannula, is the best apparatus for stomach washing. About ten inches of the catheter should be passed beyond the lips. The temperature of the irrigating solution should be about 100° F., or higher if special indications arise. The quantity of solution to be instilled varies with the capacity of the child's stomach (see page 116). Generally pure boiled water answers all medicinal purposes, except in poisoning, in

which instance antidotes may be employed. In hyperacidity of the stomach bicarbonate of soda or lime-water may be added.

Lavage is contra-indicated in heart disease and hemorrhagic diathesis.

Irrigations.—Their action is chiefly mechanical. They are indispensable in the treatment of diverse affections of the lining membranes of internal cavities. In chronic cystitis, for example, washing of the *bladder* by means of sterile or medicated (boric acid, nitrate of silver) water will often rapidly effect a cure.

Irrigations of the *vagina* are frequently employed in vulvovaginitis; a slow current of water should be employed, permitting the fluid to return without injury to the adjacent parts. A fountain syringe with a small, sterile, soft, rubber catheter attached, generally suffices for ordinary purposes. The water-bag should be suspended about two feet above the child's body.

Irrigations with warm, sterile water are very beneficial in *ear affections*, such as impacted cerumen, foreign bodies in the external auditory meatus, and external otitis.

In febrile diseases, adenoids, chronic pharyngitis, etc., instillation of weak salt water or ichthyol solutions prevent and cure affections of the *naso-pharynx* and ear; it often relieves reflex cough and embarrassed respiration. Instillation may be performed by means of a teaspoon or dropper, and should be repeated at least twice a day.

Copious irrigations of the *mouth* with sterile or medicated (nitrate of silver, hydrogen peroxid) water are invaluable in the treatment of grave forms of stomatitis.

Enteroclysis.—The indications for *low enemas* are too well known to need further discussion. It may be mentioned, however, that in habitual constipation only small quantities of water should be injected into the bowel. Large quantities are apt to produce atony of the colon by overdistension and thus aggravate the disease.

High enemas are given by means of a flexible (colon) tube and a fountain syringe. High enemas not only remove effete material from the intestines, but by using water at a temperature of from 80° to 90° F. also reduce temperature. Hence they combine two therapeutic measures which are of signal benefit in

all gastro-intestinal disorders, peritonitis, typhoid, etc. Soap-suds, turpentine, starch, and salt, among other adjuvants, may be added according to indications.

Saline injections stimulate the kidneys and promote elimination of putrid material. They stimulate the circulation and supply the deficiency of body fluids in conditions associated with an excessive drain of fluids. Saline injections are therefore a sovereign remedy in uremia, typhoid fever, scarlet fever, small-pox, measles, diphtheria, eclampsia, anemia, hemorrhages, and in shock after surgical operations, etc.

A physiological (0.9 per cent.) salt water solution at a temperature of from 100° to 110° F. is generally used. It should be injected slowly through a colon tube, and continued for from fifteen to twenty minutes.

Hypodermoclysis.—Subcutaneous injection of salt water (110° F.) is performed by means of an ordinary fountain syringe with an antitoxin syringe-needle attached. The syringe, needle, and skin should be rendered aseptic. The injection should be made in places where there is an abundance of subcutaneous cellular tissue—*e.g.*, anterior surface of abdomen and thorax. The current should be very slow and the quantity of the saline solution to be injected should vary between 2 and 6 ounces, according to age and indications. Hypodermoclysis is of inestimable value in cases of collapse resulting from hemorrhage; in pneumonia; uremia; acute gastro-enteritis with great loss of body fluids; and in leukemia. It should be preferred to intravenous infusion.

Intravenous Infusion.—Saline intravenous infusion in children should be limited to cases of acute profuse hemorrhage or such as are not remedied by enteroclysis or hypodermoclysis. The quantity of salt water to be injected should be somewhat approximated to the amount of blood lost. The temperature of the solution as it runs into the vein should be from 110° to 115° F.

Intravenous infusion is performed by means of a fountain syringe or small funnel with a few feet of rubber tubing and a small cannula. The injection may be made in any medium-sized vein, the median basilic or cephalic at the bend of the elbow being the one usually chosen on account of its ready ac-

cessibility. F. Hawkes gives the following details of the operation:—

"We first let the arm and forearm hang down over the edge of the table, so that the veins will become engorged as much as possible, showing us in this way their exact location. We then tie a bandage at the upper third of the arm tight enough to constrict the venous, but not the arterial, circulation and proceed to cut down upon the then still more prominent vein.

"These veins are *subcutaneous* and should be cut down upon carefully and with light strokes. When the vessel wall is reached, this fact is perfectly evident and the rest may be done by blunt dissection or separation, the vessel being dissected out from its fatty entourage for about an inch or an inch and a half, and the forceps placed directly under it. This gives us the vein in a good elevated position for our work, and the rest is very simple.

"We tie a ligature tight (boiled thread is all right), first on the distal end of the exposed vein in our wound, then we make a first loop only with the thread on the vein at its proximal position; taking the point of the scalpel, we now make a horizontal or a transverse cut in the vein wall until the shining endothelial coat is seen (this is important, as otherwise the point of the cannula when introduced may dissect up the vessel sheath without being in its lumen).

"We are now ready to introduce our cannula, which has previously been hitched to the rubber tube attached to the funnel. The salt solution should be running through the cannula at about the right temperature when the cannula is introduced into the vein; there should be *no bubbles* in the stream. The tip of the cannula is thus introduced into the opening made in the vein wall (it should enter and go along easily) until it has passed the loosely tied loop of the proximal ligature. This loop is now tightened down on to the end of the cannula and the bandage on the arm immediately taken off (otherwise the salt will not flow or course into the vein to any extent).

"The funnel should be held about two or three feet above the level of the patient's body.

"The proper amount of salt solution is now allowed to enter the venous circulation (ten minutes to the quart), the pulse

being watched, and great care being exercised that *no bubble* enter the rubber tube from the funnel. This can be prevented by shutting off the current in the rubber tube with the finger while the funnel is filled from the pitcher containing the hot salt solution (as soon as the bubbles, if any, made by the pouring, have arisen to the surface of the water in the funnel, the stream is allowed to flow again). The level of the fluid in the funnel should also never be allowed to get low. This is a perfectly sure way to prevent the entrance of bubbles; it can be tested by introducing a glass tube in the curve of the rubber tubing and watching the effect of this procedure.

"When the salt solution has run in to the desired amount, the cannula is withdrawn and the second loop tied down (the intervening portion of vein wall being cut out, if desired).

"If you have a needle and thread the wound may be sewed up; if not, an aseptic compress is applied and a few turns of bandage and the operation is completed. It certainly is a very simple procedure.

"When we can have the apparatus ready beforehand, we can make use of certain convenient procedures, as the insertion of a thermometer in a glass tube in the course of the stream of the solution, so that we can watch the temperature of the inflowing solution carefully, and we have various flasks to contain the sterile solution at different temperature, to get the desired temperature by mixing, or we may lead our rubber tubing directly to a flask containing our solution and cause the solution to run out into the tube by air pressure pumped into the flask above the solution."—SHEFFIELD.]

[ELECTRICITY.

Electricity as a remedial agent in the treatment of diseases of children is employed in the following named forms, in the order in which they are given: Galvanic, faradic, and static.

The Galvanic Current.—The effect of the galvanic, or direct, current on the *muscle* is to produce contraction. The contraction takes place at the moment the current is closed or opened ("make" or "break").

The galvanic current, if applied by means of two electrodes along the course of a *motor nerve*, produces a uniform contraction of the entire muscle supplied by that nerve.

The reaction produced by the constant current upon the *sensory nerve* varies according as the application is made with the positive or negative electrode, the anode being sedative in its effect, the cathode stimulating.

A constant current of suitable strength,—10 to 15 milliampères,—passed through living tissues causes, at the point of contact of the anode, an accumulation of oxygen, chlorin, and acid; coagulation and shrinking of the exposed tissue—*positive electrolysis.*

On the other hand, if the cathode is brought in contact with living animal tissue, hydrogen and the alkalies are set free and liquefaction of the parts adjacent to the electrode takes place—*negative electrolysis.*

The Faradic Current.—The faradic, or induced, current causes contraction of muscles and nerves and is very effective in producing muscular massage. It stimulates nerve action and nutrition, excites secretion, and arouses latent physiological function.

The Static Current.—The static current produces vivid and persistent contraction of a large group of muscles with a minimum of pain. The second prominent characteristic of this current is its power of relieving pain.

The following rules should be borne in mind:—

1. Always administer the weakest possible current that will cause muscular contraction.

2. Never employ electricity in the inflammatory stage of organic disease.

3. In applying electricity to muscles always endeavor separately to reach the electromotor points. In deep-seated muscles the current should be applied along the course of the nerves supplying them.

4. Each electric treatment should last no longer than twenty minutes, and no one muscle should be subjected to the currents for more than three minutes.

The indications for electricity in the treatment of diseases of children are practically the same as in adults. The discus-

sion of the subject will therefore be limited to such diseases in which electricity is of undoubted value.

Chorea.—Electricity may be tried in obstinate cases. A feeble galvanic current should be applied to the head, in the region of the motor areas, or to the spinal cord. The spasms are sometimes lessened by passage of the constant current through the limbs.

Chronic Constipation.—The galvanic or faradic current may be used. One electrode is passed successively over different portions of the abdominal wall, and the other electrode is placed upon any other part of the body. The electric treatment should be continued for a long period.

Diphtheritic Paralysis.—In this condition faradization of the respiratory muscles, particularly the diaphragm, is of some service. It should be used in attacks of respiratory failure and continued while they last.

Enuresis.—The broad anode is placed over the lumbar region of the spine and the small cathode over the region of the bladder or upon the perineum, allowing quite a strong galvanic current to act for from two to four minutes. Sometimes faradization proves effective. The wire end of a conducting cord, connected with the negative pole, should be introduced into the urethral orifice for from one to two centimeters, and quite a strong faradic current allowed to act for from one to two minutes.

Facial Paralysis.—This form of paralysis is greatly benefited by a weak, stable galvanic current. It should be employed four to six times a week, for from two to three minutes at a time. The anode should be placed in the auricular fossa and the cathode upon the muscles of the affected side; or the anode may be placed behind the ear, while the different nerve branches and the muscles are slowly stroked with the cathode. In later stages faradization also is of service.

Hysteria.—The vague disconnected symptoms of hysteria call for general electric treatment, and no form of electricity so advantageously combines tonic and sedative effects as the static current. A mild current should be employed. Two or three treatments a week will generally suffice. Galvanism and faradism also are of service, especially in hysterical contractures.

Multiple Neuritis.—The application of electricity to the affected muscles is important in order to maintain their nutrition. It should be begun after the acute stage has passed, that is, at the end of three or four weeks. A moderate faradic current may be used if the muscles respond to it, otherwise a voltaic. The electricity should be applied daily by means of large electrodes, so that the current may reach as much muscular tissue as possible. The current should be strong enough to produce visible contraction of the muscles.

Poliomyelitis.—The galvanic current gives the best results. It should not be employed earlier than the third or fourth week. A large flat electrode, well wetted in salt water, is placed upon the spine over the affected region and the muscles are repeatedly stroked by means of a small electrode. The current should be of such strength as will produce visible contraction of the muscles, without, however, causing sufficient pain to distress the child.

Rheumatism.—The sequelæ of rheumatism, atrophy and contractures, often call for electric treatment. The galvanic, faradic, or static current may be employed. It is sometimes advantageous to use the galvanic and faradic currents at one sitting. The treatment should be repeated at least every alternate day and continued for several months. In muscular contracture the anode should be placed over the portion of the spine governing the contractured muscles and the cathode over the muscles themselves. For the relief of pain the positive pole should be applied to the most painful spot.

Tetany.—Electric treatment has been followed by improvement in a number of cases. The stabile galvanic current should be employed; the negative pole to the spine and the positive to the irritable nerve-trunks.

Torticollis.—A weak galvanic current is frequently very serviceable. The positive pole should be placed just below the occiput and the negative pole allowed to act upon the contracted muscles for from five to ten minutes.

The indications for electrolysis are identical with those in adults.—SHEFFIELD.]

[MASSAGE.

Massage is a mechanical form of treatment consisting of intelligent manipulations of the superficial parts of the body. It is intended to produce changes in the local and general nutrition, action, and other functions of the body.

Indications.—Massage is indicated in hysterical, paralytic, rheumatic, and traumatic contractures of joints; in fractures—to hasten absorption of callous masses; in chronic glandular enlargements; in swellings associated with rheumatism, sprains, contusion, etc.; in torticollis—to relax muscular contraction; in constipation, atonic dyspepsia, and gastric dilatation; in all forms of muscular atrophy or dystrophy; as a general stimulant in cases of prolonged muscular inactivity, whether from indolence, disease, feebleness (rachitis) or prolonged use of splints or braces, or other cause. In various forms of paralysis—to improve nutrition and function of the affected muscles.

Contra-indications.—Massage is contra-indicated in children suffering from gonorrheal rheumatism or peliosis rheumatica; in tuberculous, typhoidal, or syphilitic ulcerations of the intestines; in acute peritonitis, appendicitis, gastro-enteritis, and gastric ulcer; in tuberculous glandular enlargements.

Massage is generally divided into the following principal manipulations:—

Effleurage or Stroking.—In making the strokes both hands are employed. The limb is grasped with one hand just above the other in such a manner that pressure is exerted to some extent by the whole palm, but especially the ball of the thumb and the inner surface of the last two phalanges of the fingers. The strokes are delivered in the form of an ascending spiral, the two hands being moved simultaneously in opposite directions, the lower following closely upon the upper. The strokes must be made with regularity. Light stroking has a soothing influence; heavy stroking stimulates the superficial structures, increasing the arterial, venous, and lymphatic circulation.

Friction.—This manipulation is performed with the finger-tips, and consists of firm circular, semicircular, or to-and-fro movements. It is usually combined with *effleurage*, and is intended to promote absorption by the veins and lymphatics.

Pétrissage or Kneading and Pinching.—In kneading the endeavor of the operator is to pick up the individual muscle or muscle-groups between the fingers of the two hands or in some cases between the thumb and finger of one hand, and then to roll and squeeze the muscle with a double movement. These manipulations cause circulatory, nutritive and alterative changes in the muscles, tendons, and organs within reach.

Tapotement, Percussion, or Tapping.—Percussion is made either with the points of the fingers brought into a line with one another or with the side of the hand and fingers. The movement should be very rapid and elastic. These manipulations are usually employed on muscular parts, such as the back of the legs and the gluteal regions. The effect of *tapotement* is similar to that obtained by *pétrissage*. This manipulation may also be enforced by vibrations—*i.e.*, rhythmical, tremulous movements under pressure.

Generally all the movements are practiced at one sitting. Thus *effleurage*, friction, *pétrissage*, *tapotement*, and vibration. The treatment is concluded by *effleurage*. While in local affections local massage is generally sufficient to effect the desired results, it is always advantageous to supplement the local treatment by general massage. The duration of each *séance* varies from a few minutes to a quarter of an hour. At first the treatment should not last more than five minutes. No force should be used, and the delicate skin of the child should be spared unnecessary injury. It is therefore advisable to anoint the skin with borated vaselin, cocoanut-oil, or any other emollient. In young infants massage should be limited to general friction of the body. In malnutrition it is a good rule to give a fat-inunction daily after the morning bath.—SHEFFIELD.]

[CLIMATOLOGY.

The American physician is at last awakening to the importance of climate as a remedial measure for various acute and chronic affections; and the laity is at last beginning to realize that the mountain, seashore, and inland resorts of our great country rival, if not surpass, the most celebrated of Europe.

In selecting a suitable health resort we must bear in mind not only the state of health and the peculiarities of the indi-

vidual patient, but also the local conditions, which may seriously undermine the salubrity of the particular resort, as, for example, bad drainage, impure water, endemic diseases, etc.

The air of mountainous regions is rarefied, dry, cool, bracing, and free from organic and inorganic impurities. It improves the action and tone of the skin; it favors deeper expansion of the lungs and correspondingly quickens the heart; it improves sleep and stimulates the appetite and the powers of assimilation.

The climate of the mountains, therefore, is particularly beneficial in chronic disorders of the alimentary canal and liver; in anemia and chlorosis; in chronic naso-pharyngeal catarrh, spasmodic asthma, and most cases of pulmonary phthisis; in rheumatism and malaria; in heart disease with good compensation and sufficient breathing space.

The climate of the seashore is very strong. The air contains more oxygen and ozone than that of the interior; it is loaded with moisture and is comparatively free from dust particles; the temperature is less liable to sudden variations.

Convalescents from croupous pneumonia, pleurisy, empyema, typhoid, and surgical operations do well at the seashore or in a dry, sunny inland resort. The same applies to patients suffering from severe forms of heart and kidney disease. The seashore climate acts almost as a specific in acute gastro-enteritis of childhood. The surf-baths have a particularly stimulating effect in cases of general nervousness, in rachitis, and in scrofula; but they are contra-indicated in organic diseases of the nervous system, in epilepsy, and in severe pulmonary and circulatory disturbances. Children suffering from chronic catarrhal pneumonia or severe bronchitis generally do best in low, warm, dry, sheltered health resorts.—SHEFFIELD.]

[DIETARY OF THE CHILD DURING HEALTH AND DISEASE.

Healthy infants under 9 months of age should be fed exclusively on milk (see "Infant-feeding"). As salivary digestion is fully established at this age, a small quantity of carbohydrates in the form of a crust of stale bread or zwieback will certainly do no harm. When the child is over 1 year of age an effort should be made, so to say, to teach it to eat a few articles of

food other than milk,—in case an emergency arises when an exclusive milk diet is contra-indicated, as, for example, in gastro-intestinal disorders. Cereal gruel; soft-boiled egg; toasted bread; oatmeal or graham crackers; strained chicken-, mutton-, or beef- soup; orange juice and, later, baked apple, baked potato with a little sweet cream or butter, will ordinarily be found suitable additions to a plain milk diet. Of course, the transition from an exclusive milk diet to a more or less mixed diet should be very slow and gradual, the effect of the change being watched from day to day and week to week, always bearing in mind that milk is the ideal food for the young child. Indeed, milk should be the chief constituent of the child's dietary until the sixth year; but, beginning with the third year, the milk diet should from year to year gradually be displaced by the articles of food just mentioned, as well as by small quantities of chicken broth and mutton broth, scraped beef, rare steak, mutton chops, fresh white fish, fresh vegetables, rice pudding, custard, cocoa, etc. All kinds of pastry, confectionery, and fried food should be excluded, as much and as long as possible, from the dietary.

Children over $1\,^1/_2$ or 2 years of age very often discontinue drinking milk. This, I believe, is due chiefly to the fact that at about this age, generally upon the advice of the family physician, the child is forced to dispense with the bottles and nipples —its only companions for many months past. Why physicians have come to look upon bottles and nipples as a source of all evils to a child *over* a year old, while readily sanctioning the use of bottles for children *under* that age, is to me a mystery! The mere facts that children continue to drink large quantities of milk until they are 3 or 4 years of age, if allowed to enjoy it from a bottle; that taken through a nipple the milk enters the stomach very slowly, and hence is better digested; and that, finally, during sickness milk as well as water (!) can best be administered by means of a bottle, justify me in the belief that the use of bottles for children of the ages mentioned should be encouraged rather than discarded, provided, of course, the bottles are kept scrupulously clean, are sterilized, if you please.

In feeding children during *acute illness,* Nature's method of induction of anorexia while in that condition—obviously in-

tended to prevent overfeeding at a time when the digestive powers are greatly diminished—should be taken as a reliable guide. It is often surprising to see very delicate babies withstand a very grave and tedious attack of sickness with hardly any nourishment at all. Like fish, they seem to thrive on water; and this heavenly beverage should be given to them *ad libitum*. After a few days' illness, if the infant still refuses food, an attempt should be made to force it to take small quantities of liquid food, such as well diluted milk, toast water, farinaceous water, albumin water, some artificial infant-food (*e.g.*, Reed & Carnrick's), peptonized or malted milk,[1] etc., in breast-fed babies breast-milk, if need be, may be given by means of a spoon or dropper. Older children may be given also strained cereal gruel, koumiss, matzoon; chicken-, or mutton-, or beef- soup; beef tea, beef jelly, lactosomatose, eggnog, water ices, ice cream, fresh fruit juice, etc. In delirium or stupor the child may be fed by gavage *(q.v.)* or per rectum.

Rectal feeding is sometimes indispensable, for example, in diphtheritic paralysis, severe convulsive seizures, etc., when feeding by the mouth may give rise to aspiration pneumonia; but it should be employed only as a last resort, since, in young children, it is very apt to produce irritation of the rectum. Furthermore,

[1] **Malt-soup.** — This food is intended for infants suffering from gastro-intestinal disease. It has recently been highly recommended particularly by Keller, and employed with very good results at the children's clinic of Breslau. This food is a modification of the once popular Liebig's soup, and was prepared to meet the following considerations: There is increased excretion of ammonia in infants affected with gastro-intestinal disorders, showing that, with unsuitable feeding, there is increased formation and excretion of acid metabolic products. As acid intoxication leads to loss of fixed alkalies in the infantile organism, a food rich in alkalies must be administered. This may be accomplished by avoiding large quantities of milk-albumin and fat and by increasing the food value by means of larger quantities of readily oxidizable carbohydrates. Keller suggests, therefore, the following mixtures: 50 grams of wheat flour are stirred in $^1/_3$ liter of cows' milk and strained through a sieve. In another vessel 100 grams of malt extract are dissolved in $^2/_3$ liter of water at 50° C. To this are added 10 cubic centimeters of an 11-per-cent. solution of sodium carbonate. The malt extract solution is finally mixed with the milk-flour mixture and boiled. For infants under 3 months of age and for those very sick the mixture may again be diluted with water.

infants rarely retain a nutrient enema for any length of time. Peptonized milk or, in older children, milk with egg or somatose in quantities of from 1 to 2 ounces may be injected into the rectum at intervals of from three to four hours, preceded by a high rectal irrigation. To check excessive irritation and peristalsis a minute dose of deodorized tincture of opium may be added. The injection should be given at the temperature of the body, run in very slowly and as high up into the intestine as possible by means of a small-sized rectal tube and funnel, and retained by compression of the buttocks for at least half an hour afterward.—SHEFFIELD.]

[PALATABLE PRESCRIBING.

Palatable prescribing is essential to success in the management of sick children. The physician who is not a medicinal atheist, but believes that drugs possess the power of curing or relieving disease, is bound to see that his little patient is able to take and retain medicines he prescribes. For otherwise the anguish and distress inflicted upon the unfortunate child and mother during the administration of a nauseous and disgusting medicine make the cure by far worse than the disease.

Indeed, on a few occasions the writer found children with pneumonia in a state nigh to suffocation from the effects of prolonged and firm compression of the nostrils; and many a child bleeds from gums and lips and losses a tooth or two from the attempt of the *kind* mother to force down into the child's throat a teaspoonful of miserable stuff—intended, perhaps, as a mere *placebo!*

"It is an open secret that there are many families which employ regular physicians for their adult members, while the young children are intrusted to the care of homeopaths. Why? Because there is never any trouble with the children's taking the homeopathic pellets, or 'little candies.'"

With the object, therefore, of aiding the beginner—it will not hurt the old practitioner—in palatable prescribing, I will endeavor to enumerate the most useful and palatable preparations of our materia medica, and to suggest several adjuvants and methods by means of which medicines offensive in taste may be made at least acceptable.

Digestants.—Most of the digestants and appetizers, especially pepsin, pancreatin, and orexin tannate, are tasteless, and can be made palatable by the addition of powdered sugar.

Bitter Tonics.—The simple bitters are very bitter indeed. Except nux vomica, they are of little utility and ought better to be let alone. Prunus Virginiana is very pleasant in taste and one of the best members of the aromatic bitters. The cinchona preparations, the chief representatives of the peculiar bitters, can hardly ever be made palatable, and ought never to be used in children, unless intended as an antimalarial. In the latter case quinin is best administered by rectum in the manner suggested by the writer a few years ago, namely: $^1/_2$ drachm of quinin sulphate or bisulphate with a few grains of salt are mixed with the white of an egg, and by means of a glass syringe forcibly injected into the bowels. In a child 4 years old this can be repeated three times a day. The white of the egg prevents irritation of the rectum, and, together with the salt, aids in the absorption of the quinin. Large doses can in this way be administered without any unpleasant effects. Children who take medicines readily will find euquinin—perfected, almost tasteless, quinin—quite a palatable preparation. It may be prescribed in simple syrup, or peppermint-oil sugar (oleosaccharum menthæ), and has further advantages over quinin in being less apt to produce nausea and tinnitus. Grown-up children can usually be induced to take the following mixture:—

℞ Quinin sulphate ..... $^1/_2$ drachm.
Dilute sulphuric acid,
Essence of peppermint.....of each, 30 drops.
Comp. syrup of yerba santa, to make 3 ounces.
Sig.: Two teaspoonfuls every three hours.

Iron may be prescribed in the following combinations:—

℞ Bitter wine of iron,
Elixir of orange.....of each, 1 ounce.

℞ Iron and ammonium citrate..... 16 grains.
Brandy ..... $^1/_2$ ounce.
Essence of pepsin..... 1 ounce.
Simple syrup .....to make 2 ounces.

℞ Tinct. ferric chloride..... 1 drachm.
Glycerin ..... 4 drachms.
Syrup of ginger or orange-flowers..... 1 ounce.
Water .....to make 2 ounces.

In administering iron to children after the appearance of their permanent teeth it is well worth remembering that inorganic iron solutions act very destructively upon the teeth. The newer organic iron preparations, such as ferrosomatose, hemogallol, etc., prescribed in powder form with a little sugar or chocolate, are effective and palatable hematinics and free from the injurious effects just spoken of.

Alteratives.—Arsenic, the iodids, and mercurials are the leading remedies of this group. Fowler's solution is palatable however it may be exhibited. Among the iodids, syrup of ferrous iodid and iodipin with a little syrup are excellent preparations for children. Potassium or sodium iodid may be prescribed in water and compound tincture of cardamom, tincture of orange, or compound syrup of sarsaparilla.

Corrosive sublimate can be diluted in the same manner. Calomel, the pediatrist's panacea, is well taken by children, if triturated with a pinch of sugar. Codliver-oil is invaluable in the treatment of sick children, but it is, unfortunately, almost impossible to disguise its repulsive taste. The various mercantile malt and hypophosphite compounds are more acceptable than the pure oil, but who can vouch for their supposed strength?

The following formula may be tried by mouth:—

℞ Codliver-oil ..... 4 ounces.
Extract of malt..... 1 ounce.
Syrup of calcium hypophosphite ..... 1 ounce.
Glycerin,
Powdered acacia .....of each, 4 drachms.
Cinnamon-water .....to make 8 ounces.

Antipyretics.—To relieve pain and reduce temperature the coal-tar products in small doses can safely be resorted to. Phenacetin is almost tasteless, and, with a little sugar containing a drop of oil of peppermint, very palatable indeed. If properly administered it is certainly a safe preparation. Anti-

pyrin and the salicylates are best exhibited in a little glycerin and peppermint or orange-flower water. The following mixture is very serviceable in acute articular rheumatism of children:—

℞ Sodium benzoate,
Sodium salicylate .....of each, 1½ drachms.
Tincture of orange ..... 4 drachms.
Distilled water .....to make 2 ounces.

Salol, aspirin, and salicylic acid are best prescribed in powder, with the addition of a minute quantity of oil of wintergreen, just enough to impart its taste.

Hypnotics and Anodynes.—The selection of tasteful anodynes is rather difficult. The author prefers the deodorized tincture of opium to all other preparations, as it is very efficient in but very small quantities, and can therefore be readily disguised in any elixir or syrup—*e.g.*, syrup of ginger or syrup of raspberry. In prescribing codein, heroin, or dionin in a fluid, a little gum arabic should be added to avoid the formation of a sediment. In excessive irritability of the stomach, opium as well as the bromids, chloral, trional, and sulphonal may be administered by rectum. The last two preparations are usually well taken by children in powder form with sugar or in elixir of orange or glycerin with bitter almond, cinnamon, peppermint, or anise-water. Syrup of lactucarium may be added to the former in treating infantile convulsions.

Antispasmodics.—Belladonna is the principal drug of this group. The fluid extract should be prescribed in preference to the tincture. Syrup of almonds or of wild cherry, with a little water, is, among many others, an excellent vehicle for it. Camphor holds on to its miserable taste no matter what is done. Powdered chocolate disguises it somewhat. Emulsion of chloroform and compound spirit of ether are excellent antispasmodics and need but little dilution.

Stimulants.—Nux vomica, strychnine, ammonia, alcohols, strophanthus, caffein, and digitalis are all indispensable drugs in children's practice, and fortunately can be made palatable in any of the usual adjuvants. The extracts and alkaloids should be preferred to tinctures or infusions. As quick circulatory

and respiratory stimulants the ammonia preparations, such as aromatic spirit of ammonia, anisated solution of ammonia, are very agreeable and efficient. It is really sinful to use ammonium chlorid instead.

Heart Sedatives.—There are but very few occasions when these drugs are beneficial in children. Aconite, the old standby of the homeopath, may be given in minute doses and well diluted with water. Like digitalis, it is a dangerous remedy in the hand of the ignorant. The indication for aconite is sthenic fever, and there are not many children who are too vigorous while sick. It is a good rule never to prescribe aconite for more than eight doses. The same holds good with antimony, except the mild preparation, syrupus scillæ comp., which is an agrecable and efficient expectorant.

Emetics.—Although intended to disgust, most emetics are not disgusting in taste. The wine of ipecac is quite palatable and preferable to the syrup. Apomorphin is a cardiac depressant, and ought to be used with caution in children. Occasionally tartar emetic or zinc sulphate is indicated, and no special effort need be made to make them palatable. It is to be regretted that emetics are dropping into disuse, as many cases of gastritis could be arrested in their incipiency by the early administration of an emetic.

Laxatives, Cathartics, and Purgatives.—Very few of the many drugs of this group are being employed in children. Calomel and aromatic tincture of rhubarb answer well in most cases. Senna mixture can be made agreeable in conjunction with compound syrup of sarsaparilla. If castor-oil is wanted, use the following emulsion:—

℞ Castor-oil ..... 1 ounce.
Oil of peppermint ..... 5 drops.
Sugar ..... 1 drachm.
Mucilage of acacia,
Water .....to make 2 ounces.

Rochelle salt, in a little aromatic spirit of ammonia, glycerin, and fennel-water, forms a pleasant mixture. Podophyllin or aloin may be triturated with aromatic powder. Finally,

it is worth remembering that an enema with soapsuds often dispenses with drugging.

Anthelmintics. — For all kinds of worms, except tenia, small doses of santonin and calomel in powdered sugar do well, especially if assisted by an enema of soapsuds and turpentine or a decoction of quassia-wood. All teniafuges are disagreeable to the taste and irritate the stomach. The following is quite efficient and palatable:—

℞ Ethereal extract of aspidium (Merck) . . . 3 drachms.
Emulsion of chloroform . . . . . 4 drachms.
Emulsion of almond . . . . . to make 2 ounces.

Two teaspoonfuls for a child six years old, followed by a moderate dose of castor-oil in emulsion.

Failure to expell the worm is often due to the fact that an oleoresin is used which is prepared from old male fern. This can be obviated by prescribing a preparation made from the fresh green drug like the above.

Tanret's solution of pelletierin is claimed to be a pleasant remedy.

Diuretics and Diaphoretics.—In addition to most of the heart stimulants which are classed among the hydragogue diuretics, we possess several alkaline diuretics that are palatable or can be made so; namely, distilled water, solution of ammonium acetate, solution of potassium citrate, and spirit of nitrous ether. Among the alkaline salts, sodium benzoate is deserving of special attention, as it is free from any unpleasant effects and acts simultaneously as a diuretic, diaphoretic, expectorant, antipyretic, antirheumatic, and antiseptic. It is almost a specific in influenza. It may be administered in any medicated water. Recently agurin and theocin have been found to be very active and useful diuretics; they are best prescribed in tablets or in powder form.

Expectorants.—Anisated solution of ammonia, compound syrup of squill, and wine of ipecac, which have already been referred to, are very palatable and efficient expectorants. To these may be added syrup of senega, tincture of cubeb, compound mixture of glycyrrhiza, syrup of wild cherry, syrup of Tolu, and syrup of althea; the latter four syrups serve also as

excellent adjuvants. Creosote is of inestimable value in protracted coughs, and may be prescribed either in the form of creosote carbonate or in the following manner:—

℞ Creosote (beechwood) .....8 to 16 minims.
Glycerin ..... 4 drachms.
Sherry wine .....to make 2 ounces.

Astringents.—It will usually be found that bismuth and chalk mixture will do well in most cases where astringents are indicated:—

℞ Bismuth subnitrate..... 2 to 4 drachms.
Chalk mixture ..... 3 drachms.
Glycerin ..... 2 drachms.
Syrup of acacia ..... ½ ounce.
Peppermint-water .....to make 2 ounces.
Shake well before using.

Krameria and tannic acid are best administered in an enema of starch and water. Tannic acid and the tannin preparations *(q.v.)* may be given by mouth with aromatic powder.

Gastric Sedatives.—Last in line, but first in importance, are the gastric sedatives, for, no matter how palatable the medicine may be, it will usually be rejected by a highly irritated stomach. There are many methods for diminishing gastric irritability, notable among them being the use of cracked ice, cold or hot water, small doses of calomel and sodium bicarbonate; lime, peppermint, or bitter-almond water; bismuth, and cerium oxalate. A palatable mixture, which Dr. Hartshorne designates as "remarkably useful," and which the author has often employed with excellent results in vomiting of acute gastro-enteritis in children, is the following:—

℞ Aromatic spirit of ammonia,
Magnesia .....of each, 1 drachm.
Peppermint-water .....to make 2 ounces.
One teaspoonful every half hour till relieved. Camphorated tincture of opium may be added if indicated. Shake well before using.

In administering medicines to infants it is at times advantageous to divide the regular dose into several small doses, giving it drop by drop until the whole is consumed. In this

way the most irritable stomach will often retain the medicine, where it would reject it otherwise. The following general rules should be borne in mind:—

1. Never prescribe medicines unless thoroughly convinced of their absolute indication. If a *placebo* is desirable, employ a palatable adjuvant.

2. Never prescribe a preparation requiring a large dose when a small quantity of another will prove equally efficient—*i.e.*, use an alcoholic extract or an alkaloid instead of a syrup, tincture, or infusion.

3. Never prescribe an offensive, nauseous mixture when a palatable one will be equally serviceable.

4. Never prescribe more than two ill-tasting drugs in one adjuvant, and do not combine several adjuvants which are apt to disguise each other.—SHEFFIELD.]

MATERIA MEDICA.

Acetum [Vinegar] is applied externally in fever, hyperidrosis, etc., and as a styptic (1 to 5 or 10 parts of water) in epistaxis. As an addition to enemas (1 to 3 tablespoonfuls to 1 glass of water) it is very serviceable in poisoning by gas, alkalies, opium, and santonin; and in asphyxia, sopor, and oxyurides.

Acetum Pyrolignos in 1-per-cent. solution has been recommended by Steffen in acute enteritis. Dose, 4.0 to 8.0 [℥j to ℥ij] every hour. With equal parts of glycerin it is employed locally in chronic pharyngitis.

Acidum Aceticum is useful in acne in the following combination:—

℞ Acidi acetici concentr.,
Tincturæ benzoini,
Spiritus camphoræ.....of each, 6.0 [℥iss].
Alcoholis .....ad 100.0 [℥iij].

Sig.: To be rubbed in three times a day.

In prurigo the patient is sponged with a 5- to 10-per-cent. solution, followed by painting with glycerin.

[**Acidum Aceticum Glaciale.**—Externally it is employed in tinea circinata; two or three applications usually suffice to effect a cure.—SHEFFIELD.]

Acidum Benzoicum is an efficient expectorant and stimulant.

℞ Acidi benzoici.....0.02 to 0.05 [gr. $^1/_3$-$^3/_4$].
Sacchari lactis ..... 0.50 [gr. viij].

M. et ft. p.
Sig.: One powder every one to two hours.

℞ Acidi benzoici,
Pulveris camphoræ.....of each, 0.02 to 0.05 [gr. $^1/_3$-$^3/_4$].

M. et ft. p.
Sig.: One powder every two to four hours.

[These powders may be made more palatable by the addition of chocolate.—SHEFFIELD.]

℞ Acidi benzoici ..... 1.0 [gr. xv].
Pulveris camphoræ ..... 0.3 [gr. iv].
Spiritus ætheris,
Aquæ destillatæ .....of each, 5.0 [3j].

Sig.: One-half to one syringeful subcutaneously [very painful!]. (Stimulant, according to Soltmann.)

℞ Acidi benzoici ..... 6.0 [3iss].
Spiritus ætheris,
Tincturæ aromaticæ .....of each, 5.0 [3j].

Sig.: Three to six drops every hour (in cholera—Soltmann).

℞ Acidi benzoici ..... 0.5 [gr. viij].
Liquoris ammonii anisati ..... 2.0 [3ss].
Syrupi senegæ,
Syrupi simplicis .....of each, 25.0 [3vj].

Sig.: One teaspoonful every two hours (expectorant).

Acidum Boricum is employed in the form of an ointment (5 to 10 per cent.) in eczema, intertrigo, combustio, congelatio, etc., and as a dusting powder, either by itself or combined with equal parts of dermatol [aristol] or amylum. In 4-per-cent. solution it is used as an antiseptic and disinfecting lotion in acute eczema, as a gargle in stomatitis, diphtheria, etc., and as

an eyewash and earwash. A 2-per-cent. boric-acid solution is sometimes administered by enema in dysentery and in $^1/_2$- to 1-per-cent. solution is employed in irrigations of the bladder in cystitis.

℞ Acidi borici ..... 0.50 [gr. viij].
Acidi salicylici ..... 0.25 [gr. iv].
Zinci oxidi,
Amyli .....of each, 10.00 [3iiss].
Vaselini ..... 20.00 [3v].

M. f. past. (antimycotic).

℞ Acidi borici ..... 0.5 [gr. viij].
Acidi salicylici ..... 0.2 [gr. iij].
Zinci oxidi,
Magnesiæ,
Talci .....of each, 5.0 [3j].
Seminis lycopodii ..... 15.0 [3iij].

Sig.: Dusting powder.

Acidum Carbolicum should never be given internally [may be administered in very minute doses ($^1/_{20}$ to $^1/_{10}$ drop) in influenza, pertussis, etc.—SHEFFIELD]. Also externally it should be used with great caution, as in children, particularly, the newly born, it has a tendency to cause intoxications (*e.g.*, in circumcision it should not be employed at all). Even in older children its use should be governed by the appearance of the urine (dark, olive-green discoloration is suggestive of poisoning). Carbolic acid is sometimes employed in diphtheria (1-per-cent. solution as a gargle; 1 to 3 per cent. for cauterizing purposes; 4 to 5 per cent. as an inhalation, five to ten minutes at a time, every two hours), and stomatitis ulcerosa (with equal parts of alcohol). In severe scarlatinal infection of the throat, Heubner injects carbolic acid in the tonsils and in the soft palate (1 cubic centimeter [gtt. xv] of a 3-per-cent. solution should be injected in several places once a day, for several days). This method is deserving of recommendation. As an inhalation ($^1/_2$- to 1-per-cent. solution) it is also employed in pertussis. It is useful (in 1- to 2-per-cent. solution) in pruritus [urticaria] and in erysipelas (0.5-1.5 [1 to 3 per cent.]: 50.0 glycerin). In pulpitis

the tooth-cavity is packed with absorbent cotton dipped in pure carbolic acid. In congelatio:—

℞ Acidi carbolici ..... 1.0 [gr. xv].
Unguenti plumbi,
Lanolini .....of each, 20.0 [3v].
Olei amygdal. dulcis ..... 10.0 [3iiss].

[For the naso-pharyngeal toilet:—

℞ Acidi carbolici ..... 0.06 (gr. j).
Sodii bicarbonatis,
Sodii boratis .....of each, 0.30 (gr. v).
Glycerini ..... 4.00 (3j).
Aquæ destillatæ ..... 30.00 (℥j).

Sig.: As a spray or wash. ("Dobell's solution.")]

Acidum Citricum is used in diphtheria either as a gargle or as an application (10-per-cent. solution) to the diphtheritic patches by means of a brush. It is also administered internally:—

℞ Acidi citrici ..... 10.0 [3iiss].
Aquæ destillatæ ..... 100.0 [℥iij].
Saccharini ..... 0.4 [gr. $^3/_4$].

Sig.: One tablespoonful to a glass of water p. r. n.

℞ Acidi citrici ..... 1.0 [gr. xv].
Aquæ destillatæ ..... 70.0 [℥ij].
Syrupi citricis ..... 30.0 [℥j].

Sig.: One teaspoonful every half-hour, for children under 1 year of age.

[Citric acid is almost exclusively used in the form of lemon-juice *(succus limonis)*. It is prescribed in scurvy in the form of lemonade. Locally it is also valuable in epistaxis.—SHEFFIELD.]

Acidum Lacticum is employed as an inhalation (15 to 300), as a topical application in diphtheria (10 to 20 drops to a tablespoonful of water), and as a caustic in tuberculous ulcers (10 to 20 per cent.). Internally it is administered in dyspepsia, diarrhea, and cholera infantum. Dose: gtt. $^1/_4$ for children a few weeks old; gtt. ss, 1 year old; gtt. i-ij for older ones.

℞ Acidi lactici .....0.5 to 1.0 to 2.0 [*m*viii-xv-xxx].
Aquæ destillatæ ..... 80.0 [℥iiss].
Syrupi simplicis .....ad 100.0 [℥iij].

Sig.: One teaspoonful every hour or two.

Acidum Muriaticum [Hydrochloricum] is administered in dyspepsia, acute gastro-enteritis, diarrheas, typhoid, etc.

Dose: Gtt. $^1/_6$ for a child under 1 year old.
Gtt. $^1/_4$ for a child under 2 years old.
Gtt. ss-j for older children.

The dose may be repeated every two hours.

It may also be combined with tinctura opii in cases of diarrhea. Its action as an appetizer is enhanced by the addition of spiritus ætheris nitrosi, tinctura cinchonæ composita, etc.

℞ Acidi muriatici .....0.25 to 0.5 [*m*iv-viij].
(Tincturæ thebaicæ [opii]..... gtt. ii-x.)
(Spiritus ætheris nitrosi .....1.0 to 2.5 [*m*xv-xl].)
Syrupi rubi idæi..... 15.0 [℥ss].
Aquæ destillatæ .....ad 100.0 [℥iij].

℞ Acidi muriatici .....0.25 to 0.5 [*m*iv-viij].
Tincturæ cinchonæ compositæ.....2.5 to 5.0 [℥ss-j].
Syrupi corticis aurantii..... 15.0 [℥ss].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One teaspoonful to one tablespoonful every two hours.

[The acid is best given in the form of the official acidum hydrochloricum dilutum (10 per cent.; sp. gr., 1.050). Dose: 1 to 10 drops.—SHEFFIELD.]

Acidum Phosphoricum is a mild antifebrile.

Dose: Gtt. ss for a child under 1 year of age.
Gtt. j for a child under 2 years of age.
Gtt. iss for a child from 3 to 4 years of age.
Gtt. ii-iv for older children.

To be repeated every two hours.

Acidum Pyrogallicum is employed as a caustic—*e.g.*, in lupus—in the form of a paste (1 to 10 of vaselini flavi). It produces little pain and attacks only diseased tissues.

Acidum Salicylicum should not be administered internally, owing to the gastric irritation it produces. Externally it is employed as an ointment (1-2 to 20) and dusting powder, especially in eczema and hyperidrosis; as a mouthwash (1 to 300) in stomatitis; and in irrigations of the bladder in cystitis (0.2 to 100.0 [gr. iij to ℥iij]).

℞ Acidi salicylici ..... 2.0 [3ss].
Talci ..... 70.0 [℥ij].
Amyli ..... 30.0 [℥j].
Sig.: Dusting powder (for eczema, hyperidrosis).

℞ Acidi salicylici ..... 2.0 [3ss].
Bismuthi subnitratis ..... 40.0 [3x].
Pulveris amyli ..... 15.0 [3iv].
Unguenti rosæ ..... 100.0 [℥iij].
Sig.: To be smeared thickly on gauze for eczema of the face (Kistler).

℞ Acidi salicylici ..... 3.0 [gr. xlv].
Zinci oxidi ..... 10.0 [3iiss].
Amyli ..... 25.0 [3vj].
Vaselini flavi .....ad 100.0 [℥iij].
(Lassar's paste.)

℞ Acidi salicylici ..... 1.0 [gr. xv].
Unguenti simplicis ..... 15.0 [3iv].
(Umbilical gangrene.)

℞ Acidi salicylici ..... 0.25 [gr. iv].
Amyli ..... 50.0 [3xij].
(Umbilical fungi.)

℞ Acidi salicylici .....2.5 to 5.0 [gr. xl-lx].
Spiritus vini } .....
Glycerini puri } q. s. ad solut.
Vaselini ..... 30.0 [℥j].
(Eczema [Henoch].)

℞ Acidi salicylici ..... 2.0 [3ss].
Alcoholis ..... 10.0 [3iiss].
Glycerini ..... 20.0 [3iv].
Sig.: Swab for obstinate and painful aphthæ (Hirtz).

[℞ Acidi salicylici ..... 1.0 (gr. xv).
Ichthyolis ..... 1.0 (*m*xv).
Epicarini ..... 1.0 (gr. xv).
Unguenti zinci oxidi..... 32.0 (℥j).

Sig.: To be applied once or twice a day (in parasitic skin diseases).]

[℞ Acidi salicylici ..... 1.0 (gr. xv).
Extracti cannabis Indicæ ..... 0.5 (*m*viij).
Alcoholis ..... 1.0 (*m*xv).
Ætheris ..... 2.5 (*m*xl).
Flexible collodion ..... 6.0 (℥iss).

Sig.: Paint the corn twice daily for five days, then soak the foot in hot soap-water. (For corns.)]

Acidum Tannicum is administered internally in nephritis (especially hemorrhagic), cystitis, diarrheas, enteritis, and dysentery. It may be prescribed in solution (0.25 [gr. iv] to 50.0 [℥iss] for a child under three months; 0.5 [gr. viij] to 50.0 [℥iss] for older children; 1 teaspoonful every hour or two) or in powder form, sometimes combined with opium.

℞ Acidi tannici .....0.01 to 0.05 [gr.$^{1}/_{6}$-$^{3}/_{4}$].
Sacchari albi ..... 0.5 [gr. viij].

Sig.: One powder every hour or two.

℞ Acidi tannici .....0.01 to 0.05 [gr.$^{1}/_{6}$-$^{3}/_{4}$].
Opii puri .....0.0005 to 0.001 [gr. $^{1}/_{120}$-$^{1}/_{60}$].
Sacchari albi ..... 0.5 [gr. viij].

Sig.: One powder every hour or two.

In the conditions just mentioned tannic acid is also given as an enema; or in conjunction with strychnin, in more chronic intestinal diseases [in subacute and chronic intestinal catarrh Escherich obtained very prompt action, even as early as the second day, from the administration of tannigen].

℞ Acidi tannici .....1.0 to 3.0 [gr. xv-xlv].
Aquæ destillatæ ..... 200.0 [℥vj].

Sig.: As an enema.

℞ Acidi tannici .....0.02 to 0.04 [gr. $^{1}/_{3}$-$^{2}/_{3}$].
Strychninæ .....0.0003 to 0.0006 [gr. $^{1}/_{200}$-$^{1}/_{100}$].
Sacchari albi ..... 0.5 [gr. viij].

Sig.: One powder every two to four hours.

In tenesmus:—

℞ Acidi tannici ..... 1.0 [gr. xv].
Tincturæ belladonnæ ..... gtt. v.
Olei theobromatis ..... 15.0 [3iv].
Ft. supp. no. v (Soltmann).

Internally it is also employed in poisoning by alkaloids and metals, and externally as an injection in epistaxis (5 per cent.), as an insufflation in chronic pharyngitis (1.0-3.0 [gr. xv-xlv] to 200.0 [℥vj]); for the latter condition also the following is ordered:—

℞ Acidi tannici ..... 2.0 [3ss].
Spiritus diluti,
Aquæ destillatæ .....of each, 5.0 [3iss].
Glycerini ..... 12.0 [3iij].

Henoch recommends in eczema:—

℞ Acidi tannici ..... 2.0 [3ss].
Vaselini ..... 30.0 [℥j].

[℞ Acidi tannici ..... 30.0 (℥j).
Acidi salicylici ..... 10.0 (3ij).
Alcoholis ..... 60.0 (℥ij).
Aquæ destillatæ ..... 200.0 (℥vj).
Sig.: Externally in hyperidrosis and bromidrosis.—SHEFFIELD.]

Adonis Vernalis [Adonidin].—Cardiac stimulant. It is administered in heart disease, without involvement of the kidneys, [sometimes] in combination with digitalis. [Dose, for children 3 years old, 0.0006 (gr. $^1/_{100}$).]

℞ Adonidini ..... 0.0165 [gr. $^1/_4$].
Fol. digitalis .....0.3 to 0.6 [gr. v-x].
Infund. c. aqua..... 80.0 [℥iiss].
Syrupi simplicis .....ad 100.0 [℥iij].
Sig.: One teaspoonful every four to six hours.

[Agurin (acet-theobromin-sodium) is a nonirritating active diuretic recommended especially in the treatment of dropsical effusions, occurring in cardiac and chronic renal diseases.

Dose: gr. iss-v (0.1 to 0.3) three to four times a day, in solution or in wafers or capsules.—SHEFFIELD.]

Althea is employed as an expectorant in bronchitis, pneumonia, etc. It may be administered with liquor ammonii anisatus, and, if the cough is severe, in combination with opium:—

℞ Decocti radicis altheæ.....5.0-10.0 to 75.0 [3i-ij to ℥ij].
Liquoris ammonii anisati.....2.0 to 5.0 [3ss-j].
(Tincturæ opii benzoicæ.....1.0 to 5.0 [*m*xv-3j]).
Syrupi altheæ ..... 15.0 [3iv].

Sig.: One teaspoonful every two hours.

Alumen [Alum] in solution is employed as a gargle in angina and stomatitis (3ss to a glass of water), as a topical application to the nasal mucous membrane in epistaxis (3ss-j to a pint of water), and as an instillation in the ear in otorrhea; as a vaginal injection in fluor albus (5 per cent.). In powder form it is used externally to check excessive granulations (omphalitis) [and internally (3j) as an emetic in croup].

Aluminium.—*Aluminium Aceto-tartras* is applied (1 to 2 per cent.) in eczema and intertrigo.

Liquor aluminii acetatis is employed as a cooling lotion (10 to 20 per cent.); as a mouthwash in stomatitis, etc.; and as an injection in vulvo-vaginitis (3j to a glass of water); also as an enema in dysentery and enteritis follicularis (1 per cent. solution) once in twenty-four hours. In these conditions Soltmann also administers it internally:—

℞ Liquoris aluminii acetatis..... 30.0 [℥j].
Aquæ destillatæ ..... 60.0 [℥ij].
Syrupi simplicis ..... 10.0 [3iiss].

Sig.: One teaspoonful every two hours.

Ammonium Preparations.—[*Ammonii Carbonas.*—Stimulating expectorant in capillary bronchitis, pneumonia, etc. Dose: 0.03 to 0.3 (gr. ss-v).

Liquor Ammonii Acetatis (Spirit of Mindererus).—Mild stimulant, diaphoretic, and diuretic; it is very useful in febrile and inflammatory affections. Dose: 0.3 to 2.0 (*m*v-xxx).—SHEFFIELD.]

Liquor Ammonii Anisatus.—Good expectorant and analeptic. As expectorant it is administered with or without ipecacuanha, senega, althea, etc., namely: to a 100.0 [℥iij] mixture 0.5 [*m*viij] of liquor ammonii anisatus is added for children a few months old; 1.0 [*m*xv] beyond 6 months; 2.0 [ʒss] beyond 1 year; 3.0 [*m*xlv] beyond 2 years old, etc.; 1 teaspoonful every two hours. It is prescribed as analeptic—*e.g.*, in severe pneumonia, and in many other conditions associated with collapse, often in conjunction with spiritus ætheris.

℞ Liquoris ammonii anisati,
Spiritus ætheris .....of each, 10.0 [ʒiiss].
Sig.: Ten to twenty-five drops in sugar-water every hour.

Ammonii Chloridum.—Expectorant in laryngitis, bronchitis, etc. Dose: 0.02 [gr. $^1/_3$] for a child 1 year old, 0.03 to 0.06 [gr. ss-j] for a child from 2 to 3 years old.

℞ Ammonii chloridi ..... 1.0 [gr. xv].
Liquoris ammonii anisati.....2.0 to 3.0 [gr. xxx-xlv].
Extracti glycyrrhizæ fluidi ..... 15.0 [ʒiv].
Aquæ destillatæ .....ad 100.0 [℥iij].
Sig.: One teaspoonful every two hours (for a child from 2 to 3 years old).

[*Spiritus Ammoniæ Aromaticus.*—An agreeable and powerful carminative, antacid, and general stimulant. Dose: gtt. ii-x.

℞ Spiritus ammoniæ aromatici.....2.0 to 4.0 (ʒss-j).
Magnesiæ ..... 4.0 (ʒj).
(Tincturæ opii camphoratæ.....2.0 to 4.0 [ʒss-j]).
Aquæ menthæ piperitæ .....ad 64.0 (℥ij).
Sig.: One teaspoonful every half-hour till relieved (in vomiting of acute gastro-enteritis [Hartshorne]).—SHEFFIELD.]

Amylene Hydrate.—Hypnotic. Dose: 0.05 to 0.1 [gr. $^3/_4$-iss] for a child under 1 year, 0.3 to 0.5 [gr. v-viij] for older children.

Amylum is employed as a dusting powder in eczema, intertrigo, etc.; in enemas in diarrheas ($^1/_2$ to 1 teaspoonful to be stirred in a little cold water and allowed to swell in $^1/_2$ glassful of hot water; 1 to 3 drops of tincture of opium may be added).

Aneson (a colorless, watery solution of trichlor-pseudobutyl alcohol or aceton-chloroform) is a new local anesthetic. It is frequently used in children instead of Schleich's solutions. Aneson is identical in its effects with a 2- to 2 $^1/_2$-per-cent. solution of cocain, and acts also in inflammatory infiltrations (1 to 3 grams [*m*xv-xlv] are sufficient for ordinary purposes). It has the advantage of always being ready for use and permanent, thus saving the physician the trouble of preparing solutions. Aneson is considered harmless and nonirritating. Recently Goeppert recommended aneson for the relief of pain in diseases of the mouth (stomatitis). Fifteen minutes before eating, a moderate quantity of the solution is carefully (without rubbing) applied over the affected parts and repeated after five minutes. The swab is left in place for some time, if the disease is very pronounced. Anesthesia usually follows after from five to ten minutes.

Antifebrin [Acetanilid] should not be often administered to children owing to the collapse (cyanosis of the lips!) it is prone to produce. Antipyrin [or phenacetin] should be given instead. If ever administered it should be begun with small doses: 0.03 to 0.05 [gr. $^1/_2$-$^3/_4$] for a child 1 year old; 0.05 to 0.07 [$^3/_4$ to 1], 2 years old; 0.1 to 0.15 [gr. iss-ii $^1/_4$], 4 years old; 0.2 to 0.25 [gr. ii-iv], 6 years old. [Regarding its uses, etc., see "Phenacetin."]

Antimonii et Potassii Tartras [Tartar Emetic] in small doses acts as a diaphoretic and expectorant. Dose: 0.0003 to 0.0006 [gr. $^1/_{200}$-$^1/_{100}$]. It should be used with caution in larger doses.

Antinosin (nosophen-natrium), in $^1/_{10}$- to $^1/_2$-per-cent. solution, is useful in chronic otitis media purulenta.

Antipyrin [phenyl-dimethyl pyrazolon] is generally preferred to antifebrin. As some children show an idiosyncrasy to antipyrin and are affected by an exanthema resembling measles or scarlatina, the initial dose should be small. It is employed in fever, pertussis, hemicrania, rheumatic effections, chorea, laryngospasm and diabetes.

Dose (in powder form or in solution with sweetened water or wine) as many centigrams [gr. $^1/_6$] as the age of the child in months, or as many decigrams as the age of the child in years. The dose may be repeated two or three times a day.

Antipyrin Salicylate (Salipyrin) is successfully employed in influenza, neuralgia, and rheumatism. Dose: the same as for antipyrin.

℞ Salipyrini .....1.0 to 5.0 [gr. xv-lxxv].
Glycerini ..... 15.0 [℥iv].
Aquæ destillatæ ..... 50.0 [℥xij].
Syrupi rubi idæi..... 30.0 [℥j].

Sig.: Two to four teaspoonfuls three to four times a day.

Antipyrin Mandelate (Tussol) is an efficient preparation in pertussis. Dose: the same as for antipyrin.

Antispasmin [narcein-sodium and salicylate of sodium] is frequently used in pertussis:—

℞ Antispasmini ..... 1.0 [*m*xv].
Aquæ amygdalæ amaræ ..... 19.0 [℥v].

Sig.: From ten to fifteen or twenty drops once or twice a day.

Apomorphin.—Prompt emetic (acts within ten to fifteen minutes) and useful expectorant. Dose as an emetic: 0.001 [gr. $^1/_{64}$] for a child 1 year old; 0.0015 [gr. $^1/_{40}$], 2 years old; 0.0025 [gr. $^1/_{24}$], from 3 to 4 years old; 0.003 to 0.005 [gr. $^1/_{20}$-$^1/_{12}$] for older children. Dose as an expectorant: 0.0005 [gr. $^1/_{120}$] for a child 1 year old; 0.001 [gr. $^1/_{60}$], 2 years old; 0.002 [gr. $^1/_{30}$], 4 years old, etc.; may be repeated every two hours. It is advantageously prescribed with diluted hydrochloric acid and syrup of althea, and, if the cough is very pronounced, with codein phosphate. Thus, in bronchitis, pneumonia, pertussis, etc., the following may be ordered:—

℞ Apomorphinæ muriatis ..... 0.02 [gr. $^1/_3$].
(Codeinæ phosphatis ..... 0.1 [gr. $^1/_6$].)
Acidi muriatici diluti..... gtt. xij.
Syrupi altheæ ..... 15.0 [℥iv].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig: One dessert-spoonful every two to four hours for a child 3 years old.

Aqua Amygdalæ Amaræ is employed as a sedative in gastric, intestinal, and bronchial irritation—*e.g.*, gastralgia, flatulence, irritable cough, and pertussis. Dose: as many drops as

the age of the child in years, several times a day. Maximum dose: 0.5 [*m*viij] *pro dosi* and 1.5 [*m*xxij] *pro die.*

[Aqua Anisi, Cinnamomi, Fœniculi, and Menthæ Piperitæ.—Carminatives. They are also used to correct the unpleasant taste or smell of other medicines (see "Palatable Prescribing"). Dose: 0.5 to 5.0 (*m*viii-ʒj).—SHEFFIELD.]

Aqua Calcis.—As an addition to milk (1 tablespoonful to 10 tablespoonfuls of milk) lime-water is employed in dyspepsia and rachitis. In inflammations of the throat, diphtheria, etc., aqua calcis and aqua destillata, equal parts, are administered every hour in teaspoonful doses to a child 1 year old and in tablespoonful doses to older children. It is also used ás a gargle.

Aqua Chlori [Chlorin-water].—As an eyewash (1 teaspoonful to 5 tablespoonfuls of water). [It is also used, well diluted, as a gargle in diphtheria and as a wash for foul ulcers and wounds.—SHEFFIELD.]

Aqua Petroselini is a mild diuretic. Dose: 1 tablespoonful from three to four times daily.

Argentum Nitras is administered internally in dysentery, gastric ulcer, and enteritis follicularis (0.001 to 0.005 [gr. $^1/_{64}$-$^1/_{12}$] *pro dosi,* 0.01 to 0.05 [gr. $^1/_6$-$^3/_4$] *pro die,* in solution); in cardialgia of girls at puberty (0.03 [gr. ss] to 100.0 [ʒiij], 1 dessert-spoonful three or four times a day); in nervous diseases such as epilepsy and chorea. In older children silver nitrate may be prescribed in pill form. In obstinate cases of dysentery and enteritis [and proctitis] it should be employed by enema (0.05 to 0.1 [gr. $^3/_4$-iss] to 100.0 [ʒiij]). As a prophylactic measure silver nitrate, in 2-per-cent. solution, is invaluable in gonorrheal ophthalmia (see "Credé's Method") and as an irrigation, in 2- to 3-per-cent. solution, in gonorrheal vulvo-vaginitis (should be employed once a day). In obstinate rhinitis and rhagades at the nares it should be applied in 1-per-cent. solution once or twice a day; in thrush in 2- or 3- per-cent. solution. As an irrigation (1 to 1000) of the bladder it is very useful in bacteriuria and colicystitis. [As an antiphlogistic and astringent it is used in $^1/_2$- to 1- per-cent. solution in conjunctivitis, pharyngitis, laryngitis, etc., and in stronger solutions in epistaxis.—SHEFFIELD.] In fissura ani it may be applied several times a day in the form of an ointment. In prolapsus recti, cauteriza-

tion of the edges of the anal mucous membrane by means of the nitrate-of-silver stick. According to Rehn, from five to eight applications usually suffice to effect a cure. In eczema extending over large surfaces (*e.g.*, buttocks and thighs), which are moist, glossy, infiltrated, and painful a 2- to 3- per-cent. ointment is often very useful. Silver nitrate is also employed in frostbite (3-per-cent. ointment), in balanitis, and in slowly granulating wounds (1- to 1 $^{1}/_{2}$- per-cent. ointment).

Argilla (Bolus Albus [White or Potter's Clay]) is administered internally as an astringent. Dose: 0.5 to 1.0 [gr. viii-xv] to 100.0 [℥iij]; 1 teaspoonful every two to three hours. Soltmann prescribes the following in enteritis:—

℞ Argillæ	1.0	[gr. xv].
Aquæ destillatæ	80.0	[℥iiss].
Tincturæ opii benzoicæ	2.0	[℥ss].
Syrupi cinnamomi	15.0	[℥iv].

Sig.: One teaspoonful every hour or two.

It is also employed externally as a dusting powder (1 to 10 of talcum) in suppurating wounds, ulcers, eczema, etc.

[**Aristochin** (neutral carbonic ester of quinin) is a tasteless quinin preparation free from disagreeable by-effects. It is especially valuable in the treatment of pertussis. Dose: the same as that of quinin sulphate.]

Aristol (di-thymol di-iodid) is a nonpoisonous, nonirritating, odorless *succedaneum* for iodoform. It is especially useful in chronic rhinitis and ozena, and may be employed either pure as a powder (insufflation) or in the form of an ointment (1 to 10). [Also in suppurative otitis, burns, as a dressing for the umbilical cord and for wounds and as a sedative and protective in infantile eczema (Comby).]

Aspidium (Filix Mas) is the surest and safest tapeworm remedy. It is being administered to hundreds of cases without bad effects. Sometimes, however, even with exact dosage it produces severe and even fatal intoxication. It is therefore sometimes withheld, notwithstanding its prompt action.

Extract of Male Fern [*Merck*].—Dose: 3.0 [*m*xlv] for children 3 years old; 4.0 [℥j], 4 years, etc., with electuarium sennæ (15.0-20.0 to 30.0 [℥iv-v to ℥j]) and prune-juice *(ad libitum)*.

The whole quantity should be taken within one-half hour (Neumann) :—

℞ Ext. fil. mar. æther.....3.0 to 5.0 [*m*xlv-lxxv].
Mellis despumati ..... 25.0 [3vj].

Sig.: Should be taken in two portions on an empty stomach.

It is also administered in conjunction with granatum. Thus, Kraus prescribes for a child 3 to 5 years old:—

℞ Extracti fil. mar. æther. [Merck]..1.5 to 3.0 [gr. xxii-xlv].
Ext. punicæ granati,
Elect. lenitiv. .....of each, 30.0 to 50.0 [℥i-iss].

Sig.: The whole quantity to be taken in two hours at intervals of fifteen minutes' duration.

Aspirin (acetyl salicylic acid) is a new salicylate preparation that is distinguished by palatability and by its freedom from unpleasant after-effects. It does not split up into its components until it reaches the intestine. Its action and dose are identical with those of sodium salicylate and it has proved of great value in the treatment of different forms of rheumatism, pleuritis, etc. [Numerous clinicians prefer aspirin to all other salicylic acid preparations.]

Auri et Sodii Chloridum deteriorates rapidly and should therefore be prescribed in small quantities. Internally it is useful in catarrh of the small intestine. Dose: 0.002 [gr. $^1/_{30}$] for a child 3 to 4 years old, 0.004 [gr. $^1/_{15}$] for older children; to be repeated every three to six hours until the diarrhea is checked. Locally it is employed in diphtheria (0.1 to 10.0 [gr. iss to 3iiss]).

Balsamum Peruvianum is an excellent antiscabiosum. It is prescribed either pure or in combination with equal parts of alcohol, vaselin, or storax.

℞ Balsami Peruviani,
Styracis liquidi .....of each, 45.0 [3xj].
Olei ricini ..... 10.0 [3ij].

Sig.: For three applications, to be rubbed in on three successive evenings.

It is also used in frostbite (12-per-cent. ointment). In fistula following inflammations of the bones or joints (tubercu-

losis!) healing is promoted by the use of gauze packings saturated with balsam of Peru and an equal quantity of alcohol. Internally Peruvian balsam has been recommended in tuberculosis in the form of Peru cognac.

Belladonna.—Anodyne and antispasmodic. It is indicated in enteralgia, spasmodic conditions, irritable cough, and pertussis.

Extractum Belladonnæ Fluidum.

Dose: Gtt. $^1/_{20}$ for a child 1 year old.
Gtt. $^1/_{15}$ for a child 2 years old.
Gtt. $^1/_{10}$ for a child 3 years old, etc.

It is also effective in enuresis and may be prescribed in solution or in older children, in pill form:—

℞ Extracti belladonnæ ..... 0.1 [gr. iss].
Pulveris et succi glycyrrhizæ..of each, 1.0 [gr. xv].

Ft. pil. no. xx.
Sig.: Two pills at bedtime.

In tenesmus, dysentery, and cystitis the [solid] extract may be prescribed in suppositories, in doses of 0.01 to 0.03 [gr. $^1/_6$-ss].

[*Tinctura Belladonnæ.*—Dose: 1 to 10 drops three times a day.]

Atropinæ Sulphas should be very cautiously administered to children (up to 0.0002 [gr. $^1/_{250}$] *pro dosi*, and 0.0007 [gr. $^1/_{100}$] *pro die).* In night-sweats of children from 8 to 13 years old $^1/_3$ to $^1/_2$ milligram [gr. $^1/_{200}$-$^1/_{120}$] should be given in the evening. In morphin poisoning larger doses are tolerated. To a child 14 days old poisoned by 0.004 [gr. $^1/_{15}$] of morphin Cruse administered 0.01 [gr. $^1/_6$] of atropin twice within an hour. Elsässer prescribes in diphtheria:—

℞ Atropinæ sulphatis ..... 0.003 [gr. $^1/_{20}$].
Cocainæ muriatis ..... 0.05 [gr. $^3/_4$].
Aquæ amygdalæ amaræ ..... 20.0 [3v].

Sig.: As many drops as the age of the child in years, every hour (in the beginning also at night), in a teaspoonful of Tokay wine.

Benzonaphthol [benzoyl-betanaphthol] is employed, especially in France, in intestinal catarrh. Dose: 0.05 [gr. $^3/_4$] for a child a few months old; 0.1 [gr. iss], 6 months old; 0.2 [gr. iij], 1 year old. It may be administered every two or three hours with or without bismuth.

Bismuth Preparations.—*Bismuthum.*—[Bismuth betanaphtholate (see "Orphol").]

Bismuthum Salicylas, like bismuth subnitrate, is employed in intestinal catarrhs, etc., but more rarely, owing to its tendency to irritate the stomach. Dose: 2.0-5.0 [ʒss-j] to 100.0 [ʒiij]; shake mixture. One teaspoonful every two hours. Blindreich recommends in dysentery:—

℞ Bismuthi salicylatis ..... 3.0 [gr. xlv].
Plumbi acetatis ..... 0.03 [gr. ss].
Tincturæ thebaicæ..... gtt. x.
Decocti salep .....ad 100.0 [ʒiij].
Sig.: One teaspoonful every two hours.

Dermatol, Bismuthum Subgallas, is employed externally in wounds and ulcers, in the treatment of the normal and diseased umbilicus, in intertrigo, pemphigus neonatorum, etc. Internally it has frequently been found effective in diarrheas. Dose: 0.05 to 0.1 [gr. $^3/_4$-iss] every three hours, in powder form.

Bismuthum Subnitras is an excellent intestinal antiseptic and astringent in diarrhea, gastro-intestinal catarrh, typhoid fever, dysentery, etc. It should be administered either in powder form or in a shake mixture.

Dose: 0.05 to 0.1 [gr. $^3/_4$-iss] for a child a few months old.
0.10 to 0.2 [gr. iss-iij] for a child over 6 months old.
0.25 to 0.3 [gr. iv-v] for a child over 1 year old.

℞ Bismuthi subnitratis .....1.0 to 2.0 or 3.0 [gr. xv-xxx-xlv].
Mucilaginis acaciæ ..... 20.0 [ʒv].
[Glycerini ..... 8.0 (ʒij).]
Aquæ destillatæ .....ad 100.0 [ʒiij].
Sig.: One teaspoonful to a dessert-spoonful every two or three hours.

In enteralgia or cardialgia it may be prescribed with pulvis opii or pulvis Doveri *(q.v.).*

Externally it is employed in combustio:—

℞ Bismuthi subnitratis ..... 9.0 [3ij].
Acidi borici ..... 4.5 [3j].
Lanolini ..... 70.0 [3xviij].
Olei olivæ ..... 20.0 [3v].
(Wertheimer).

Also in eczema and intertrigo:—

℞ Bismuthi subnitratis,
Zinci oxidi .....of each, 5.0 [3j].
Amyli .....ad 100.0 [℥iij].
Sig.: Dusting powder.

Bromids.—*Ammonii, Potassii, and Sodii Bromidum.*—Since the prolonged use of potassium bromid is apt to be followed by unpleasant after-effects, and ammonium bromid is slow in its action, sodium bromid is generally preferred in pediatric practice. Dose: 0.5 [gr. viij] daily for every year of the child's age. According to Erlenmeyer, it is of advantage to prescribe the three bromid preparations together in the proportion of $1:1:{}^{1}/_{2}$.

℞ Potassii bromidi,
Sodii bromidi .....of each, 4.0 [3j].
Ammonii bromidi ..... 2.0 [3ss].
Soda-water ..... 600.0 [Oj].
(Erlenmeyer's "Bromid-water.")

Sodium bromid is a very valuable nervine in convulsions, chorea, epilepsy, tetanus, pertussis, disturbances during dentition, migraine, hysteria, neurasthenia, insomnia, and spasmus glottidis. In the latter affection Baginsky orders:—

℞ Potassii bromidi .....1.5 to 3.0 [gr. xxiii-xlv].
Tincturæ moschi .....1.0 to 2.0 [gr. xv-xxx].
Syrupi simplicis ..... 15.0 [3iv].
Aquæ destillatæ .....ad 100.0 [℥iij].
Sig.: One teaspoonful every two hours.

To render sodium bromid more soluble it is best to add sodium bicarbonate. To obtain a restful night the following may be prescribed:—

℞ Sodii bromidi,
Ammonii bromidi .....of each, 5.0 [3j].
Sodii bicarbonatis ..... 3.0 [gr. xl].
Syrupi simplicis ..... 15.0 [3iv].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: 1 teaspoonful at bedtime for a child 1 year old.
1 dessert-spoonful at bedtime for a child 2 years old.
1 tablespoonful at bedtime for a child 4 years old.

In chronic nervous conditions the dose of the bromids is:—

Ad 1.0 [gr. xv] *pro die* for a child 1 year old.
Ad 2.0 [3ss] *pro die* for a child 2 years old, etc.

[**Bromipin** (10-per-cent. brominized sesame-oil) is a nervine and sedative. It can be administered for a long time without impairing the appetite, disturbing digestion, or producing bromism. Bromipin is thus especially adapted to the treatment of epilepsy and diseases wherein long-continued bromin medication is indicated. Dose: 3ss-j (2.0 to 4.0) three to four times daily for a child 3 years old (in emulsion with peppermint-water and syrup).]

Bromoform is a very efficient remedy in pertussis, but great caution is required in its administration. Dose: As many drops as the age of the child in years, to be repeated three or four times a day; the maximum dose should not exceed 15 drops *pro die*. It should be prescribed in small quantities, either pure or with equal parts of alcohol:—

℞ Bromoformi ..... gtt. xlviij.
Olei amygdalæ dulcis ..... 20.0 [3v].
Pulveris tragacanthæ ..... 2.0 [3ss].
Pulveris acaciæ,
Aquæ laurocerasi .....of each, 4.0 [3j].
Aquæ destillatæ .....ad 100.0 [℥iij].

One teaspoonful represents two drops. (Marfan.)

In order to obtain a permanent, promptly acting, harmless mixture, M. Cohn recommends the following mode of preparation: Dissolve the bromoform in an equal quantity of absolute alcohol; add gum arabic, ten times as much as bromoform; and stir the mixture three to six times, at intervals; now add slowly some water and again stir this mixture until a thin slime is

formed and the fluid ingredients are thoroughly mixed with it; this is followed by the addition of syrupus aurantii corticis.

℞ Bromoformi .....0.5 to 2.0 [*m*viii-xxx].
Solve in
Spirit. rectificatiss. .....of each, partes æquales.
Tere exactiss. cum
Pulveris acaciæ .....5.0 to 10.0 [3i-iv].
Adde paulatim
Aq. dest. ..... 100.0 [℥iij].
Syrupi corticis aurantii ..... 20.0 [3iv].

Sig.: One teaspoonful to one dessert-spoonful every two hours. Shake mixture.

Byrolin (boroglycerin-lanolin) is a mild antiseptic employed for children suffering from small wounds, rhagades, burns, eczema, intertrigo, etc. It is sold in sterile, air-tight, sealed tubes.

Caffeina.—[Cardiac stimulant resembling digitalis in action.] Dose: 0.02 to 0.04 to 0.06 [gr. $^1/_3$-$^2/_3$-j]. It is also employed in hemicrania.

Caffein Sodium Benzoate is most frequently administered as a cardiac stimulant—*e.g.*, in heart diseases. It may be prescribed either in powder form or solution.

Dose: 0.03 [gr. ss] for a child 1 year old.
0.06 [gr. j] for a child from 2 to 3 years old.
0.1 [gr. iss] for a child from 4 to 5 years old.
0.15 to 0.2 [gr. iiss-iij] for older children.

The dose may be repeated every two or three hours.

It may also be employed hypodermically:—

℞ Caffein. sod. benz. .....0.01 to 0.05 [gr. $^1/_6$-j].
Aquæ destillatæ ..... 10.0 [3iiss].

Sig.: One-half to one syringeful.

Camphora.—Excitant and analeptic in cardiac debility.

Pulvis Camphoræ.

Dose: 0.01 to 0.03 [gr. $^1/_6$-ss] for a child a few months old.
0.04 to 0.05 [gr. $^2/_3$-$^3/_4$] for a child 1 year old.
0.06 to 0.2 [gr. i-iij] for a child 2 years old, etc.

The dose may be repeated every hour or two.

℞ Pulveris camphoræ ..... 1.0 [gr. xv].
Spiritus ætheris ..... 4.0 [3j].

Sig.: From 5 to 15 drops every hour or two [in a palatable adjuvant].

In cardiac debility associated with bronchitis, pneumonia, and pulmonary edema camphor is advantageously combined with benzoic acid:—

℞ Pulveris camphoræ,
Acidi benzoici .....of each, 0.01 to 0.05 [gr. 1/6-3/4].
Sacchari lactis,
[Chocolate] .....of each, 0.5 [gr. viij].

Ft. pulv. no. j.

Sig.: One powder every hour or two.

[In cardiac collapse associated with gastric irritability it is best to administer camphor hypodermically in the form of *sterilized camphorated oil* (10 per cent. in almond-oil). Dose: 1/2 to 1 syringeful.

Externally camphor is employed in congelatio:—

℞ Pulveris camphoræ,
Creosoti .....of each, 1.0 [gr. xv].
Balsami Peruviani ..... 1.0 [*m*xv].
Vaselini ..... 10.0 [3iiss].

Calcium Preparations.—*Calcii Carbonas Præcipitatus* is employed in hyperacidity of the stomach and in poisoning by acids. Dose: 0.15 to 0.5 [gr. iiss-viij] several times a day.

[*Mistura Cretæ (Chalk Mixture)*, a combination of chalk, gum acaciæ, syrup, and cinnamon-water, 1 to 32. It is extensively used in diarrhea. Dose: 4.0 to 16.0 (3i-iv).—SHEFFIELD].

Calcii Phosphas is indicated in dyspepsia, rachitis [and scrofulosis]. Dose: 0.06 to 0.3 [gr. i-v].

℞ Calcii phosphatis,
Calcii carbonatis .....of each, 6.0 [3iss].
Sacchari lactis ..... 8.0 [3ij].

Ft. pulv. no. xxx.

Sig.: One powder three times a day.

[*Liquor Calcis (Lime-water).*—Gastric sedative and antacid; also astringent. Dose: 2.0 to 4.0 (3ss-j).

Linimentum Calcis (Carron-oil) is employed as a dressing for burns, scalds, etc.—SHEFFIELD.]

Calumba (Columbo).—[Stomachic and aromatic tonic.] It is sometimes of service also in diarrhea.

℞ Infusi radicis calumbæ .....1.0-5.0 to 80.0 [gr. xv-3j to ℥ij].
Tincturæ opii simplicis ..... gtt. i to v.
Syrupi simplicis .....ad 100.0 [℥iij].

Sig.: One teaspoonful to one dessert-spoonful every two hours.

Cascara Sagrada.—Laxative.

Extractum Cascaræ Sagradæ Fluidum.—Good laxative in doses of from 5 to 8 or 15 drops, morning and night, for children from 3 to 5 years of age. Or:—

℞ Extracti cascaræ sagradæ fluidi,
Aquæ destillatæ,
Syrupi simplicis .....of each, 10.0 [3iiss].

Sig.: One-half to one teaspoonful morning and night.

Extractum Cascaræ Sagradæ Aromaticum.—Dose: $^1/_2$ teaspoonful.

Both cascara preparations are effective in habitual constipation.

Cascarilla.—Aromatic bitter. It is useful in dyspepsia and intestinal catarrh.

℞ Decocti corticis cascarillæ.....5.0-8.0 to 80.0 [3i-ij to ℥iiss].
Tincturæ opii simplicis ..... gtt. v-xx.
Syrupi simplicis .....ad 100.0 [℥iij].

Sig.: One teaspoonful to one dessert-spoonful every two hours.

Cerii Oxalas sometimes acts well in the vomiting and diarrhea associated with gastro-intestinal affections. Dose: 0.03 [gr. ss] for children 3 to 6 months old, 0.05 [gr. $^3/_4$], 1 year old, etc.; to be repeated every two to three hours. It should be prescribed in powder form.

Chinolin is employed as a gargle (1 to 500 of water) in diphtheria or as a swab:—

℞ Chinolin ..... 5.0 [3j].
Spiritus vini,
Aquæ destillatæ .....of each, 50.0 [3xij].

Chloral.—Chloral hydrate is a very useful hypnotic and sedative. It is well tolerated by children of all ages and may therefore be administered even in infants but a few months old. Indications: Trismus, tetanus neonatorum, eclampsia, uremia, laryngospasm, pertussis, chorea, asthma, nervous manifestations —*e.g.*, in typhoid [scarlatina], meningitis, etc. Dose:—

By Mouth:

0 to 1 year,	0.1	[gr. iss]	*pro dosi;*	0.3	[gr. v]	*pro die.*
1 to 2 years,	0.2	[gr. iij]	*pro dosi;*	0.5	[gr. viij]	*pro die.*
3 to 4 years,	0.3	[gr. v]	*pro dosi;*	1.0	[gr. xv]	*pro die.*
5 to 10 years,	0.5	[gr. viij]	*pro dosi;*	1.5	[gr. xxii]	*pro die.*
11 to 15 years,	0.75	[gr. xij]	*pro dosi;*	2.0	[gr. xxx]	*pro die.*

Or, by enema: (0.15 to 0.5 [gr. ii-viij]).

℞ Chloralis hydratis .....0.3 to 2.0 [gr. v-xxx].
Syrupi corticis aurantii ..... 20.0 [3v].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One teaspoonful to dessert-spoonful every one or two hours, if necessary.

Cocaina.—*Cocainæ Hydrochloras* is usually well borne even by small children, and is frequently recommended in vomiting —*e.g.*, of gastro-intestinal diseases.

℞ Cocainæ muriatis .....0.006 to 0.01 [gr. $^1/_{10}$-$^1/_6$].
Spiritus ætheris ..... 5.0 [3j].

Sig.: Gtt. v in a teaspoonful of gruel every half to one hour, until vomiting is arrested.

In pertussis cocain is generally prescribed in the following doses (should be repeated three or four times a day):—

0.004 [gr. $^1/_{16}$] for a child 1 year old.
0.01 [gr. $^1/_6$] for a child from 3 to 4 years old.
0.02 [gr. $^1/_3$] for a child from 6 to 7 years old, etc.

Externally cocain is employed in coryza. One drop of a 2-per-cent. solution is instilled in each nostril three or four times a day; in blepharospasm, associated with eczema of the lids: 0.15-0.2 to 5.0 of vaselin [gr. iiss-iii to 3j], or combined with other remedies:—

℞ Zinci oxidi,
Bismuthi subnitratis .....of each, 0.3 [gr. v].
Cocainæ muriatis ..... 0.5 [gr. $^3/_4$].
Lanolini,
Vaselini .....of each, 10.0 [3iiss].

In dentitio difficilis:—

℞ Cocainæ muriatis ..... 0.15 [gr. iiss].
Chloroformi ..... 1.0 [*m*xv].
Glycerini ..... 20.0 [3v].
Olei rosæ ..... gtt. iv.
Sig.: To paint the gums several times a day. (Chompert.)

Condurango is lauded as an appetizer—*e.g.*, in dyspepsia.

Extractum Condurango Fluidum.—Dose: 3 drops for a child a few months old; 6 drops for a child 1 year old; 10 drops for older children.

Vinum Condurango.—Dose: 5 drops for a child a few months old; 10 drops for a child 1 year old; $^1/_2$ to 1 teaspoonful for older children.

Chrysarobin.—As a 10-per-cent. ointment or 10-per-cent. mixture with traumaticin, it is recommended in eczema and psoriasis [but should be used with caution].

Cosaprin (sulpho derivative of antifebrin) is antipyretic and antirheumatic, acts promptly, and is odorless and almost tasteless. It is recommended in rheumatism, typhoid, pneumonia, etc. The following combinations are prescribed:—

℞ Cosaprin .....2.0 to 3.0 [gr. xxx-xlv].
Aquæ destillatæ ..... 80.0 [℥iiss].
Syrupi simplicis .....ad 100.0 [℥iij].
Sig.: One dessert-spoonful every two hours.

℞ Cosaprin .....0.2 to 0.5 [gr. iii-viij].
D. t. dos. no. viij.
Sig.: One powder three times a day.

Creolin [Metaphenol].—It is employed for vaginal irrigations ($^1/_2$-per-cent. solution) in gonorrheal vaginitis and for irrigations of the bladder ($^1/_4$ per cent.) in cystitis. In scabies the affected parts are painted with the following emulsion:—

℞ Creolin .....5.0 to 10.0 [3i-ij].
Olei olivæ ..... 100.0 [℥iij].

Creosotum.—Effective in intestinal catarrh of nurslings, cholera nostras, and dyspepsia.

℞ Creosoti ..... gtt. i-ij.
Aquæ destillatæ ..... 40.0 [3x].
Mucilaginis acaciæ .....ad 50.0 [3xiiss].

Sig.: One teaspoonful every two hours (for children under 1 year).

It is also advantageously employed in scrofula, phthisis, pulmonary gangrene, etc.

Dose: $^1/_2$ drop for a child 1 to 2 years old; 1 drop for a child 3 years old; 2 drops for a child 4 years with oleum jecoris aselli, tinctura gentianæ, etc.

℞ Creosoti ..... 1.0 [gtt. xv].
Olei jecoris aselli or olei sesami.....ad 100.0 [℥iij].

Sig.: From one-half to one teaspoonful two or three times a day (for a child from 2 to 3 years old).

℞ Creosoti ..... 3.0 [*m*xlv].
Tincturæ gentianæ ..... 15.0 [3iv].

Sig.: Ten drops three times a day (for a child from 6 to 8 years old).

Creosoti Carbonas (Creosotal).—Excellent substitute for creosote in lung affections and scrofula.

℞ Creosotalis ..... 5.0 [*m*lxxv].
Vini xerici ..... 10.0 [3iiss].

Sig.: From ten to twenty drops three times a day.

[Creosote carbonate contains 92 per cent. of purest creosote chemically combined with 8 per cent. of carbon dioxid. Its

slightly unpleasant taste and odor can be easily overcome by means of palatable adjuvants, and, as it can be administered in large doses without producing the noxious by-effects of plain creosote, creosotal is the ideal remedy in all diseases of childhood in which creosote is indicated; thus, in all forms of tuberculosis, intestinal fermentation, etc. Its action in acute diseases of the lungs—such as pneumonia, influenza, pertussis, etc.—is almost specific in character, as attested by numerous authorities.

The initial dose of creosotal is as many drops as the age of the child in years, three or four times a day, in wine, water, or palatable syrup with a little acacia and also in codliver-oil.

℞ Creosoti carbonatis (creosotal) ..... 2.0 (3ss).
Glycerini ..... 15.0 (3iv).
Aquæ destillatæ ..... 8.0 (3ij).
Syrupi altheæ ..... 60.0 (℥ij).
Pulveris acaciæ ..... q. s.

Sig.: One teaspoonful every four to six hours (for a child from 2 to 3 years old).—SHEFFIELD.]

Digitalis is employed in noncompensating heart disease and as a diuretic in pleuritis, dropsy, endocarditis, pneumonia, etc. It should be administered with caution, owing to its accumulative action and its bad effect on the stomach.

Pulvis Digitalis.

0.02 [gr. 1/3] *pro dosi;* 0.1 [gr. iss] *pro die* (1 to 2 years).
0.025 [gr. 3/8] *pro dosi;* 0.15 [gr. ij] *pro die* (3 to 4 years).
0.03 [gr. 1/2] *pro dosi;* 0.2 [gr. iij] *pro die* (5 to 8 years).
0.04 [gr. 2/3] *pro dosi;* 0.3 [gr. ivss] *pro die* (8 to 11 years).
0.05 [gr. 3/4] *pro dosi;* 0.5 [gr. viiss] *pro die* (12 to 15 years).

Digitalis is best given in powder form, preferably with calomel, but also as infusion.

℞ Infusi fol. digitalis.....0.1-0.5 to 80.0 [gr. iss-viiss to ℥iiss].
Kalii acetatis .....1.0 to 5.0 [gr. xv-xxv].
Syrupi simplicis .....ad 100.0 [℥iij].

Sig.: This quantity should be taken in twenty-four hours in divided doses at intervals of from one to two hours.

Diphtheria Antitoxin.—[*Diphtheria Antitoxin* is the fluid portion of the blood of a healthy horse that is rendered immune to diphtheria by a long course of careful treatment with diphtheria toxin. Antidiphtheritic serum administered in moderate doses is entirely harmless, if free from admixture of virulent bacteria. Under reasonable conditions it should keep at least six months. It is always better to use a small quantity of a high-grade serum than a large quantity of a low-grade preparation.

The serum is administered by deep hypodermic injections, a syringe somewhat larger than a hypodermic syringe being preferably employed for this purpose. The anterior surface of the abdomen or thorax or the outer surface of the thigh, where there is an abundance of subcutaneous cellular tissue, is generally chosen for the injection. Before the diphtheria antitoxin is administered the skin should be carefully washed with alcohol or some disinfecting solution and the syringe carefully sterilized. The earlier the remedy is administered, the more certain and rapid is the effect.

Dosage.—Children under 2 years should receive from 1000 to 3000 units, to be repeated in from six to twelve hours, the dose depending upon the severity of the attack. Children over 2 years, in whom the attack is severe, should receive from 3000 to 5000 units; the dose should be repeated in from six to eight hours, if no improvement is observed. In malignant cases, especially if seen late, the initial dose of the antitoxin should range between 6000 and 10,000 units, to be repeated, if necessary, in from six to eight hours.

Immunization.—Where children or adults have been much exposed to diphtheria, they may be protected from the disease by the administration of from 500 to 1000 antitoxin units, according to age. The protection usually lasts from four to six weeks. —SHEFFIELD.]

Unfavorable Effects from Antitoxin Injections.—The administration of antidiphtheritic serum may be followed by an exanthema (urticarial, morbilliform, scarlatiniform, or polymorphous eruption), multiple articular swellings (with fever and pain), and finally sometimes by albuminuria. These manifestations are, as a rule, mild and harmless in nature, and should therefore not deter one from the use of the serum.

Diuretin (sodio-theobromin salicylate—Knoll) is a valuable diuretic in nephritis (*e.g.*, scarlatinal), pleuritis, etc. It is administered either in powder form (0.2 to 0.5 [gr. iii-viij]) three to four times daily or in solution (without syrup), thus:—

℞ Diuretini .....1.0 to 3.0 [gr. xv-xlv].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One dessert-spoonful every two hours.

Ergota. — Hemostatic in melena neonatorum and hemorrhages from the bowels, lungs, and kidneys; also recommended in hemicrania.

Extractum Ergotæ Fluidum.—Dose: gtt. ss-ij.

℞ Extracti ergotæ fluidi ..... 1.0 [*m*xv].
Syrupi simplicis ..... 20.0 [℥v].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One teaspoonful every two hours.

Ergotin.—Dose: gr. $^1/_{10}$-j (0.006 to 0.06). Neumann often obtained with it excellent results in very desperate cases of collapse. Henoch recommends it (subcutaneously) in prolapsus ani:—

℞ Ergotini ..... 1.0 [gr. xv].
Glycerini,
Aquæ destillatæ .....of each, 30.0 [℥j].

Sig.: One hypodermic syringeful to be injected in the vicinity of the anus, once a day.

Ether.—Internally ether is administered in collapse, cardiac debility, and vomiting.

Dose: Gtt. ij for a child a few weeks old.
Gtt. v for a child a few months old.
Gtt. vi-x for a child 2 years old.
Gtt. x-xx for older children.

The dose may be repeated every one-quarter to one hour, and administered in gruel, wine, equal parts of liquor ammonii anisatus (the latter especially in collapse during pneumonia, capillary bronchitis, etc.), or tinctura ammonii valerianatis. In

urgent cases it may also be given hypodermically [very painful!]. As an inhalation ether is employed in convulsive conditions (a handkerchief saturated with ether is held before the child's nose until the spasm subsides,—this mode of administration may also be intrusted to the laity).

Ether narcosis for children by means of Juillard's mask is nowadays frequently (*e.g.*, by Stooss) preferred to chloroform. Stooss employed it in an infant 4 days old. The bronchial and tracheal irritation, as well as salivation, is much milder than in adults; the narcosis is quiet and deep; the awakening is rapid; vomiting is rare; it is almost never followed by bad after-effects; broncho-pneumonia, collapse, or death never occurs from ether anæsthesia (Stooss). It is contra-indicated in pulmonary affections.

Eucasin.—Composed of ammonia and albumin; it is lauded as a nutrient preparation for anemic children and those debilitated through acute or constitutional diseases.

Eudoxin [tetra-iod-phenolphthalein bismuth] is a useful intestinal disinfectant in enteritis, intestinal tuberculosis, and dysentery. Dose: as many centigrams [gr. $^1/_6$] as the age of the infant in months, three times a day; older children, 0.1 to 0.2 [gr. iss-iij] every three hours.

Europhen [iso-butyl-ortho-cresol-iodid] is an excellent *succedaneum* for iodoform in wounds, burns, intertrigo, eczemas, etc. ["It possesses advantages over iodoform in being free from odor and less toxic."

℞ Europhen ..... 1.0 (3j).
Vaselin,
Lanolin .....of each, 30.0 (℥j).

in extensive burns.—SHEFFIELD.]

Ferrosomatose. — An excellent combination of iron and somatose which is of greatest value in the treatment of anemic, scrofulous, and rachitic children and all forms of debility. [Dose: gr. xv-xxx (1.0 to 2.0) daily, in water, milk, broth, sweet wines, etc. Dr. E. v. Metzner recommends ferrosomatose in cases of: *(a)* chlorosis; *(b)* primary and secondary anemias; *(c)* convalescence from acute exhausting diseases, particularly severe

infections, such as typhoid and diphtheria; *(d)* underfed anemic children.—SHEFFIELD.]

Formalin [Formic Aldehyde] is employed as an addition to irrigations in gonorrhea [vulvo-vaginitis] of small girls (10.0 to 100.0 aq. [℥iiss to ℥iij]; of this, 1 tablespoonful to a liter of water). It is also effectively used to cleanse the eyes in ophthalmoblennorrhea (1 drop to 100.0 [℥iij] of water) and diphtheritic conjunctivitis (0.1-0.5 to 200.0 [*m*iss-viii to ℥vj), and for disinfection of infected clothes, rooms, etc. (by means of Schering's formalin apparatus).

Gelsemium is recommended by Naegeli-Akerblom in dentitio difficilis *(q.v.)*.

Tinctura Gelsemii.—Dose: gtt. i-iv in solution.

Glycerinum is employed in constipation in the form of suppositories (0.3 to 2.0 [*m*v-xxx] with cacao-butter) or as an enema (either a few drops of pure glycerin or from 1 to 2 teaspoonfuls in from 1 to 3 tablespoonfuls of water, injected through a small colon tube). Glycerin acts very promptly, but should not be employed too often, as it has a tendency to irritate the rectum. [Glycerin is extensively employed as a vehicle for internal and external medication.]

Grindelia Robusta is prescribed in bronchial asthma.

Extractum Grindeliæ Robustæ Fluidum.—Dose: gtt. ii-x.

Guaiacol [methyl-pyro-catechol] is being frequently prescribed in tuberculosis in children, and some clinicians (*e.g.*, Jacoby) obtained with it very good results: increased appetite and body-weight, loosening of the cough, diminution of the objective signs in the lungs, etc. Jacoby usually administers from 6 to 15 drops *pro die;* Neumann is more careful with the dose and administers 1 drop *pro die* to children under 3 years; 3 drops to children from 4 to 6 years old, etc.; and gradually increases the dose. Guaiacol is generally prescribed in olive-oil, milk, sugar-water, or codliver-oil.

Guaiacol Carbonate (Duotal) is as effective as simple guaiacol and has the advantage of being odorless and tasteless. [A. Jacobi, among others, recommends it in tuberculosis in children, and it is reported to be a valuable intestinal antiseptic, especially in typhoid fever. Dose: 0.1 (gr. iss) to 0.5 (gr. viiss) daily. It is best administered in powder form.—SHEFFIELD.]

[**Hedonal** (methyl-propyl-carbinol-urethan) is an efficient hypnotic chiefly employed in milder grades of insomnia, such as hysteria, neurasthenia, chorea, etc. Dose: gr. iii-viij (0.2 to 0.5) in powder form.]

Hematogen (purified hemoglobin) is readily assimilated and very useful in anemia, scrofula, rachitis, convalescence from serious diseases, in rapid growth, etc.

Dose: From 1 to 2 teaspoonfuls *pro die* (in milk) for infants, and from 1 to 2 dessert-spoonfuls *pro die* for older children.

Hemogallol (hemoglobin deoxidized by pyrogallol) is a very efficient blood preparation in anemia, chlorosis, chronic nephritis, diabetes, convalescence, etc. Dose: 0.05 to 0.2 (gr. $^3/_4$-iij) three times daily, one-half hour before meals, in powder form with sugar or chocolate.

Heroin (diacetyl morphin) is a substitute for morphin and codein; it is less poisonous than the latter and free from disagreeable effects. It frequently proves efficacious in diseases of the respiratory organs: by considerably mitigating the cough, regulating respiration, and relieving pain. It may be administered in the form of powders or drops (with aqua amygdalæ). Dose: 0.000335 to 0.0005 (gr. $^1/_{200}$-$^1/_{120}$) for a child 3 years old.

℞ Heroini	0.016 to	0.033	(gr. $^1/_4$-$^1/_2$).
Extracti hyoscyami fluidi		2.0	(ʒss).
Aquæ laurocerasi		8.0	(ʒij).
Syrupi altheæ		60.0	(ℨij).
Spiritus frumenti	q. s. ad	100.0	(ℨiij).

Sig.: One teaspoonful three times a day for a child 6 years old.

It is very useful in the diverse forms of spasmodic cough, especially pertussis.—SHEFFIELD.]

Hydrargyrum (Mercury) Preparations.—*Hydrargyri Chloridum Corrosivum* [*Corrosive Sublimate*] is employed externally as an addition to baths (0.5 to 1.0 [gr. viii-xv] to each bath) in the treatment of hereditary syphilis and furunculosis; as an instillation (1 to 5000) and ointment (0.003 to 10.0 of vaselin [gr. $^1/_{20}$ to ʒiiss]) in gonorrheal ophthalmia; as an irrigation (1 to 10,000) in vulvo-vaginitis; as a local application (0.1 to 50.0 [gr. iss to ℨij] of water or glycerin) in ulcerative stomatitis

and thrush; in cutaneous nevi (1 to 25 of collodion); as an injection in echinococcus of the liver (evacuation of the pus is followed by an injection of 20.0 [3v] of a 1-per-cent. solution); and in lichen ruber:—

℞ Hydrargyri bichloridi ..... 0.03 [gr. ss].
Acidi carbolici liquefacti ..... 1.0 [*m*xv].
Vaselini flavi .....ad 30.0 [℥j].

Hydrargyri Chloridum Mite [*Calomel*].—As a disinfectant and astringent, calomel is prescribed either by itself or in combination with pulvis Doveri or bismuth, in gastro-intestinal catarrh, cholera nostras, dysentery, etc.

Dose: 0.005 [gr. $^1/_{12}$] for a child a few months old.
0.01 [gr. $^1/_6$] for a child 1 year old.
0.015 to 0.02 [gr. $^1/_4$-$^1/_3$] for a child 2 years old.
0.03 [gr. ss] for a child 3 years old, etc.

The dose may be repeated three times a day.

It is very frequently used as a cathartic and during the onset of febrile diseases such as influenza, pneumonia, meningitis, etc.; also in dropsical conditions associated with heart disease (in conjunction with digitalis).

Dose: 0.008 to 0.01 [gr. $^1/_8$-$^1/_6$] for a child in the first year of life.
0.015 to 0.02 [gr. $^1/_4$-$^1/_3$] for a child in the second year of life.
0.025 to 0.03 [gr. $^1/_3$-$^1/_2$] for a child in the third year of life.
0.040 to 0.05 [gr. $^2/_3$-$^3/_4$] for a child in the fourth year of life, etc.

The dose is to be repeated every two or three hours [or more often] until the bowels act. In less frequently repeated doses it is often given in hereditary syphilis.

Externally calomel is employed in phlyctenular conjunctivitis and syphilitic condylomata (after moistening with salt-water).

[Calomel is advantageously combined with santonin as an anthelmintic. The following dusting powder is very useful in herpes labialis, eczema, etc.:—

℞ Calomel ..... 0.3 (gr. v).
Pulveris acaciæ ..... 0.6 (gr. x).
Bismuthi subnitratis ..... 4.0 (3j).
Zinci oxidi ..... 30.0 (℥j).

Sig.: To be applied two or three times a day.—SHEFFIELD.]

Hydrargyri Iodidum Flavum (Protiodid of Mercury).—Antisyphilitic.

Dose: 0.005 [gr. $^1/_{12}$] for a child a few months old.
0.0075 [gr. $^1/_8$] for a child 1 year old.
0.01 [gr. $^1/_6$] for a child 2 years old.
0.015 [gr. $^1/_4$] for a child 3 years old.

To be repeated three times a day.

Hydrargyri Oxidum Flavum is prescribed as an ointment in syphilitic skin diseases (0.03 [gr. ss], 0.05 [gr. $^2/_3$], or 0.1 [gr. iss] to 10.0 [3iiss] vaselin) and in phlyctenular conjunctivitis (0.1 [gr. iss] to 10.0 [3iiss]; to be rubbed on the conjunctiva once a day).

Hydrargyrum Ammoniatum [*Ammoniated Mercury*], *White Precipitate,* is a very useful local remedy in syphilitic skin diseases, blepharadenitis, eczema narium (0.1-0.2 [gr. iss-ij] to 10.0 [3iiss]).

℞ Hydrargyri ammoniati ..... 1.0 [gr. xv].
Balsami Peruviani ..... 5.0 [3j].
Vaselini ..... 25.0 [3vj].

(In squamous eczema.)

℞ Hydrargyri ammoniati,
Bismuthi subnitratis .....of each, 5.0 [3j].
Olei olivæ ..... 2.0 [3ss].
Lanolini ..... 10.0 [3iiss].

Sig.: To be applied in the evening (in chloasma and lentigo).

Hydrargyrum Tannicum.—Good antisyphilitic; it should be given internally in powder form, two or three times a day, in doses of 0.01 to 0.03 [gr. $^1/_6$-$^1/_2$].

[*Unguentum Hydrargyri (Mercurial Ointment, Blue Ointment).*—Used externally for inunction in syphilis, to destroy pediculi, and as a dressing to syphilitic ulcers.

Unguentum Hydrargyri Oxidi Rubri and *Unguentum Hydrargyri Oxidi Flavi,* each containing 10 per cent. of mercuric oxid, are employed in chronic forms of conjunctivitis and blepharitis and in corneal (scrofulous) ulcers.

Unguentum Hydrargyri Ammoniati (Ointment of Ammoniated Mercury) is used especially in parasitic skin diseases.

Unguentum Hydrargyri Nitratis (Citrine Ointment) is employed in various skin affections, pruritus, etc.—SHEFFIELD.]

Hydrogen Peroxid in 10- to 50-per-cent. solution is often prescribed as a gargle in stomatitis, angina, diphtheria, etc. [It is also employed in suppurating wounds and as a hemostatic.]

Hyoscyamus.—Anodyne and antispasmodic, effective especially in pertussis and cystitis.

Extractum Hyoscyami Fluidum.—Dose: 0.008 [*m* $^1/_8$] for a child 1 year old; 0.012 [*m* $^1/_5$] for a child 2 years old; 0.02 [*m* $^1/_3$] for a child 3 years old. The dose may be repeated every three hours.

Ichthalbin (ichthyol albuminate) is readily taken by children (with chocolate or cacao). It acts as a stimulant to the appetite and nutrition and as a general tonic in scrofula, rachitis, anemia, and intestinal atony; it is also employed in intestinal catarrh and in chronic eczema. Dose: 0.15 [gr. ij] for a child from 1 to 3 years old; 0.25 [gr. iv] for a child from 4 to 6 years old; 0.3 [gr. v] for older children.

Ichthyol [ammonium sulpho-ichthyolate (Merck)] is an exceedingly valuable remedy in the treatment of skin diseases, such as eczema, intertrigo, acne, etc.; burns, erysipelas, rheumatism, pleuritis, and glandular swellings. In all of these conditions it is employed in the form of a 5- to 20-per-cent. ointment or in the following mixture:—

℞ Ichthyolis .....1.0 to 2.0 [gtt. xv-xxx].
Ætheris,
Glycerini .....of each, 5.0 [3j].
Sig.: To be applied by means of a brush.

It is very efficient in vulvo-vaginitis [1 part to 10 of glycerin] and in frostbite (1.0-2.0 to 10.0 of collodion [gtt. xv-xxx to 3iiss]).

Iodalbacid contains from 8 to 10 per cent. of iodin. It is almost odorless and tasteless. Its action is slow, but continuous, and free from bad after-effects. It is recommended in syphilis instead of potassium iodid.

Iodoform.—This is too dangerous a drug to be used as an antiseptic in the treatment of wounds in children, especially very young ones; therefore its substitutes [aristol, europhen, etc.] are

used instead. In tuberculous ulcers it acts better than the latter. It is frequently employed also as an injection in tuberculous inflammations of joints:—

℞ Iodoformi subtill. pulv. 10.0
Mucilaginis acaciæ 5.0
Glycerini 15.0
Aquæ destillatæ .....ad 100.0

Some employ iodoform ointment (10 per cent.) in meningitis.

The following crayons are recommended in vulvo-vaginitis:—

℞ Iodoformi,
[Protargol] .....of each, 0.2 [gr. iij].
Tragacanthæ,
Pulveris acaciæ,
[Olei theobromatis],
Aquæ destillatæ ..... q. s.

Ut. f. bacill. longit. 3 cm.; diam., 2 cm.

Iodoformogen [iodoform albuminate] is a *succedaneum* for iodoform. Almost odorless and nonpoisonous. Can be easily sterilized and produces but little irritation.

Iodol [tetraiodo-pyrrole] is an odorless and efficient substitute for iodoform; it is regarded as harmless.

Iodothyrin.—The active principle of the thyroid gland combined with sugar of milk. [Fifteen grains (1.0) of iodothyrin contain $^{5}/_{1000}$ grain (0.0003) of iodin. According to R. H. Chittenden it is apparently the physiological equivalent of the gland itself.] It is effective in myxedema, cretinism, tumors of the lymph-glands, and struma parenchymatosa. Dose: 0.3 [gr. v] one to three times daily.

Iodids.—*Iodum* [*Iodin*].—Internally it is often given in scrofula:

℞ Iodi puri .....0.03 to 0.05 [gr. $^{1}/_{2}$-$^{3}/_{4}$].
Kalii iodidi ..... 1.0 [gr. xv].
Aquæ menthæ piperitæ ..... 25.0 [℥vj].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One dessert-spoonful two or three times a day.

Iodin Ointment is employed in glandular enlargements [and chronic rheumatic swellings]:—

℞ Iodi puri .....0.05 to 0.1 [gr. $^3/_4$-iss].
Kalii iodidi .....1.0 to 1.5 [gr. xv-xxij].
Vaselini ..... 25.0 [3vj].

Sig.: For inunctions.

Iodoglycerin is used in chronic pharyngitis or laryngitis:—

℞ Iodi puri ..... 0.1 [gr. iss].
Kalii iodidi .....1.0 to 1.5 [xv-xxij].
Glycerini .....ad 25.0 [3vj].

Potassii Iodidum.—It is best administered with sodium bicarbonate. It is indicated in syphilis, scrofula, asthma, meningitis, goiter, and rheumatism. Dose *pro die:* 0.1 [gr. iss] for a child 1 year old; 0.2 [gr. iij] for a child 2 years old; 0.3 to 0.5 [gr. v-viij] for a child 3 years old; 1.0 [gr. xv] for a child from 5 to 10 years old; 1.5 to 2.0 [gr. xxii-xxx] for a child from 10 to 15 years old, in solution with peppermint-water or in milk.

[*Sodii Iodidum* is less apt to disturb the stomach. Dose and indications are the same as for potassium iodid.]

Tinctura Iodi.—Externally (with equal parts of tinctura gallæ), in goiter, glandular tumors, pleuritis, hydrocele, epididymitis, meningitis, etc.

[Internally it may be tried in very minute doses, $^1/_4$ to $^1/_2$ drop, in incessant vomiting.—SHEFFIELD.]

Ipecacuanha [emetic, expectorant, and cholagogue]; as an expectorant it may be combined with althea, senega, hydrochloric acid, liquor ammonii anisatus, or tinctura opii benzoica. [Dose as an expectorant: 0.005 (gr. $^1/_{12}$) to 0.01 (gr. $^1/_6$).]

As a cholagogue it acts well in dyspepsia [and dysentery].

[Ipecac is the safest emetic for children.]

℞ Pulveris radicis ipecacuanhæ .....1.0 to 2.0 [gr. xv-xxx].
Syrupi altheæ .....ad 30.0 [℥j].

Sig.: One teaspoonful every ten minutes until emesis results.

℞ Pulveris radicis ipecacuanhæ .....1.0 to 2.0 [gr. xv-xxx].
Antimonii et potassii tartratis ..0.03 to 0.05 [gr. $^1/_2$-$^3/_4$].
Aquæ destillatæ ..... 30.0 [℥j].
Oxymelis scillæ ..... 15.0 [3iv].

Sig.: One teaspoonful every ten minutes until vomiting occurs. (Henoch.)

[*Pulvis Ipecacuanhæ et Opii* (see "Opium").]

[*Syrupus Ipecacuanhæ.*—Dose as an expectorant, gtt. ii-v; as an emetic, 3ss-j (2.0 to 4.0).

Vinum Ipecacuanhæ.—Dose, as an expectorant, gtt. ss-ij; as an emetic, gtt. x-xxx.—SHEFFIELD.]

Iron Preparations.—Iron is indicated in anemia, chlorosis, rachitis, scrofula, leukemia, spleen affections, after hemorrhages, in convalescence after severe diseases, etc.

Liquor Ferri Albuminati or Liquor Ferri Peptonati.—Dose: 8 drops for a child 1 year old; 15 drops for a child 2 years old; 30 drops for a child 5 years old, etc., three times a day.

Tinctura Ferri Chloridi or Tinctura Ferri Pomati.—Dose: 8 to 15 drops three times a day.

Ferrum Reductum, Ferri Lactas, or Ferri Carbonas Saccharatus.—Dose, in powder form, 0.03 to 0.05 [gr. ss-j] three times a day.

Iron is frequently prescribed in conjunction with mangan and quinin. Thus, liquor ferro-mangani peptonatus. Dose, $^1/_3$ to $^1/_2$ teaspoonful three times a day. Also extractum malti with iron and mangan.

℞ Euquininæ,
Ferri reducti .....of each, 0.03 to 0.05 [gr. ss-j].
Sacchari albi .....0.3 to 0.5 [gr. v-viij].
D. dos. T. no. xx.
Sig.: One powder three times a day.

℞ Ferri carbon. sacch.,
Euquininæ .....of each, 1.0 [gr. v].
Olei sacchari menthæ piperitæ..... 4.0 [3j].
M. et ft. pulv. no. xx.
Sig.: One powder three times a day.

℞ Ferri lactatis,
Extracti cinchonæ .....of each, 5.0
Mucilaginis acaciæ, q. s. ut ft. pil. no. c.
Sig.: One or two pills three times a day (for older children).

Liquor Ferri Sesquichloridi.—Good hemostatic. It is given internally in melena neonatorum. Dose: 1 drop in gruel or

glycerin every two hours, or, according to Seitz, in the following combination:—

℞ Liquor ferri sesquichloridi ..... gtt. v.
Aquæ destillatæ,
Aquæ cinnamomi,
Syrupi simplicis .....of each, 15.0 [℥iv].

Sig.: One teaspoonful every two hours.

This preparation is employed also in hemorrhages,—*e.g.*, typhoid, intestinal bleeding, and hemoptysis,—and in obstinate cases of nephritis, etc.

℞ Liquor ferri sesquichloridi ..... 1.0 [gr. xv].
Syrupi simplicis ..... 20.0 [℥v].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One teaspoonful every two hours.

[*Mistura Ferri et Ammonii Acetatis (Basham's Mixture).*—An excellent combination. It is very valuable as a tonic and diuretic in nephritis scarlatinosa and various forms of dropsy. Dose: 2.0 to 4.0 (℥ss-j).—Sheffield.]

Syrupus Ferri Iodidi and Ferri Iodidum Saccharatum.—Very useful in anemic and debilitated conditions, particularly in syphilis, scrofula, and rachitis. In syphilis congenita Monti prescribes ferri iodidum saccharatum in powder form in doses of 0.02 [gr. $^1/_3$] to children under 3 months of age; 0.03 to 0.04 [gr. $^1/_2$ to $^2/_3$], 1 year; 0.1 to 0.15 [gr. iss-ij], 2 years. Ordinarily the dose ranges between 0.015 and 0.06 [gr. $^1/_6$ and gr. j] several times a day. In older children it is also administered in pill form:—

℞ Ferri iodidi saccharati ..... 4.0 [℥j].
Kalii iodidi ..... 1.0 [gr. xv].
Mucilaginis acaciæ,
Sacchari lactis, q. s. ut ft. pil. no. c.

Sig.: Three to five pills *pro die.*

Syrup of the iodid of iron is best prescribed with an equal quantity of simple syrup. Of this mixture the dose is from 4 to 5 drops for a child 1 year old; 5 to 10 drops for a child 2 years

old; 10 to 15 drops for a child 3 years old; 15 to 25 drops for a child between 4 and 6 years old, etc.

[*Syrupus Ferri, Quininæ, et Strychninæ Phosphatum.*—Hematinic and tonic. Dose: gtt. v-xx].

Lactosomatose (somatose with 5 per cent. of tannin in organic combination) is a nutrient which is well tolerated and readily assimilated. It is especially useful in cases with deficient nutrition, all forms of debility, in rachitis (particularly with intestinal affections), also tuberculosis, anemia, dyspepsia, etc. Dose: 3.0 to 10.0 [gr. xlv-ʒiiss] *pro die.*

Lipanin is a mixture of 94 parts of olive-oil and 6 parts of free oleic acid. It is frequently employed as a substitute for codliver-oil (3 to 4 teaspoonfuls *pro die*). It is easily absorbed, tastes and keeps better than codliver-oil, so that it can be used also in the summer in scrofula, rachitis (with phosphorus), etc.

Lithii Carbonas is recommended in urinary concretions and renal and vesical calculi. Dose: 0.025 to 0.1 [gr. ss-iss] in Selters, three times a day.

Magnesia Preparations.—*Magnesii Citras Effervescens.*—Mild laxative. Dose, 1 teaspoonful, p. r. n.

Magnesii Sulphas.—Laxative. Dose, $^1/_2$ to 1 teaspoonful.

Magnesia Usta.—Dose as an antacid, 0.1 to 0.5 [gr. iss-viij] several times a day; as an antidote in poisoning with acids, 2.0 to 4.0 [ʒss-j]. Externally it is employed as a dusting powder—*e.g.*, in intertrigo.

℞ Magnesiæ ustæ ..... 5.0 [gr. lxxv].
Talci ..... 20.0 [ʒv].
Acidi salicylici ..... 0.2 [gr. iij].
Misturæ oleoso-balsam. ..... gtt. x.
(Klamann.)

Pulvis Magnesiæ cum Rheo ("Ribkes's or Hufeland's Children's Powder").—Mild and efficient laxative for children. It is composed of 12 parts of magnesia carbonate, 3 parts of radix rhei, and 8 parts of oleo saccharum fœniculi. Dose: 2.0 to 4.0 [ʒss-j] two or three times a day.

Manna.—Laxative. Dose: $^1/_2$ to 1 teaspoonful in milk.

℞ Mannæ .....10.0 to 15.0 [ʒiiss-iv].
Aquæ fœniculi .....ad 50.0 [ʒxij].
Sig.: In teaspoonful doses.

Moschus [Musk].—Stimulant and antispasmodic. It is frequently prescribed in spasmus glottidis.

Tinctura Moschi.—Dose: gtt. v-xv every two to three hours.

Myrrha.—[Astringent, carminative, and hematinic.]

Tinctura Myrrhæ is employed as a swab (with tinctura ratanthiæ and tinctura iodi, of each, equal parts) in stomatitis, and as a gargle (6 to 10 drops to a glass of water) in stomatitis, angina, and diphtheria. Ströll recommends its internal administration in diphtheria, and the author also obtained good results with it before the antitoxin treatment. At present the author prescribes it in conjunction with the latter:—

℞ Tincturæ myrrhæ ..... 2.0 [3ss].
[Tincturæ ferri chloridi ..... 2.0 (3ss).]
[Syrupi aurantii ..... 30.0 (℥j).]
Glycerini ..... 4.0 [3j].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One teaspoonful to one tablespoonful every hour or two.

Naftalan has proved to be an excellent remedy in skin diseases, especially in the diverse forms and stages of eczema. It acts well also in burns. It is employed either pure or in the form of a 50-per-cent. paste.

℞ Naftalan ..... 50.0 [3xij].
Zinci oxidi,
Amyli .....of each, 25.0 [3vj].

Naphthalin [Tar Camphor].—*Internally* it is employed in diarrhea and vomiting, chronic intestinal catarrh, and in colicystitis. Dose: 0.03 to 0.05 to 0.1 [gr. $^1/_2$-$^3/_4$-iss], in the form of a powder, every two hours. Or:—

℞ Naphthalini purissimi ..... 1.0 [gr. xv].
Pulveris acaciæ ..... 5.0 [3j].
F. cum aq. dest. emulsio..... 100.0 [℥iij].
Syrupi simplicis ..... 20.0 [3v].

Sig.: One teaspoonful to dessert-spoonful every two hours.

Biedert recommends naphthalin (with equal parts of starch) as an insufflation in diphtheria.

Naphthol (Beta).—An efficient remedy in skin diseases, especially acne, prurigo, scabies, psoriasis, favus, and ichthyosis. It should be employed with caution (5- to 15-per-cent. ointment), as it often irritates the kidneys.

℞ Naphthol (beta) ..... 2.5 [gr. xl].
Sulphuris præcipitati ..... 12.5 [3iiiss].
Vaselini flavi,
Saponis viridis .....of each, 5.0 [3iss].
(For acne.)

℞ Naphthol (beta) .....5.0 to 10.0 to 15.0 [3i-iiss-iv].
Vaselini ..... 100.0 [℥iij].
Saponis viridis ..... 50.0 [3xij].
Cretæ albæ ..... 10.0 [3iiss].
(For scabies.)

℞ Naphthol (beta) .....3.0 to 5.0 [gr. xlv-lxx].
Unguenti zinci oxidi ..... 100.0 [℥iij].
(For prurigo, ichthyosis, etc.)

To prevent otitis in scarlatina Comby recommends naphthol-camphor as a daily application to the throat:—

℞ Naphthol (beta) ..... 10.0 [3iiss].
Camphoræ ..... 20.0 [3v].
Glycerini ..... 30.0 [℥j].

Nosophen [tetraiodo-phenolphthalein] is a good substitute for iodoform in rhinitis scrofulosa and eczema (5-per-cent. ointment). As a dusting powder, with equal parts of starch, it is employed in intertrigo, omphalitis, etc.

Nutrose (sodium salt of casein) is an albumin of the same nature as that found in milk; it is a good nutrient, and may be given in soup, milk, and cocoa (it is readily taken in powder form, since it is odorless and tasteless) in anemia, rachitis, scrofula, convalescence, etc.

Oleum Morrhuæ (Oleum Jecoris Aselli [Codliver-oil]).—Easily absorbable fat, and therefore an excellent nutrient in anemia, scrofula, tuberculosis (may be combined with creosote), and especially rachitis (also with phosphorus). Dose: 1 to 3 teaspoonfuls to tablespoonfuls *pro die*. The dark (unpurified) codliver-oil is more effective, but is more disagreeable in taste. Indeed, codliver-oil is frequently refused by children, owing to

its bad taste. Its administration is facilitated in the form of an emulsion. Codliver-oil sometimes produces diarrhea and gastric disturbances; hence it should not be given in the presence of fever, anorexia, vomiting, and diarrhea. It should be avoided also in the summer, as it is apt to become rancid. Lipanin may be given instead [see "Palatable Prescribing," page 473].

Oleum Ricini [Castor-oil].—Excellent laxative in children over 2 years of age [also in younger ones]. Dose: 5.0 to 15.0 [3i-iv]. To improve its taste the castor-oil is warmed and sprinkled with sugar; or it is given with "weiss" beer in a conical glass (the oil between two layers of "weiss" beer), without shaking. Also in the form of an emulsion.

℞ Olei ricini .....5.0 to 20.0 [3i-v].
Pulveris acaciæ,
Syrupi sacchari .....of each, 7.5 [3ij].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One tablespoonful every hour until effective [see "Palatable Prescribing," page 473].

Oleum Terebinthinæ [Oil of Turpentine] is employed as an inhalation (1 teaspoonful to a pint of boiling water) in putrid lung processes, asthma, and croup. Here, as well as in phosphorus poisoning [and hemorrhage from the bowels], it is also administered internally. (The urine should be examined for albumin!) Dose: gtt. ss-v every two to six hours, in emulsion.

Opium Preparations.—Opium, in any form, should not be given to infants under 1 year of age, and even to older children it should be administered with caution. Opium is often indispensable, however, in the treatment of peritonitis, typhlitis, typhoid fever, lung affections associated with diarrhea, colic, etc. [its use should, however, be deferred until other, less poisonous, remedies have proved futile].

Tinctura Opii Benzoica [*and Tinctura Opii Camphorata*].—Dose: 1 drop for every six months of the child's age.

℞ Tincturæ opii benz. [or camph.] ..2.0 to 3.0 [gtt. xxx-xlv].
Liquoris ammonii anisati..... 2.0 [3ss].
Syrupi altheæ ..... 15.0 [3iv].
Aquæ destillatæ .....q. s. ad 100.0 [℥iij].

Sig.: One teaspoonful for a child 2 years old; one dessert-spoonful for a child 4 years old.

Tinctura Opii [*Laudanum*].—Dose: $^1/_4$ drop for every year of the child's age.

Pulvis Opii.—Dose: 0.001 to 0.003 [gr. $^1/_{60}$-$^1/_{20}$], three to four times a day [preferably in suppositories].

Pulvis Ipecacuanhæ et Opii ("Dover's Powder").—It is composed of 1 part each of opium and ipecac and 8 parts of sugar. Efficient expectorant, anodyne, and antispasmodic in bronchitis, laryngitis, pneumonia, influenza, and intestinal catarrh, etc. In the latter affection it is advantageously combined with calomel, bismuth, tannin preparations, etc.

Dose: 0.001 to 0.003 [gr. $^1/_{64}$-$^1/_{30}$] for a child 1 year old.
0.01 to 0.03 [gr. $^1/_6$-$^1/_2$] for a child from 3 to 4 years old.
0.03 to 0.04 [gr. $^1/_2$-$^2/_3$] for a child from 5 to 7 years old.
0.05 to 0.08 [gr. $^3/_4$-j] for a child from 8 to 10 years old.
0.1 to 0.2 [gr. iss-iij] for a child from 10 to 15 years old.

Codeinæ [methyl morphin] is a sedative and antispasmodic. It is frequently prescribed in lung affections, colic, etc.

Codeinæ Sulphas.—Dose: 0.0005 [gr. $^1/_{120}$] for a child over 1 year of age; 0.003 [gr. $^1/_{20}$] for children 5 to 6 years old.

[*Codeinæ Phosphas* is soluble in 4 parts of water. It may be administered either by mouth or hypodermically. The dose and indications are the same as for codein sulphate.]

[*Dionin* (ethyl-morphin-hydrochlorate) is frequently prescribed as a cough-sedative and anodyne. Dose, the same as for codein sulphate.]

Morphinæ Hydrochloras should not be prescribed for children under 1 year of age. In older children it is very efficient in obstinate spasm of the glottis, bronchial asthma, and in all conditions associated with severe pain.

℞ Morphinæ muriatis .....0.01 to 0.03 [gr. $^1/_6$-$^1/_2$].
Aquæ destillatæ ..... 40.0 [3x].
Syrupi altheæ ..... 15.0 [3iv].

Sig.: One teaspoonful two or three times a day. (Henoch.)

In atropin poisoning larger doses of morphin are tolerated and should preferably be administered hypodermically. Morphin is often indicated in obstinate insomnia, in which con-

dition it should be administered once in twenty-four hours in the following doses:—

0.003 [gr. $^1/_{20}$] for a child from 4 to 6 years old.
0.005 [gr. $^1/_{12}$] for a child from 6 to 8 years old.
0.006 [gr. $^1/_{10}$] for a child from 9 to 11 years old.
0.008 to 0.01 [gr. $^1/_8$-$^1/_6$] for older children.

[A severe attack of uremia will frequently yield to a hypodermic injection of morphin (gr. $^1/_{60}$-$^1/_{30}$) and atropin (gr. $^1/_{600}$-$^1/_{300}$).]

Orexin Tannas [phenyl-dihydro-quinazolin tannate] is a valuable stomachic—*e.g.*, in anemia, scrofula, chlorosis, atony of the stomach, nervous anorexia, convalescence, etc. [contra-indicated in excessive acidity of the stomach and in gastric ulcers—SHEFFIELD]. This tasteless powder is given to children from 3 to 15 years old in doses of 0.5 [gr. viij] two hours before dinner and supper; also in the form of chocolate tablets (0.25 [gr. iv]).

[Orphol (Betanaphthol Bismuth).—Efficient antiseptic and astringent for the gastro-intestinal tract. It is very useful in infantile diarrhea, dysentery, and gastritis. Dose: from 2 to 5 grains (0.15 to 0.3) every three to six hours.]

Orthoform (amido-oxybenzoic acid, acid methyl-ester) is employed either as a dusting powder or ointment (5 to 10 per cent.) as a local anesthetic in burns, herpes zoster, and diverse forms of ulcerations. It relieves pain in a few minutes and its anesthetic effect lasts several hours. Recently it has also been recommended as an insufflation in painful affections of the mouth (stomatitis aphthosa and ulcerosa; it should be applied by means of an insufflator from ten to twenty minutes before meals.

Pelletierin Tannas. — Anthelmintic, obtained from the roots of granatum. Though its effect is not constant, it should be tried, especially in small children. Dose: 0.15 to 0.25 [gr. ii-iv], in two doses, within one hour, in sugar-water [should be followed in two hours by a cathartic].

Pepsinum.—Excellent remedy in dyspepsia. Dose: 0.02 to 0.06 [gr. $^1/_4$-j]. This drug is usually prescribed with hydrochloric acid.

℞ Pepsini ..... 1.0 [gr. xv].
Acidi muriatici ..... 0.5 [*m*viij].
Sacchari albi ..... 10.0 [ʒiiss].
Aquæ destillatæ .....ad 100.0 [ʒiij].
Sig.: One teaspoonful three to four times daily, after meals.

Vinum Pepsini.—Good stomachic. Dose: 10 drops to 1 teaspoonful three times a day.

Peronin is a valuable remedy to relieve the cough of laryngitis, bronchitis, and pertussis.

Dose: Three or four times a day as many milligrams [gr. $^{1}/_{60}$] as the age of the child in years.

℞ Decocti altheæ ..... 90.0 [ʒiiss].
Peronin (Merck) ..... 0.08 [gr. i$^{1}/_{4}$].
Syrupi altheæ .....ad 100.0 [ʒiij].
Sig.: One teaspoonful three times a day (for a child 4 years old).

Pertussin (extractum thymi saccharum, Täschner) is an effective remedy in pertussis, bronchitis, and laryngitis. Dose: 1 teaspoonful for a child 2 years of age; 2 teaspoonfuls for a child from 3 to 4 years old; 3 teaspoonfuls for a child from 5 to 10 years old; and 1 tablespoonful for a child from 11 to 15 years old.

Phenacetin [para-acetphenetidin] is a very efficient remedy in fever, neuralgia, rheumatism, headache, influenza (with pulvis Doveri), and pertussis. Dose: 0.05 [gr. $^{3}/_{4}$] for a child 1 year old; 0.08 [gr. j] for a child from 2 to 3 years old; 0.15 [gr. iiss] for a child from 4 to 5 years old; 0.2 [gr. iij] to 0.25 [gr. iv] for a child from 6 to 8 years old; 0.3 [gr. v] to 0.5 [gr. viij] for a child from 9 to 14 years old.

[℞ Phenacetini ..... 1.5 (gr. xxiv).
Codeinæ sulphatis ..... 0.016 (gr. $^{1}/_{4}$).
Caffeinæ natrii benzoatis ..... 0.3 (gr. iv).
Olei sacchari anisati..... 1.0 (gr. xvj).
Ft. pulv. no. viij.
Sig.: One powder every four to six hours for a child 8 years old.—Sheffield.]

Phosphorus is a well-tried remedy in rachitis and all manifestations associated with it. Dose: 0.0005 [gr. $^{1}/_{128}$] once or twice a day.

℞ Phosphori ..... 0.01 [gr. 1/6].
Olei morrhuæ .....ad 100.0 [℥iij].

Sig.: One teaspoonful once or twice a day.

℞ Phosphori ..... 0.01 [gr. 1/6].
Olei amygdalæ dulcis .....ad 10.0 [3ij].

Sig.: Ten drops morning and night.

℞ Phosphori ..... 0.01 [gr. 1/6].
Lipanin ..... 30.0 [℥j].
Syrupi simplicis,
Pulveris acaciæ .....aa 15.0 [3iv].
Aquæ destillatæ .....ad 100.0 [℥iij].

Sig.: One teaspoonful once or twice a day.

[*Tinctura Phosphori (Thompson).*—Dose: 3 to 10 drops twice a day.—SHEFFIELD.]

Physostigma.—[A depresso-motor.]

Extractum Physostigmatis Fluidum is employed subcutaneously in trismus s. tetanus neonatorum. Dose: 1 syringeful of a solution of 0.05 to 10.0 [*m* 3/4 to 3iiss] of water, three times a day.

Pilocarpinæ Hydrochloras.—Active diaphoretic; but should be used with caution (only in patients with normal heart action), as it is apt to cause collapse.

In nephritis, ascites, etc., it is usually employed hypodermically in the following doses:—

Child	1	to	2	years old,	0.0005	[gr. 1/128]	*pro dosi;*	0.001	[gr. 1/64]	*pro die.*
"	3	"	4	"	0.001	[gr. 1/64]	"	0.003	[gr. 1/20]	"
"	5	"	10	"	0.003	[gr. 1/20]	"	0.01	[gr. 1/6]	"
"	11	"	14	"	0 005	[gr. 1/12]	"	0.02	[gr. 1/3]	"
"	15	"	17	"	0.01	[gr. 1/6]	"	0.03	[gr. 1/2]	"

After the injection the patient is rolled in warm blankets and given copious draughts of warm milk and tea.

Pilocarpin may also be administered by mouth.

Pix Liquida (Tar) is useful in skin diseases, such as eczema, etc.

℞ Olei cadini,
Olei olivæ .....aa 5.0 [*m*lxxv].
Lanolini ..... 50.0 [3xij].

(Biedert.)

℞ Olei cadini ..... 5.0 [*m*lxxv].
Olei olivæ .....10.0 to 15.0 [ʒiiss-iv].

Plumbi Acetas.—Internally in powder form or solution it is administered in hemorrhage from the bowels (typhoid and dysentery), kidneys (*e.g.*, scarlatinal nephritis), and lungs. Dose: 0.003 to 0.05 [gr. $^1/_{20}$-$^3/_4$] every two to three hours. Also as an enema (0.2 to 100.0 [gr. iij-ʒiij]) in dysentery. Externally it is employed as a compress ($^1/_4$ to $^1/_2$ per cent.) in conjunctivitis or as collyrium (1 to 3 drops of a 1-per-cent. solution).

℞ Plumbi acetatis ..... 100.0 [ʒiij].
Sig.: One tablespoonful to a quart of water, as a lotion in eczema.

[*Liquor Plumbi Subacetatis (Goulard's Extract)* is a favorite external application in cases of sprains or bruises as well as in superficial inflammation. It is generally employed in diluted form.—Sheffield.]

Potassium Preparations.—*Potassii Acetas.*—Good diuretic—*e.g.*, in nephritis, pleuritis, etc. [Dose: 0.2 to 0.3 (gr. iii-v).] It is also combined with digitalis or decoctum cinchonæ.

℞ Potassii acetatis .....2.0 to 3.0 [gr. xxx-xlv].
Syrupi simplicis ..... 15.0 [ʒss].
Aquæ destillatæ .....ad 100.0 [ʒiij].
Sig.: One dessert-spoonful every two hours.

℞ Infusi herb. digital. .....0.3-0.5 to 80.0 [gr. v-viij to ʒiiss].
Potassii acetatis .....2.0 to 3.0 [gr. xxx-xlv].
Syrupi simplicis .....ad 100.0 [ʒiij].

℞ Decocti cort. cinch.....5.0-8.0 to 80.0 [ʒi-ij to ʒiiss].
Potassii acetatis .....2.0 to 3.0 [gr. xxx-xlv].
Syrupi corticis aurantii.....ad 100.0 [ʒiij].

Potassii Bitartras (Cream of Tartar).—Dose: As a diuretic, 0.03 to 0.5 [gr. $^1/_2$-viij] several times a day; as a laxative, 0.5 to 2.5 [gr. viii-xl] once or twice a day.

Potassii Chloras.—Internally [as well as externally] it is employed in stomatitis, angina, thrush, aphthæ, scarlatina, and cystitis.

Externally also in ozena. Dose: Internally, 1.0 [gr. xv] *pro die* for a child 1 year old, 1.5 to 2.0 [gr. xxii-xxx] for a child

from 2 to 3 years old, either in simple syrup or in decoctum cinchonæ [or in powders with sugar]; externally, in 1- to 4-per-cent. solution.

In stomatitis Monti irrigates the mouth with the following:—

℞ Potassii chloratis ..... 4.0 [3j].
Tincturæ myrrhæ ..... 3.0 [*m*xlv].
Aquæ destillatæ .....ad 200.0 [℥vj].

[*Potassii Iodidum.* See page 513.]

Potassii Permanganas is employed as a gargle and mouth-wash (0.1 per cent. to 0.2 per cent.), as a swab in thrush (0.5 per cent.), as an irrigation in vulvo-vaginitis (1 to 1000). [Internally it is recommended as an antidote in morphin poisoning. Dose: gr. j (0.06).—SHEFFIELD.]

[Protargol (silver proteid) is a very efficient nonirritating substitute for nitrate of silver. It is especially useful in the treatment of vulvo-vaginitis *(q.v.)* and gonorrheal ophthalmia *(q.v.)*. Dose: The average strength of solutions for gonorrhea is from $^1/_2$ to 1 per cent.; for eye diseases, $^1/_2$ to 5 per cent.—SHEFFIELD.]

Puro (Scholl).—Meat-juice obtained from raw meat. It contains 21 per cent. of natural egg-albumin. It is nutritious and readily digestible, and therefore indicated in anemia, rachitis, scrofula, and convalescence.

Quinin Preparations.—*Quininæ Sulphas and Hydrochloras* are specifics in malarial intermittent fever. They are also valuable in other fevers and in pertussis. Dosage: Three times a day as many decigrams [gr. iss] as the age of the child in years, and as many centigrams [gr. $^1/_6$] as the age of the child in months. Quinin is best administered in a warm solution of chocolate; it should never be given on an empty stomach. It is otherwise very rarely taken by children, owing to its bitter taste. The latter may also be disguised, by placing the quinin between two layers of scraped apple. It may be administered in the form of chocolate lozenges (à 0.1 [gr. iss]), suppositories (with 0.05 [gr. $^3/_4$], 0.1 [gr. iss], 0.2 [gr. iij], 0.3 [gr. v], 0.4 [gr. vj], 0.5 [gr. viiss] of quinin sulphate or bisulphate), or in the form of *euquinin*. The latter preparation is a very valuable

substitute for quinin sulphate; it has the same effect as the sulphate, particularly in pertussis, malaria, and influenza,—in which diseases it is employed with very good results,—and is free from its disagreeable qualities. It is odorless and tasteless, and is reported not to derange the stomach or intestines. Dose, the same as for quinin sulphate.

Quinin may also be administered by enema [see page 472] —*e.g.*, in typhoid fever:—

℞ Quininæ muriatis .....0.25 to 0.5 [gr. iv-viij].
Aquæ destillatæ ..... 40.0 [3x].
Pulveris acaciæ ..... 10.0 [3iiss].

Sig.: As an enema.

Quininæ Tannas, which consists of one-third quinin and two-thirds tannin, is more palatable than the sulphate, and therefore frequently prescribed in pertussis and in fevers associated with intestinal diseases (sometimes in conjunction with pulvis Doveri) and in nephritis. Dose: 0.1 [gr. iss] for a child a few months old, 0.25 [gr. iv] for a child 1 year old, 0.3 [gr. v], for a child 2 years old, etc.

As a roborant in anemia, chlorosis, and convalescence, etc., quinin may be given in pill [or capsule] form:—

℞ Quininæ muriatis ..... 2.0 [3ss].
Ferri lactatis ..... 5.0 [gr. lxxv].
Succi glycyrrhizæ, q. s. ut ft. pil. [or capsules] no. c.

Sig.: Three to five pills [or capsules] daily.

For the same purposes, as well as for debility,—particularly if associated with impaired digestion,—the *tinctura cinchonæ composita* is advantageously prescribed, either alone or in combination with equal parts of tinctura rhei aromatica, from 10 to 20 drops three times a day, or with dilute hydrochloric acid, 5 drops every three hours for children a few months old, and larger doses for older children:—

℞ Acidi hydrochlorici diluti ..... 1.0 [gtt. xv].
Tincturæ cinchonæ compositæ..... 9.0 [3ij].

Sig.: From fifteen to twenty drops [in sweet wine, well diluted].

℞ Decocti corticis cinchonæ.....5.0-10.0 to 75.0 [3i-ij to ℥ij].
Acidi muriatici diluti.....0.3 to 0.5 [gtt. v-viij].
Spiritus ætheris nitrosi.....1.5 to 3.0 [*m*xx-xl].
Syrupi corticis aurantii..... 20.0 [3v].

Sig.: One teaspoonful to dessert-spoonful every two hours.

[In cases of malarial fever associated with gastric irritability it is best to use quinin hypodermically. *Quinin and urea hydrochlorate,* being freely soluble in water, is particularly adopted for this purpose. Dose: gr. ss-ij (0.03 to 0.133).—SHEFFIELD.]

Resorcin [meta-dihydroxy-benzene] administered internally is effective in checking abnormal processes of fermentation in the stomach and intestine (0.25 to 0.5 [gr. iv-viij] to 100.0 [℥iij], in teaspoonful doses).

Henoch prescribes in dyspepsia of nurslings:—

℞ Resorcini ..... 0.25 [gr. iv].
Infusi chamomillæ ..... 80.0 [℥iiss].
Tincturæ thebaicæ ..... gtt. ii-vj.
Syrupi cinnamomi ..... 15.0 [3iv].

Sig.: One teaspoonful every two hours.

Externally in 1- to 2-per-cent. solution it is employed to paint the throat in pertussis [and scarlatinal angina], as an instillation in ozena, and as a local application in skin diseases:—

℞ Resorcini ..... 1.0 [gr. xv].
Zinci oxidi,
Amyli .....aa 2.5 [gr. xl].
Vaselini ..... 10.0 [3iiss].

M. et ft. past.

℞ Resorcini .....3.0 to 5.0 [gr. xlv-lxx].
Vaselini,
Lanolini .....aa 10.0 [3iiss].

M. et ft. ungt.

Rheum [Rhubarb].—In small doses it is a good stomachic, in larger doses a purgative.

℞ Infusi radicis rhei.....1.0-3.0 to 80.0 [gr. xv-xxx to ℥iiss].
Potassii tartratis .....3.0 to 6.0 [gr. xv-xxx].
Syrupi corticis aurantii.....ad 100.0 [℥iij].

Sig.: One teaspoonful every two hours (stomachic).

℞ Infusi radicis rhei.....3.0-6.0 to 80.0 [gr. xlv-3iss to ℥iiss].
Potassii tartratis .....3.0 to 6.0 [gr. xlv-3iss].
Syrupi corticis aurantii.....ad 100.0 [℥iij].
Sig.: One teaspoonful every two hours (purgative).

[*Syrupus Rhei.*—Dose: 3ss-j (2.0 to 4.0).
Syrupus Rhei Aromaticus.—Dose: 3ss-j (2.0 to 4.0).
Mistura Rhei et Sodæ.—Dose: 3ss-ij (2.0 to 8.0).
Pulvis Rhei Compositus.—Dose: gr. v-x (0.3 to 0.6).—SHEFFIELD.]

Salol [phenol salicylate] is administered in rheumatism, cystitis [and gastro-intestinal disturbances].

Dose: 0.2 to 0.4 [gr. iii-vj] for a child from 2 to 4 years old.
0.5 to 0.75 [gr. viii-xij] for a child from 5 to 12 years old.
0.75 to 1.0 [gr. xii-xv] for a child from 13 to 15 years old.

[The doses given by the author are too large; half the quantities will do for ordinary medicinal purposes.—SHEFFIELD.]

Externally salol is employed as an insufflation in ozena:—

℞ Salolis ..... 6.0 [3iss].
Acidi borici ..... 3.0 [gr. xlv].
Acidi salicylici ..... 0.6 [gr. x].
Thymol ..... 0.3 [gr. v].
Talci ..... 10.0 [3iiss].

Salophen [acetyl-para-amidophenol salicylate] usually acts promptly [in influenza, neuralgia, and rheumatism] and is well tolerated. Drews recommends it also in chorea rheumatica. Dose: 0.15 [gr. iiss] three times a day for a child from 2 to 3 years old; 0.25 [gr. iv] for a child from 4 to 5 years old; 0.3 to 0.5 [gr. v-viij] for a child from 6 to 10 years old; 0.75 to 1.0 [gr. xii-xv] for a child from 11 to 15 years old.

Sanguinal is obtained from defibrinated blood. It acts well as a tonic and roborant in anemia, rachitis, scrofula, and all forms of debility. It is also manufactured in the form of pills with creosote and guaiacol carbonate, both of which are deserving of recommendation in scrofula and tuberculosis.

Santonin acts promptly in ascaris and oxyuris. Dose: 0.01 to 0.15 [gr. $^1/_6$-iiss] for children of from 1 to 15 years of

age. It is usually given on three successive evenings, preceded and followed—on the fourth day—by a purgative. It is still better to combine the santonin with equal parts of calomel or dissolve it in castor-oil. Santonin is readily taken by children in the form of "worm-candies"—*i.e.*, trochisci santonini (usually containing 0.025 [gr. ss]). Santonin usually stains the urine yellow and sometimes renders vision yellow. In too large doses it causes vomiting, urticaria, retention of urine, more rarely coma and convulsions. In oxyuris santonin may be administered by rectum (0.1 to 0.2 [gr. iss-iij], and in pruritus ani also in the form of suppositories:—

℞ Santonini .....0.02 to 0.2 [gr. $^1/_3$-iij].
Olei theobromatis ..... 1.0 [gr. xv].

Sig.: To be introduced in the rectum in the evening and followed by an enema the next morning.

[**Scilla (Squill).**—Expectorant and diuretic.

Oxymel Scillæ.—Dose: Gtt. v-x.

Syrupus Scillæ Compositus.—Dose: gtt. ii-x.—Sheffield.]

Senega.—Expectorant. It is usually combined with althea, liquor ammonii anisatus, tinctura opii benzoica, etc.

[*Extractum Senegæ Fluidum.*—Dose: gtt. ss-ij.

Syrupus Senegæ.—Dose: gtt. v-x.—Sheffield.]

Senna.—Effective laxative.

℞ Electuarii e senna..... 25.0 [℥vj].
Aquæ destillatæ ..... 100.0 [℥iij].
Acidi tartarici ..... 1.2 [gr. xviij].
Sacchari albi ..... 10.0 [℥iiss].

Sig.: One dessert-spoonful every two hours.

Infusum Sennæ Compositum.—Dose: 1 teaspoonful every two hours.

Sirolin is a palatable and easily absorbable fluid. One teaspoonful of sirolin contains 0.4 [gr. vj] of thiocol in perfect solution. It is a very opportune remedy in the treatment of tuberculosis. Dose: 1 to 2 teaspoonfuls daily.

Sodium Preparations.—*Sodii Benzoas.*—Internally is employed in thrush (1.0 to 100.0 [gr. xv to ℥iij], 1 teaspoonful

every two hours), in vomiting or diarrhea resulting from fermentative processes (3.0-5.0 to 100.0 [gr. xlv-lxxv to ℥iij]). [Various experiments made with it proved its value as an antiseptic, antipyretic, antirheumatic, diaphoretic, diuretic, and expectorant. Sodium benzoate is therefore the ideal remedy in the treatment of influenza.—SHEFFIELD.] Externally it is often prescribed as a mouthwash (1 to 2 per cent.) in aphthæ and as a gargle (5 to 10 per cent.) in diphtheria.

Sodii Boras is employed as a mouthwash (4-per-cent. solution) in stomatitis, soor, aphthæ, etc., and as an eyewash (3-per-cent. solution) in conjunctivitis, etc. Also as an inhalation (1 per cent.) in laryngitis.

Sodii Bicarbonas is frequently given in gastric catarrh with hyperacidity:—

℞ Sodii bicarbonatis .....1.0 to 5.0 [gr. xv-lxxv].
Tincturæ rhei .....5.0 to 10.0 [3i-ij].
Syrupi simplicis ..... 15.0 [℥ss].
Aquæ destillatæ .....ad 100.0 [℥iij].
Sig.: One teaspoonful every two hours.

Also in catarrh of the respiratory and genito-urinary organs (with sodium salicylate). The author always adds sodium bicarbonate whenever he prescribes sodium salicylate or potassium iodid. It renders these remedies more tolerable. Externally sodium bicarbonate forms a good dusting powder in burns, and a useful inhalant (1 per cent.) in laryngitis.

Sodii Salicylas.—Antipyretic and antirheumatic. It acts well in influenza, pertussis (combined with sodium bromid and sodium bicarbonate), cystitis, pleuritis [tonsillitis], and diabetes. It is usually prescribed in solution, with aqua menthæ or syrupus corticis aurantii.

Dose: *Pro die,* 0.5 to 1.0 [gr. viii to xv] for a child 1 year old; 2.0 [3ss] for a child from 2 to 3 years old; 3.0 [gr. xlv] for a child from 4 to 6 years old; 4.0 [3j] for a child from 7 to 12 years old; 5.0 [gr. lxxv] for older children.

Somatose.—Excellent nutrient preparation obtained from the albuminoids of flesh [" 5 parts of somatose represent 30 parts of beef in nutritive value"—Coblenz]. It has proved extremely efficient in the treatment of anemia, scrofula, rachitis,

and convalescence and in diverse forms of debility. It is readily taken by children.

[Dose: 1 to 2 level teaspoonfuls daily, shortly before meals, in water, milk, gruel, cocoa, etc.—SHEFFIELD.]

Sozoiodol Preparations.—*Sodii Sozoiodol.* is employed chiefly as an insufflation in diphtheria:—

℞ Sodii sozoiodol. .....2.0 to 6.0 [3ss-iss].
Sulphuris sublimati ..... 6.0 [3iss].

Sig.: As an insufflation, in the throat and nose every two hours (for a child of from 2 to 4 years of age).

Potassii Sozoiodol. is employed in intertrigo (in 5- to 10-per-cent. ointment or dusting powder); for irrigations of the ear (in 2-per-cent. solution); in ozena and otorrhea (in powder form with equal parts of talcum).

Hydrargyri Sozoiodol. is recommended in intertrigo, eczema narium, etc. (in 1-per-cent. ointment); as an insufflation in pharyngitis sicca and hypertrophic rhinitis (1-5 to 20 parts of talcum); as an eyewash in eye diseases (5- to 6-per-cent. solution); in blepharitis and eczema of the lids ($^1/_2$- to 2-per-cent. ointment). For the latter conditions sodium sozoiodolate ($2\,^1/_2$ to 5 per cent.) may be employed.

Strophanthus. — [Cardiac stimulant.] Valuable *succedaneum* for digitalis.

Tinctura Strophanthi.—Dose: $^1/_2$ to 1 drop for a child under 3 years of age; 2 drops for a child from 3 to 6 years; 3 to 8 drops for older children. The dose should be gradually increased and may be repeated three times a day. It may also be prescribed in the following combination:—

℞ Tincturæ strophanthi ..... 5.0 [3j].
Tincturæ cinchonæ compositæ..... 10.0 [3iiss].

Sig.: From three to fifteen drops three times a day.

Strychnina.—[Powerful excitomotor, cardiac, and respiratory stimulant.]

Strychninæ Nitras [*and Sulphas*] are generally employed hypodermically in paralysis (especially diphtheritic), enuresis, prolapsus ani (injected around the anus) [and pneumonia and cardiac and general debility]. Dose: 0.0005 to 0.001 or 0.002

[gr. $^1/_{128}$ to $^1/_{64}$ or $^1/_{32}$] once or twice a day in gradually increased doses.

℞ Strychninæ nitratis ..... 0.01 [gr. $^1/_6$].
Aquæ destillatæ ..... 10.0 [3iiss].

Sig.: For hypodermic use, beginning with $^1/_{10}$ syringeful and gradually increasing to a whole syringeful.

[It is perfectly safe to administer from $^1/_{100}$ to $^1/_{50}$ grain of strychnin sulphate or nitrate every three to six hours in cases requiring active stimulation.—SHEFFIELD.]

[*Extractum Nucis Vomicæ.*—Dose: gtt. $^1/_{10}$-j.

Tinctura Nucis Vomicæ.—Dose: gtt. ss-v.

Both of these preparations are very useful as a general tonic and stomachic.—SHEFFIELD.]

Styrax [prepared storax] is useful in scabies (should not be used in the presence of kidney disease!).

℞ Styracis liquidi,
Olei olivæ .....aa 25.0.

Sig.: To be applied at night and washed off the next morning with soap and water.

Sulphonal [diethyl sulphon-methyl-methane] is a safe hypnotic. [It is indicated in simple insomnia and in sleeplessness accompanying mental and nervous diseases attended with excitement and delirium.—SHEFFIELD.]

Dose: 0.1 to 0.5 [gr. iss-viij].

[℞ Sulphonal ..... gr. iij [0.2].
Sodii bromidi ..... gr. v [0.3].
Spiritus ammoniæ aromatici..... gtt. v.
Elixirii simplicis ..... 3ij [8.0].

Sig.: This dose may be repeated every three to six hours according to indications (for a child 6 years old).—SHEFFIELD.]

It may also be administered by rectum.

Sulphur is used chiefly in skin diseases.

℞ Sulphuris præcipitati,
Glycerini,
Alcoholis .....aa 10.0 [3iiss].

Sig.: To be applied in the evening (in acne).

Also in combination with betanaphthol in acne, scabies, prurigo, favus, psoriasis, and ichthyosis:—

℞ Sulphuris præcipitati ..... 50.0 [3xij].
Betanaphthol ..... 10.0 [3iiss].
Vaselini,
Saponis viridis .....aa 25.0 [3vj].

Sig.: Apply a thick layer and wipe it off after from fifteen to twenty minutes (followed by powdering).

The following combination is very useful in alopecia:—

[℞ Resorcini ..... 3ss (2.0).
Sulphuris præcipitati ..... 3ij (8.0).
Tincturæ cantharidis ..... 3ij (8.0).
Olei ricini ..... 3ij (8.0).
Alcoholis absoluti ..... ℥iv (120.0).
Olei myrciæ ..... gtt. v.

Sig.: Rub into the scalp once a day.—Shefield.]

Tamarindus.—[Enters into the official confectio sennæ.]

Essentia Tamarindi (Dallman) is a good laxative in habitual constipation. Dose: 1 teaspoonful three times a day.

Tannin Preparations.—The new tannin preparations are at present frequently used in the treatment of diseases of children. They are distinguished by palatability and odorlessuess and by the fact that they are not dissolved in the stomach, but are slowly split up into their components in the intestine. They all act promptly in intestinal catarrhs, especially in the subacute and chronic varieties, in typhoid, cholera nostras, tuberculous intestinal affections, etc.

Tannigen, diacetyltannin, contains 50 per cent. of tannin.

Tannalbin, tannin albuminate, contains 50 per cent. of tannin.

Tannopin s. Tannon is a condensation product of tannin 87 per cent. and urotropin.

Tanocol, a combination of tannin and calcium.

Tannoform, a condensation product of tannin and formalin.

The dose is alike in all the tannin preparations. As long as the diarrhea is severe, it should be given every two hours: 0.1 [gr. iss] for a child under 6 months; 0.15 [gr. iiss] for a

child over 6 months; 0.25 [gr. iv] for a child from 2 to 4 years; 0.4 [gr. vj] for a child from 6 to 8 years; 0.5 [gr. viij] for a child from 9 to 14 years old. After improvement has set in the same dose should be administered three times a day. In acute conditions either of the tannin preparations may at first be combined with calomel. They may be continued for a long time without bad after-effects. Tannoform is also advantageously used externally in eczema, intertrigo, gangrene, decubitus, hyperidrosis, either as a dusting powder (4 or 5 parts of talcum) or ointment:—

℞ Tannoformi ..... 3.0 [gr. xlv].
Vaselini ..... 10.0 [3iiss].
Lanolini ..... 20.0 [3v].

Terpini Hydras. — Useful expectorant in catarrhs of the air-passages and pertussis.

Dose: 0.1 [gr. iss] for a child 1 year old; 0.15 [gr. iiss] for a child 2 years old; 0.2 [gr. iij] for a child 3 years old; 0.25 [gr. iv] for a child 4 years old; 0.3 [gr. v] for a child from 5 to 7 years old; 0.4 [gr. vj] for a child from 8 to 10 years old; 0.5 [gr. viij] for older children. The dose may be repeated every three hours.

[**Theocin** (di-methyl-xanthin) is a powerful diuretic; its main field of usefulness is in edema of cardiac affections, also in other forms of dropsy, in which rapid diuresis is called for. Dose: 0.05 to 0.2 (gr. $^3/_4$-iij) three times a day.—SHEFFIELD.]

Thiocol.—A guaiacol preparation, soluble in water, readily assimilable, and comparatively innocuous. It has proved very beneficial in the treatment of pulmonary tuberculosis. It may be prescribed in powder form (gr. i-iv) or, preferably, in solution with syrup—sirolin *(q.v.)*.

Thioform has been recommended as a local application in chronic rhinitis:—

℞ Thioform,
Sacchari lactis .....aa 10.0 [3iiss].

Thiol.—*Succedaneum* for ichthyol; does not smell as bad, and acts promptly. Its indications are the same as for ichthyol: eczema, erysipelas, combustio, epididymitis, herpes, etc.

℞ Thiol ..... 5.0 [*m*lxxv].
Adipis ..... 45.0 [3xij].
Sig.: Externally.

℞ Pulveris thiol ..... 5.0 [gr. lxxv].
Amyli ..... 20.0 [3v].
Talci ..... 5.0 [3j].
Sig.: Externally.

Thyroid Gland Preparations.—*Iodothyrin, Thyraden,* etc., are at present frequently employed in the treatment of diseases of children. They often prove very effective not only in struma and psoriasis, but also in infantile myxedema, dwarfism, cretinism, and idiocy. The dose should be gradually increased from $^1/_2$ tablet *pro die* to 3 or 4 tablets. Caution should, however, be exercised in their administration.

[**Tricresol** (ortho-, meta-, and para- cresol) is an efficient antiseptic. It is recommended as an antiseptic for collyria (1 to 1000 of water) and as an inhalation ($^1/_4$-per-cent. solution).]

Trional [diethyl-sulphon-methyl-ethyl-methan] is a prompt hypnotic very valuable in chorea, *pavor nocturnus* [and other conditions associated with marked restlessness]. [Dose: as many grains (0.06) as the age of the child in years. It should be administered in warm fluids. It may also be given by rectum. —Sheffield.]

Urethan. — Hypnotic; it is recommended especially by Demme. Dose: 0.05 [gr. $^3/_4$] to 0.3 [gr. v], according to the age of the child, in sugar-water, two or three times a day; also by rectum—*e.g.,* in eclampsia.

Uropherin *(theobromin and lithium benzoate)* is indicated in uric acid diathesis and as a diuretic in cardiac disturbances.

℞ Uropherini ..... 10.0 [3iiss].
Aquæ destillatæ ..... 100.0 [℥iij].
Sig.: One dessert-spoonful three to five times a day.

Urotropin *(hexamethylene tetramine formalin)* is frequently employed as a uric acid solvent, diuretic, and urinary antiseptic (cystitis) [also as an intestinal antiseptic—*e.g.,* in typhoid fever].

℞ Urotropini .....2.0 to 4.0 [3ss-j].
Aquæ destillatæ ..... 100.0 [℥iij].

Sig.: One teaspoonful to one dessert-spoonful two or three times a day.

Uva Ursi.—The leaves of uva ursi are extensively used in cystitis, either in the form of an *infusion* (1 dessert-spoonful to a large cupful of water; to be boiled for fifteen minutes) or in the form of *decoctum folii uvæ ursi* (5.0 to 100.0 [3iss to ℥iij]). Dose: One dessert-spoonful every hour.

[*Extractum Uvæ Ursi.* Dose: gtt. v-xv.]

Valeriana.—[Powerful carminative, circulatory stimulant, and antispasmodic.]

Tinctura Valerianæ Ætherea [or *Ammoniata*] is employed as an antinervosum—*e.g.*, in hysteria and nervous vomiting. Dose: From 10 to 15 drops three times a day.

[**Veronal** (diethylmalonylurea) is a safe and prompt hypnotic in most varied forms of insomnia. It is best administered in warm water, weak tea, or milk. Dose: gr. i-ij for a child 4 years old.—SHEFFIELD.]

Xeroform [tribromphenol bismuth] is a *succedaneum* for iodoform in wounds, etc. It is frequently used in eczema, either in the form of a powder or 5-per-cent. ointment; also in faulty healing of the umbilicus. As an insufflation it is recommended in rhinitis and otitis scrofulosa, and in the form of a 5-per-cent. ointment in ophthalmoblennorrhea.

Zincum.—[Externally it acts as an astringent and antiphlogistic; internally it appears to be a depressant to the nervous and muscular systems.—SHEFFIELD.]

Zinci Oxidum is frequently used in eczema and intertrigo. In eczema Biedert prescribes the following combinations:—

℞ Zinci oxidi,
Hydrargyri ammoniati .....aa 1.0 [gr. xv].
Adipis ..... 10.0 [3iiss].
Olei amygdalæ dulcis..... 1.0 [3j].

℞ Zinci oxidi,
Acidi borici .....aa 1.0 to 2.0 [gr. xv-xxx].
Lanolini ..... 20.0 [3v].
Glycerini ..... 5.0 [3j].

The following two ointments, which are known as *"cooling ointments,"* are employed to relieve itching, *e.g.*, in urticaria, eczema, prurigo, varicella, etc.

℞ Adipis lanæ ..... 5.0 [3j].
Unguenti zinci benzoati ..... 10.0 [3iiss].
Aquæ rosæ ..... 20.0 [3v].
Mentholis ..... 1.0 [gr. xv].

℞ Lanolini ..... 5.0 [3j].
Unguenti zinci benzoati,
Liquoris plumbi subacetatis.....aa 10.0 [3iiss].

In intertrigo:—

℞ Zinci oxidi .....5.0 to 10.0 [3i-iiss].
Olei rusci .....1.0 to 2.0 [*m*xv-xxx].
Vaselini,
Lanolini .....aa ad 100.0 [℥iij].
(Baginsky).

℞ Zinci oxidi ..... 5.0 [3j].
Acidi salicylici,
Acidi borici .....aa 0.5 [gr. viij].
Talci,
Magnesiæ .....aa q. s. ad 50.0 [3xij].

Sig.: To be used as a dusting powder.

Zinc oxid may also be combined with equal parts of starch and used as a dusting powder.

Internally zinc oxid is employed as an antispasmodic in epilepsy, eclampsia, pertussis, etc. Dose: 0.01 to 0.05 [gr. $^1/_6$-$^3/_4$] in powders three times a day; it may also be combined with lactate of iron.

Zinci Sulphas is employed *externally* in conjunctivitis (0.03-0.05 to 10.0 of water [gr. $^1/_2$-$^3/_4$ to 3iiss] 2 or 3 drops twice a day); in vulvo-vaginitis as an injection ($^1/_2$ to 1 per cent.); also in stomatitis, aphthæ, etc.; as a local application in obstinate coryza (a few drops of a 1-per-cent. solution).

Internally it sometimes acts favorably in chronic catarrh of the small intestine.

℞ Zinci sulphatis .....0.03 to 0.05 [gr. $^1/_2$-$^3/_4$].
Aquæ destillatæ ..... 100.0 [℥iij].

Sig.: One teaspoonful to 1 dessert-spoonful three times a day.

Zinci Valerianas.—Useful nervine and antispasmodic in hysteria, etc. Dose: 0.01 to 0.05 [gr. $^1/_6$-$^3/_4$].

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