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THE TREATMENT OF DISEASE IN CHILDREN

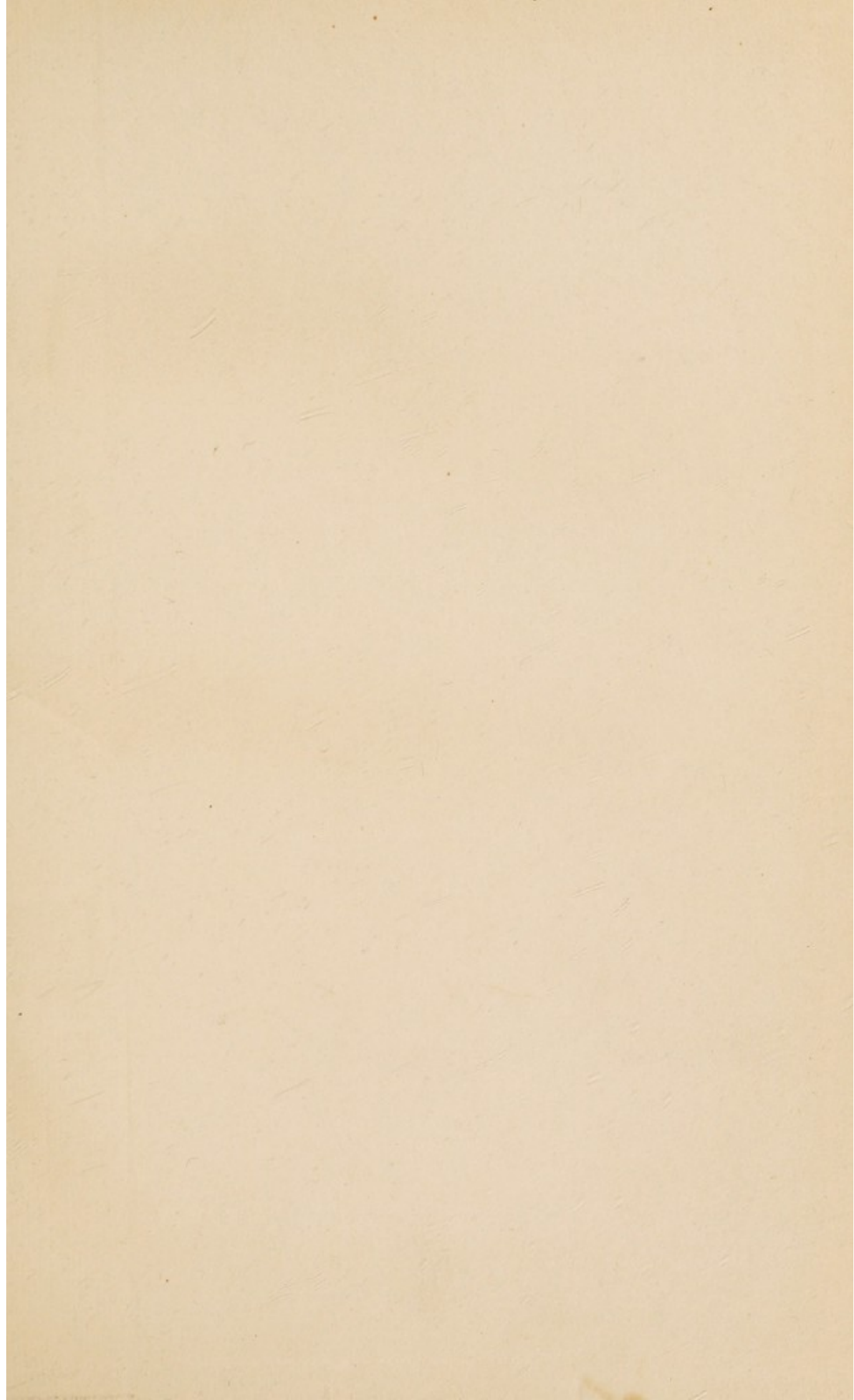
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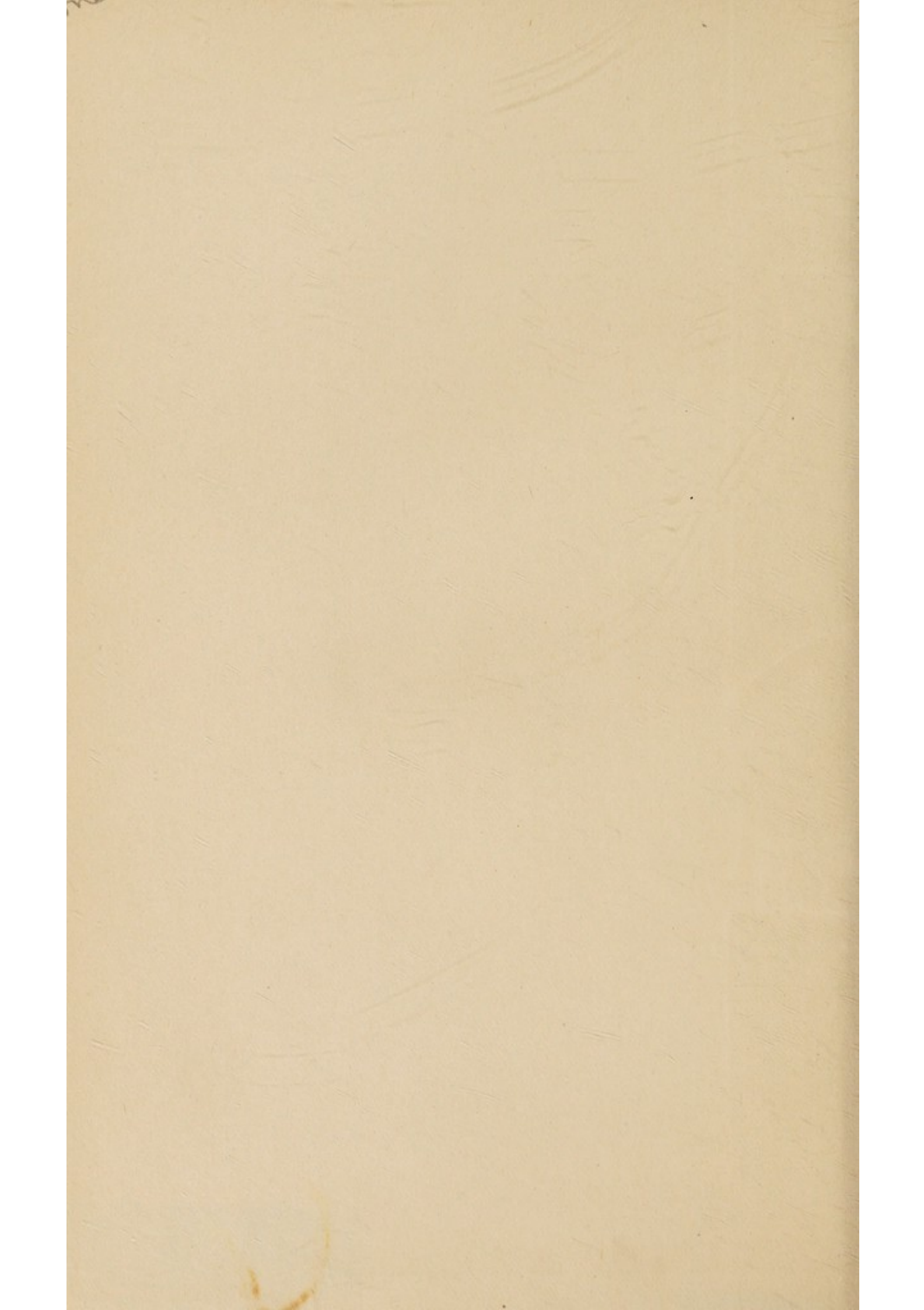
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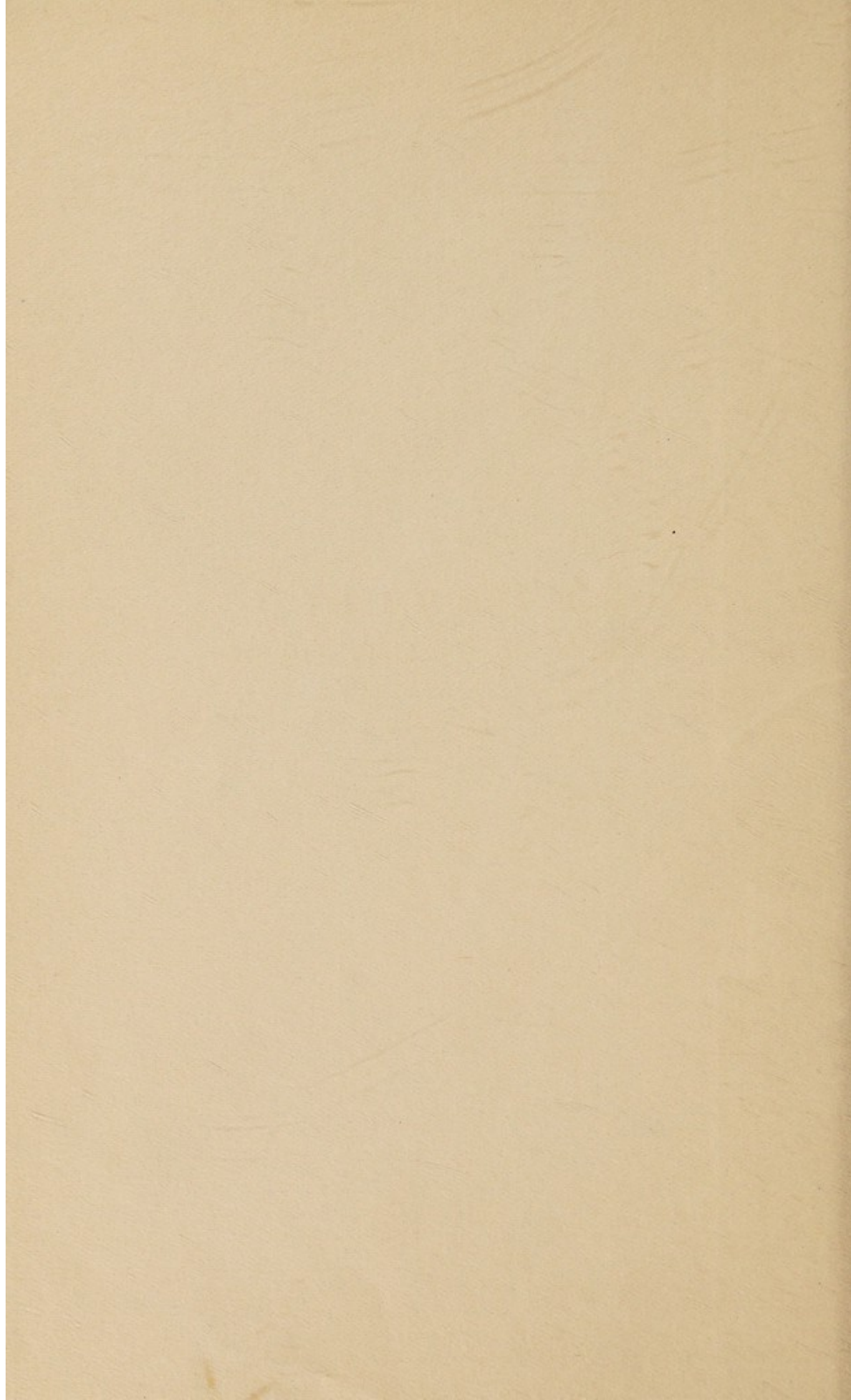






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THE TREATMENT OF DISEASE IN CHILDREN

BY

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PREFACE TO THE SECOND EDITION

IN this edition I have followed out the same plan as in the first, namely, to make the book a practical guide to the young practitioner in his treatment of the diseases of infancy and childhood. New sections have been added on the acute specific fevers and on diseases of the skin. New methods of treatment which have been personally tested, or which promise to be of permanent value, have been described. It has been considered desirable rather to give fully one definite line of treatment than to enumerate all the remedies which have been employed more or less successfully in the diseases discussed. The former method will at least provide the practitioner with some clear guidance, while the latter makes his treatment of the most haphazard character.

I am afraid that the leading feature of the first edition, namely its brevity, has gone. Some kindly critics have pointed out that many of the troublesome disorders and diseases of childhood were too briefly considered. This fault I have tried to correct without increasing unnecessarily the size of the book.

G. A. SUTHERLAND.

Wimpole Street, W.

November 1912.

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CHAPTER I

THE FEEDING OF INFANTS AND CHILDREN IN HEALTH

IF the method, reputed to be Chinese, of paying a medical adviser only while a patient enjoyed good health were carried out in this country in the case of infants, the result would probably be the saving of many lives and the raising of the standard of health in the community. As it is, the medical adviser is but too frequently called in only for the treatment of diseased conditions, while the general management of the infant, including the very important question of the diet, is entrusted to an ancient member of the family, or a hired nurse, or is based on the information supplied in the advertisement columns of the lay press, or in circulars. Before treating disease resulting from errors of diet it is necessary for a medical adviser to have a clear idea in his own mind of what the normal diet ought to be. He should be prepared to state what is the proper food, the method of its preparation, the frequency of feeding, the amount at each meal, etc., at any given age for a healthy child. He must also be prepared to modify these according to the effect produced in any given case, recognizing from the symptoms wherein the defect lies, and correcting it not by changing his tools, but by using them scientifically.

The best food for an infant during the first nine

months of its life is its mother's milk. A newly born infant should be put to the breast within a few hours, and afterwards at regular intervals. The quantity of nourishment at first may be small, but it is sufficient for the purpose until nature increases the supply. Thirst, rather than hunger, seems to be the want during the first few days, and a little plain water may be given to relieve this. Cows' milk, pieces of butter, castor oil, and all such substances are not called for, and may prove injurious. Suckling should be carried out regularly every two hours by day, and every four hours by night, until the child is three months old. After three months the infant may be fed every three hours by day, and once only during the night. The important things are regularity in the feeding-times and the avoidance of too frequent feeding. If the mother has not enough of milk, as judged by the failure of the infant to gain weight under proper rules of feeding, cows' milk may be given alternately with the breast, or as often as may be considered necessary. Loss of weight, or failure to gain weight steadily, and the cry of hunger after a breast-feed, are the chief indications that some additional nourishment is called for. Breast-feeding must not be stopped simply because the infant is not thriving. Women of certain types make bad nursing mothers. The milk of a nervous woman is apt to vary from time to time with the state of her nervous system, and this may lead not only to periodical disturbance in the infant, but even to progressive loss of weight. In such a case, if success is to be gained it is necessary for the mother to lead

an extremely quiet and retired existence, as far removed from mental and emotional excitements as possible. In all cases it will be found that devotion to the home-life, and to the care of the infant, is essential for the most successful nursing.

An examination of the infant may reveal evidence of constitutional or local disease, which is sufficient to explain the failure of nutrition, and which calls for treatment. Syphilis in an infant is no reason for weaning, but if the mother is herself healthy it is a strong reason for continuing the breast-milk, as the infant will probably require the most digestible food. Menstruation is not a reason for ceasing suckling, although, if it causes any disturbance in the child, cows' milk may be substituted during the periods. If pregnancy occurs, it is advisable to cease suckling at once, except during the hottest months of summer, when it may be carried on until the arrival of cooler weather removes the risks attending the adoption of cows' milk as the diet.

Wet-nursing is not a popular institution, owing to the many drawbacks attending its use. At the same time, in the case of an infant delicate at birth, and not thriving on artificial food, the great advantages of wet-nursing must be kept in mind. Sometimes, after a trial of artificial feeding without success, or for an infant debilitated by acute illness, the best method of treatment is by wet-nursing.

In the absence of breast-milk, artificial feeding must be carried out by means of cows' milk, suitably modified to make its composition resemble breast-milk as nearly as possible. Although the difficulties in connection with artificial feeding are numerous,

they are not so great as some people make out if only one can secure certain requisites. These are pure fresh milk, clean utensils, clean hands on the part of the nurse, regular feeding, and no over-feeding. In other words, if the food were always pure, and if the feeding were always properly carried out, there would be far less trouble in artificial feeding than at present exists.

The milk should be from a clean dairy farm, and should be delivered as soon as possible after the milking-time. The so-called nursery milk, which is believed to be from one cow, is not to be recommended, but rather the mixed milk of many cows. This is much more likely to be of a proper standard and to be free from tuberculous infection. A guarantee should be obtained from the dairy that the milk has not been pasteurized, or sterilized, or treated with preservatives, or altered in any other way. The milk should be delivered in air-tight bottles which have been sterilized before being used. Unboiled milk is probably the most nutritious form of diet, but if there is any doubt as to the purity of the milk, or any difficulty in keeping it fresh in the house, it should be boiled on delivery. The usual plan is to put the milk in a clean pan and bring it to the boil. This probably secures the object in view, but has the disadvantage of so altering the taste of the milk as to render it unpalatable for some infants. A better plan is to put the milk-containing pan into another containing water, and to bring the water to the boil. The boiling should be continued for five minutes, at the end of which time the milk will have been raised to the same tempera-

ture, and should be removed and cooled rapidly. The milk itself has not been boiled, because the boiling-point of milk is higher than that of water, and thus the change in the taste is not induced. The milk is then to be transferred to a clean glass vessel, fitted with a lid, or covered with fine muslin, or plugged with cotton wool, and placed in a cool place, for instance, the outside ledge of the window. In hot weather the milk should always be kept on ice.

Before being given to an infant, milk must be modified in order to bring the proportion of the solids as nearly as possible to that existing in breast-milk. At the same time it must be clearly understood that the chemical composition of the proteids, fats, and carbohydrates in cows' milk thus modified is not the same as in breast-milk.

The milk must be diluted with plain water or barley-water, so as to reduce the amount of proteid. For the first fortnight the dilution may be of the strength of milk to diluent as 1 : 3, and then up to the age of three months, 1 : 2. From the age of three to six months the strength may be 1 : 1, and from six to nine months, 2 : 1. Barley-water is the popular diluent, and acts well if properly prepared. The use of barley meal, or thick barley-water, is the cause of much indigestion, and it must be remembered that barley-water is not intended as a food, but merely as a bland diluent. It should be prepared as follows : A tablespoonful of pearl barley is washed and put in a saucepan with one pint of cold water. This is brought to the boil, and then allowed to simmer beside the fire for half an hour. The water is then strained off and used as required. Barley-water should

be prepared twice daily, as it does not keep well. Some infants seem to agree better with barley-water, and others with plain boiled water or lime-water.

Sugar has to be added to this diluted milk in order to bring it up to the standard. Sugar of milk is the best, in that it is the same as exists in breast-milk, but for common use it is too expensive. Extract of malt is composed of glucose and maltose, which are easily digested and absorbed by an infant. It has a marked sweetening power, and renders the milk very palatable. It will also convert any starch present, as when barley-water is added to the milk, and is believed to render the curd in the stomach less dense and indigestible. It has therefore many advantages, and is very suitable for common use. Cane sugar may also be employed, and although not so digestible as the other forms, it usually acts well, and it has the advantage of being very cheap. The amount of sweetening matter to be added will vary with the age of the infant and the degree of dilution, but for the first month the addition of half an ounce of sugar of milk or malt extract, or of three drachms of cane sugar to each fifteen ounces of milk as prepared for use, will be found sufficient.

The dilution of the milk renders the addition of some fatty material necessary. It is often advisable, however, to begin bottle-feeding without the addition of any extra cream, as the fatty material so frequently causes digestive disturbances. One can thus ascertain first of all whether the artificial food is going to be well tolerated by the infant, and can then add the fatty material in gradually increasing amounts as toleration is established. A pint

of good cows' milk will yield one and a half to two ounces of gravity cream. If we use seven ounces of milk diluted with twice its bulk of water, we have to add one ounce of cream to the mixture to bring the milk to the proper standard. If separated cream is used, half the quantity is required, as it usually contains twice as much fat as gravity cream. If the latter can be obtained fresh it is probably more digestible than the separated cream. Amongst the poorer classes fresh butter or cod-liver oil may be substituted for cream, as being cheaper. Only small quantities are required—one to two drachms *per diem* to begin with. Instead of adding the cream to the milk, one may give a certain number of cream-feeds in the day as follows: Gravity cream, half an ounce; malt extract, one drachm; barley-water, two and a half ounces. By this means there is a certain amount of variety introduced into the diet—the digestive organs are not all exercised in the same way after each meal, and it is possible to learn in the presence of digestive disturbances which element in the diet is at fault. If the cream-feed seems to cause less disturbance than the milk-feed, then it is probably the proteids, and not the fats, which are the cause of trouble.

The number of feeds in the twenty-four hours must be arranged according to the age of the infant, and the times fixed must be closely adhered to. It is very rarely that one meets with an infant who is not being fed often enough, while one is constantly coming across infants who are being fed much too frequently. The interval between meals should be long enough to allow of complete digestion and of emptying of the stomach, and of a period of rest for

the stomach. As a rule, during the first month of life these requirements will be met by feeding every two hours during a day of sixteen hours, *i. e.* from 7 a.m. till 11 p.m. It is beneficial for the child that during the night of eight hours only one feed should be given, at 3 a.m., thus giving two intervals of four hours for a little extra rest to the stomach. It is of extreme importance that the times of feeding, after having been fixed, should be rigidly adhered to. Habit is easily established—in the breast as regards the secretion of milk, and in the infant as regards the desire for food, and much trouble will be saved to mother and child by forming regular habits early. If the infant be asleep when the feeding-time comes, he should be wakened and fed. If he cries before feeding-time he is not to be fed, but an examination should be made as to other causes of discomfort, local or general. Wet clothes or cold feet may be the cause of disturbance. In hot weather more especially a common cause of crying is thirst, not hunger, and to relieve this plain water or barley-water may be given between meals.

The following table is given as a general guide regarding feeding-times—

NUMBER OF MEALS AND HOURS OF FEEDING FOR BREAST-OR BOTTLE-FED BABIES.

	By day (16 hours) Interval.	By night (8 hours) Interval.	Number of Meals in 24 hours.
Up to 3 months	2-2½ hrs.	4 hrs.	10-8
Between 3 and 6 months .	2½-3 „	4 „	8-7
Between 6 and 9 months .	3 „	8 „	6
Between 9 and 12 months .	3½-4 „	9 „	5

In the following table are given the amounts of food at a meal, and the proportion of milk and water in the mixture.

	At each Meal	Proportion of Milk and Water.
During 1st month	1-1½ ounces	1-3
„ 2nd „	2-3 „	1-2
„ 3rd „	3-4 „	1-2
„ 4th „	4-5 „	1-1
„ 5th „	4-5 „	2-1
„ 6th „	5-6 „	2-1
From 7th to 9th month . . .	6-7 „	3-1
„ 9th to 12th „ . . .	8-9 „	All Milk

In the next table are given the total quantities of food material in twenty-four hours :—

QUANTITIES OF FOOD MATERIAL IN TWENTY-FOUR HOURS.

	Milk (ounces).	Plain or Barley Water (ounces).	Gravity Cream (ounces).	Sugar or Malt Extract (ounces).
During 1st month .	3-6	10-15	½-2	½-1
„ 2nd „ .	6-8	12-16	2-2½	1-1½
„ 3rd „ .	8-10	16-20	2-3	1-1½
„ 4th „ .	10-15	10-15	2-3	1-1½
„ 5th „ .	15-20	7-10	2-3	1
„ 6th „ .	20-25	10-12	1-2	1
7th to 9th „ .	25-30	8-10	1-2	1
9th to 12th „ .	30-40	—	1-2	—

These tables are only to be regarded as approximate estimates, and not as definite standards for all infants.

If a child is prematurely born or small at birth it will not be able to digest as much food as a full-

time or big baby. Attention must always be paid to the capacity and digestive power of the individual stomach. Speaking generally the best guide as to these is the infant's appetite, which will usually indicate correctly the quantity of food at a meal and the proper frequency. Some infants take the breast very ravenously and take too much milk at a feed, so that the quality of the milk may be suspected when it is really the quantity taken which is wrong. This can be decided by weighing the infant before and after a meal, and if too much has been taken, the period of nursing may be limited to five or ten minutes. An infant should not be coaxed to take food, and it should not be allowed intervals during a meal. A quarter of an hour at the breast or bottle is sufficient time for a young infant, and if the attention flags, or the infant drops off to sleep, the meal should be ended. The habit of putting a bottle beside an infant and leaving it to be emptied when the baby pleases is quite wrong. Another point to be considered is the variation in the amount and quality of the food at different seasons. Less food is required during the hot months than in cold weather, as will be indicated also by the infant's appetite. Without diminishing the amount of fluid diluent, it will be found advisable to reduce in hot weather the amount of milk and cream as given above.

We have been dealing only with the feeding of healthy infants, and therefore have not considered the various substitute methods of feeding other than by cows' milk. Asses' milk and goats' milk may be used quite successfully, but there is only a

limited supply of them in this country. Laboratory milk, sterilized milk, and humanized milk have failed to establish their superiority over cows' milk as modified at home, and they possess many disadvantages. Predigested milk, tinned milk, and all the so-called "infants' foods," are in no sense of the term complete foods for infants, and they should be reserved for temporary use in the case of illness, under the supervision and control of the medical adviser. They are specially harmful when given to infants under the age of nine months.

Feeding after Nine Months of Age.—At the age of nine or ten months weaning should be commenced, and the process should be completed in from three to four weeks. In the hot months of the summer the suckling may be continued a little longer, as a certain amount of gastro-intestinal disturbance usually accompanies the weaning process, and the dangers of this are greater in hot weather. The amount of cows' milk for an infant between nine and twelve months is from one and a half to two pints. The latter is a maximum, and many infants will thrive better on the former. Dilution of the milk is not necessary. In addition one to two ounces of gravity cream may be given daily. Some solid food may be added in the shape of boiled bread, or porridge, or pudding. These additions must be small in quantity at first, and must not be given more than twice a day. The meals should not exceed five in number in the twenty-four hours. Spoon-feeding should be begun as soon as possible, but as regards that, and also the addition of solids, due deference must be paid to the infant's own

desires, which are sometimes very decided. At this age, and even at the age of six months, a few teaspoonfuls of orange-juice or grape-juice daily will be found to serve a useful purpose in the economy. Dr. Sim Wallace recommends that when the incisor teeth have been cut the infant should be given some fresh sugar-cane, or fruit, or a stale crust to bite and gnaw at. He has done good service in pointing out the faulty nature of a prolonged "pappy diet," and the early decay of the teeth which is apt to follow. Although some infants do not take early to biting, we believe that some such biting process is an excellent training for the thorough chewing that is so desirable later. It is not advisable to allow the use of a "soother," which is usually a repository for countless organisms, unless a hard one of bone or coral is used, which can be thoroughly cleaned and disinfected.

Between the Ages of Twelve and Eighteen Months the amount of solid food may be increased. The porridge may be made thicker and of coarser oatmeal. A little potato and gravy, or half an egg, may be given once a day. Soft bread and butter, or dripping, may be taken. Many children will take in addition two pints of milk in the day, and whatever solid extras are being given, the milk is still to be regarded as the essential part of the diet. After fifteen months the child should be fed every four hours, and there should be no night feeding, and no bottle feeding. Mastication has now been rendered possible by the eruption of the molar teeth, and should be encouraged by giving the child crisp toast, biscuits, and rusks at meal-times.

After the Age of Eighteen Months the child may be given once a day fat bacon, or chicken, or fish, or mutton. To begin with this may be pounded or minced, but as soon as the art of mastication has been acquired, there is no preliminary pulverizing required, and teeth, jaws, and nasopharynx will be more thoroughly developed by full masticatory efforts (Harry Campbell).

Between the Ages of Two and Five Years the diet may be still further extended. The following will indicate sufficiently the nature of the foods to be given—

1. *Breakfast*.—Porridge and milk, or bacon, or an egg. Cocoa and milk, or plain milk. Bread and butter, or toast and butter. Marmalade.

2. *Dinner*.—Fish, such as sole, whiting, haddock, or plaice. Mutton or beef, roast or boiled, hot or cold. Tripe, rabbit, chicken, pigeon.

Fresh vegetables, such as potatoes, cabbage, tomatoes, cauliflower, brussels sprouts, beans, onions.

Puddings, such as the plain milk puddings, jam roll, and suet, custard, or marmalade pudding. Some jam, or treacle, or stewed fruit, may be allowed with the puddings. Raw fruit such as apples, oranges, and bananas.

3. *Tea*.—Cocoa and milk, or plain milk. Plain biscuit, or cake. Bread and butter; jam. An egg occasionally.

4. *At Bedtime*.—Half a glass of milk, if desired.

In family life certain errors are apt to occur frequently in connection with this fuller dietary. Over-feeding is very common. As regards breakfast, one often finds that after porridge and milk comes

an egg or bacon. There should not be more than one solid course, and the rest of the meal should consist of a little bread and butter. At dinner there should not be more than two courses. Meals should not terminate with a fluid or semi-fluid mess of sweet-stuff, or the child will tend to eat too much of it. Things which are sweet and slide down easily must be strictly regulated in amount. If at the end of a meal—sufficient in quantity—the child is still hungry, a hard biscuit or a hard apple will usually suffice. A tendency to like certain foods and to dislike others must be checked. Some children will eat beef or mutton greedily and object to puddings, but a diet of this nature is too stimulating. Most children are very fond of bread and butter, and many partake of it to excess if they are allowed to. This tendency must be kept in check by carefully regulating the amount at a meal. A mixed diet, without too great a preponderance of any one form of food, is the best. A manifest dislike to the fat of beef or mutton, or butter, or cream, must be viewed with toleration, for it is a natural objection with some children, and if no forcing is used it will usually pass off as the child grows. Coaxing to take more food at meals should never be indulged in. One frequently hears of an hour being devoted to coaxing a child to eat his breakfast. Healthy children do not require coaxing, and loss of appetite is often Nature's method of securing a curative fast for some temporary disturbance. If with stomach and liver upset from too much food, coaxing to eat is employed, the result is simply an aggravation of the disturbance. It is a bad plan to have young children at the family

table. They are much better with their nurse in the nursery. At the family table there are many things which they should not eat, which they promptly demand, and which they too often get. Children should be encouraged to drink water, in moderation, with meals, and freely between meals. The food should be so ordered that there is always a sufficient amount of hard material at each meal to demand thorough mastication and slow eating. Tea and coffee should not to be given to young children.

After the age of five years a more varied dietary is allowed, but the youthful stomach should still be treated with respect, and no excess and nothing indigestible should be allowed.

CHAPTER II

DISEASES OF DIET

RICKETS—SCURVY

Rickets is one of the commonest diseases of early life. The symptoms may develop at any time from the sixth month to the fourth year, but the majority of cases come under observation between the ninth and twenty-fourth months of life. The term "a rickety child" is popularly applied to one with bony deformities, but although such lesions are common in rickets, they are by no means essential to the clinical picture of the disease. Rickets is to be regarded as a general disease which seems to diminish the resisting power of all the tissues of the body. This diminished resistance may be seen in one patient in the nervous system, as when convulsions occur; in another in the respiratory organs, as shown by bronchitis; in another in the osseous system, as shown by softening of the long bones; and in another in the integumentary system, as shown by the profuse sweating. The general conditions which call for treatment are diminished resisting power, weakness, and flabbiness. Anæmia is often present. The special affections of the various organs will be considered separately. The disease does not develop acutely, although certain symptoms may. The term "acute rickets" which was current for a time

has now fallen into disuse, it having been recognized that the condition so described was really scurvy.

The exact pathology of rickets is still unsettled, but certain factors in its production have been determined. As the result of improper diet, partly by excess, and partly by defect, a certain degree of gastro-intestinal indigestion is induced. This leads to the absorption into the system of certain toxins, either in the form of improperly digested food, or of the products of decomposition of the food; and the blood conveys these toxic products to all parts of the system.

The Preventive Treatment.—The special preventive treatment of rickets lies in the adoption of and persistence in a proper diet. This has already been fully discussed in connection with the feeding of infants. Custom, cheapness, advertisements, etc., have brought into common use many articles of food which are not suitable for infants, and which induce rickets when exclusively used.

The various forms of **condensed milk**, when diluted for use, are notoriously **deficient in fat**, and many of them contain an excess of sugar. This deficiency of cream is present in the best condensed milk, which is made from the whole milk, and is therefore much more marked in that made from separated or skimmed milk. There are other defects in connection with condensed milk, which render it unsuitable as a complete food for infants, but only its influence in inducing rickets need be considered here. The chemical analysis which is often attached to the various brands of condensed milk is misleading, because it shows the composition of

the milk when condensed, and not its composition when diluted for an infant's use. Hutchison quotes from Pearmain and Moore the following analysis of some of the best brands of condensed milk when diluted as recommended for the use of infants.

	Dilution recommended for Infants' Use.	Fat in such Products.
A	1 to 5	1·8 per cent.
B	1 „ 14	0·7 „
C	1 „ 14	0·6 „
D	1 „ 15	0·7 „
E	1 „ 14	0·8 „
F	1 „ 14	0·7 „
G	1 „ 14	0·7 „
Human Milk .	—	3·5 „

Both clinical experience and chemical analysis show that condensed milk, from its deficiency in fat, should not be used as the diet for an infant if rickets is to be prevented. Another factor in the production of rickets is the excessive amount of sugar which is present in many condensed milks. This makes a baby fat but not healthy, and is frequently the cause of gastro-intestinal indigestion. In all cases in which indigestion is present any tendency to rickets which arises from the nature of the diet will be much increased. Rickets will also be developed on other forms of milk in which the fatty element is deficient, such as separated milk, skimmed milk, and buttermilk. These also stand condemned as a complete diet for infants.

The **tinned starchy foods**, whether converted or unconverted, are largely responsible for the **production of rickets**. They are characterized

by a deficiency in fat and protein, and by an excess of carbohydrate material. In those in which the starch is unconverted there is the additional drawback that gastro-intestinal disturbance will probably be induced at an early stage, and the nutritive value of the food will be still further diminished. These "infants' foods" make fat, flabby children, but the fat is of an unhealthy character, and is quite different from the product of a diet rich in animal fat. The physiological needs of infants would be better met by a diminution in the use of "infants' foods," which might be prohibited entirely without any loss to the infantile population. If their use for infants under twelve months of age were allowed only under medical advice there would probably be a great fall in the infantile mortality from rickets in large cities. Other starchy foods, not of a proprietary nature, such as ground barley, arrowroot, and cornflour, are equally effective in the production of rickets, but they have rather fallen into disuse in the present day, having been replaced by the "infants' foods."

It is sometimes stated, as regards these foods, condensed milk and starchy preparations, that if deficiency of fat is the source of trouble, this can easily be remedied by adding some cream or butter. This, however, is not sufficient, and there are other drawbacks to such a system. One must recognize the tendencies of the female mind, and one of these is to regard any advertised food as possessing special virtues. The average mother has much more belief in a food that comes out of a tin, with a label extolling its good qualities, than in ordinary dairy milk.

She will naturally concentrate her attention on what she believes to be the important article of diet, and will tend to neglect the precautionary additions, of the value of which she knows nothing. Many of the proprietary foods are sold with instructions appended as to the addition of fresh cows' milk. One finds, however, as a matter of experience that as time goes on the amount of fresh milk is not increased, and is possibly lessened, while the amount of the patent food is steadily increased. In the preventive treatment of rickets it is not sufficient to give from a quarter to half a pint of cows' milk daily, along with some other food, but there must be a proper amount of fresh proteins and fats. Again, one constantly meets with cases in which some months previously a medical man had ordered condensed milk or some patent food for a temporary digestive disturbance, and this food had been continued until the symptoms of rickets led the mother to seek medical advice again. It is of the greatest importance that a time-limit should always be imposed in the case of such substitute feeding, lest its undue prolongation lead to the production of rickets.

The question is sometimes raised—and it is a very important one—as to whether an infant, nourished entirely at the breast, ever develops rickets. The answer must be in the affirmative, but with qualifications. If a healthy mother, with plenty of good milk, feeds her infant at regular intervals, and uses no other food whatever, we may safely assert that the infant will not become rickety during the normal period of lactation. The cases of rickets

in breast-fed infants in the writer's experience have occurred as follows : in some cases there has been too frequent feeding, which resulted in the production of a milk deficient in fat, and as regards the infant in gastro-intestinal catarrh. The milk being deficient in fat and the digestion being imperfect, the conditions for the development of rickets were present. In other cases an excessive amount of unconverted starch, either in the form of thick barley water, or of some proprietary food, was given to the infant in addition to the breast-milk. The disturbance of digestion which accompanies the use of improper food may render the assimilation of the best milk impossible. Again, lactation may have been carried on beyond the normal period, and the nutriment supplied has become deficient in fat. In some cases, from too frequent childbearing, the breast-milk after two or three months may be of such inferior quality that rickets develops. Dr. Cheadle has found that if a mother becomes pregnant while suckling, the *fœtus in utero* may flourish, but the infant at the breast may dwindle into a condition of rickets and marasmus. This he ascribes to the diversion of the nourishment from the breast to the fœtus. These exceptions in no way affect the general rule that sound breast-milk is the best food for infants.

In the case of infants over a year old, the same general causes, namely, a deficient amount of fat and an excessive amount of carbohydrate, must be avoided in the preventive treatment of rickets. Carbohydrates are cheap and easily prepared, when fatty foods are dear and are not in such common

use. Tea, bread, jam, potatoes, and perhaps a "penn'orth of milk" represent a common dietary for young children, and it is one specially conducive to rickets. Such a diet is so deficient in fats and proteins that its unsuitableness is at once apparent. These deficiencies must therefore be avoided.

The Curative Treatment.—We shall begin with an ordinary case of rickets in an infant of from twelve to eighteen months of age. The first and the most important thing is to restore the stomach and bowels to a healthy condition. A glance at the abdomen is sufficient proof of this. The typical abdomen of rickets is swollen and distended with air; the sides are bulging; the recti muscles are widely separated, and when the child strains the intestines are pushed forward between these muscles in a keel-like protrusion; and the stomach and bowels are dilated and atonic. Further evidences of gastro-intestinal catarrh are often present. The appetite is probably lost or capricious, vomiting occurs, and the motions are loose, frequent and offensive, and mixed with mucus. If a patient in this condition is treated with cream, cod-liver oil, and Parrish's syrup much sorrow and tribulation will follow. It is advisable to begin with simple, plain food in small quantities. A mixture of milk, lime water, and thin barley water in equal quantities is to be ordered, of which $4\frac{1}{2}$ oz. may be taken every three hours during the day. The aim at this time is not to feed up the child, but to rest the stomach and bowels, and allow them to recover their tone. After some days of this dietary, it may be less than a week, or more, according to the

conditions present, the strength of the food may be increased by giving equal parts of milk and lime-water, and later two parts of milk to one of lime water. If the signs of gastro-intestinal fermentation persist, it is advisable to stop all milk for a few days, and to give only mutton or chicken soup. The child is thus brought into a condition to digest and assimilate the full diet suitable for the disease.

Not only must the digestive organs be allowed to rest at the beginning of treatment, but they must also be thoroughly cleared of the fermenting material which is present. For this purpose nothing acts better than castor oil, as in the following mixture :—

MISTURA OLEI RICINI.

R.	Olei Ricini	℥	x
	Tincturæ Rhei	℥	v
	Glycerini	℥	v
	Tragacanthæ	gr.	ss
	Aquam Menth. Pip.	ad	℥ j

Sig. ℥ j.—T.D.S. (For an infant of twelve months.)

Although the **diet** is the most important part in the treatment of rickets, it must not be thought that there is anything very special or unusual about it. The chief points to be observed are : first, that a sufficient amount of fatty food is given; and, secondly, that no excess of carbohydrates is allowed. Fat may be given as cream, cod-liver oil, butter, yolk of egg, dripping, and beef or mutton fat, the chief essential being that it is animal fat. Vegetable or mineral oils do not seem to be nearly so efficacious. It may appear at first sight superfluous to give a large fat baby more fat in its diet, but experience

has shown that the fatty tissues of a rickety infant, derived as a rule from carbohydrates, are merely a burden. Under the use of a diet rich in animal fat these flabby tissues melt away and are replaced by healthy tissues. Further, there is required for the growth and nutrition of most of the organs an abundant supply of fat, and in rachitic infants these organs may be said to be starved in this respect. As a result their function is much impaired and their powers of resistance much lowered. Hence we find that many of the disorders of rachitic infants do not yield readily to an ordinary diet or to ordinary medication, but do yield to a full amount of fat in the food. The form in which the fat is administered is not unimportant, and gravity cream, bacon fat, and cod-liver oil will be found the most suitable for young children. Fresh milk is to be regarded as the most important part of the diet during the whole of the rachitic period. Other foods, suitable to the age of the child, are also to be given. Rickety infants have often a great liking for salt, and this probably implies a demand on the part of the organism. One to two drachms of salt may be given daily in the milk. It will also be found beneficial to give them some fresh fruit, such as orange or grape juice, and a small quantity of mashed potato occasionally. These will supply the anti-scorbutic elements, which have often been markedly deficient in the previous diet. This treatment is specially called for in all cases where tenderness of the limbs is present.

A dietary suitable for different ages may be drawn up as follows :—

Between Nine and Twelve Months.—Cows' milk which has been brought to the boil, and slightly sweetened and salted (1 to 1½ pints daily).

Half a teaspoonful of butter or one to two teaspoonfuls of cream may be given three or four times a day in milk.

In addition, two meals a day consisting of (1) porridge made with milk, or (2) any plain milk pudding, or (3) boiled bread and milk.

Feed every three hours by day, and only once during the night (10 p.m. to 7 a.m.).

Between Twelve and Eighteen Months.—Milk may be increased to 2 pints daily. In addition, an ounce of cream or the yolk of one egg, or bacon fat, or sardines in oil, daily. Bread and butter.

After Eighteen Months.—In addition, boiled fish, chicken, or mutton, biscuits, green vegetables. The amount of milk must be lessened when other foods are added, but the fatty material must be in sufficient amount.

General Hygiene.—Sunshine and fresh air are of great value in the treatment of rickets. The child should be out in the open air as much as possible. Except for a few months in summer, the air of towns is neither so full of sunshine nor so pure as country or seaside air. Residence in the country or at the seaside is therefore to be preferred. The night-nursery and the day-room should always be well ventilated and never over-heated. Infants flourish in warmth, but they get depressed and weakened in rooms which are over-heated and stuffy. The body clothing of the patients should

be warm, light, and loose. It is not advisable to overclothe them in winter, or to dress them in gauzy garments in summer, with the extremities half exposed so as "to harden them," as it is sometimes expressed. Flannel should be worn next the skin during the summer and the winter, the day and the night. A flannel band about the abdomen is also to be recommended, as the organs beneath are specially liable to the effects of external chilling. At night a long flannel nightdress fastened around the neck, and fastened also beyond the feet, will prevent any chilling of the body from the habit of kicking off the bed-clothes. When sweating about the head is present, the best plan is to use a firm pillow, as a head bathed in perspiration and sunk in a soft pillow is most uncomfortable. As a rule, with the head resting on a firm pillow the patient will not suffer any inconvenience from the sweating, which subsides as the general treatment is pursued. Warm baths should be given once or twice a day, and this ritual is carried out more thoroughly if some common salt is added to the bath, one table-spoonful to a gallon.

Medicinal Treatment.—This has already been referred to in connection with the disturbances of the alimentary canal. After the use of castor oil, it may be advisable in some cases to still further improve the condition of the digestive organs. The following prescription will be found useful:—

R. Tr. Nuc. Vom., ℥ ij; Tr. Rhei, ℥ v; Sodii Sulpho carb., grs. ii j; Tr. Zingib., ℥ ij; Aquam ad ʒ j. Sig. ʒ j.—T.D.S. (For an infant of twelve months.)

As soon as the digestive organs are healthy, cod-

liver oil should be given. Many infants will take it plain—a half to one drachm thrice daily; others will prefer it mixed with equal parts of malt extract. Considering the bony and pulmonary complications we prefer an emulsion of cod-liver oil with hypophosphites, as in the following prescription:—

EMULSIO MORRHUÆ ET HYPOPHOSPHITUM.

R. j.	Sodii Hypophosph.	Calcii Hypophosph.	āā gr. $\frac{1}{2}$
	Olei Morrhuæ	.	℥ xxx
	Olei Cassiæ	.	℥ $\frac{1}{10}$
	Glycerini	.	℥ vj
	Tragacanthæ	.	q.s.
	Aquam Destill. ad	.	℥ j

Sig. 3 j.—T.D.S.

As this is not easily dispensed, unless made up in bulk with care,¹ one of the good emulsions on the market may be ordered. They differ chiefly in the flavouring used. Cod-liver oil in one or other of the above forms should be administered continuously for some months. After the age of two years the dose may be increased gradually up to six drachms daily.

Special Rickety Manifestations.—It is important to remember that certain symptoms and certain affections have a rachitic background. Some of them are peculiar to rickets, others are very frequently found in association with rickets. In both cases complete treatment implies not only relief of the immediate symptoms, but also the employment of a full anti-rachitic treatment as described above.

¹ An elegant preparation according to the above formula is made by Mr. George Lapthorn, Chemist, Abbey Road, London, N.W.

1. Pulmonary Complications.—Bronchitis is one of these affections. Rickety children are extremely liable to bronchitis. In some this will be found associated with obstruction in the nasopharynx from adenoid hypertrophy. This obstruction should be removed. In others the hygienic surroundings are bad, and must be looked to. The error may be found in hot stuffy rooms, or in improper clothing. In others an excess of adipose tissue is present, probably from an excess of carbohydrate food. In over-fat babies the peripheral resistance to the flow of blood is very great, and a congested state of the bronchial tubes is common. A slight cold spreads rapidly to the bronchi, and in many cases the patient is never free from chronic bronchitis. This condition is much improved by reducing the weight. A rigid dietary is to be employed, in which the carbohydrates are reduced to a minimum, and proteids and animal fats are used in strict moderation for a time. The flabby, fatty tissue will melt away, and will be replaced by a firmer tissue, less bulky and less obstructive to the circulation. In all cases, the use of anti-rachitic remedies will do more good in curing the bronchitis than any special measures directed towards the lungs. The treatment for acute attacks will be discussed in the section on Bronchitis. Broncho-pneumonia is another common pulmonary disease of great gravity in rickety infants, and while special measures are called for during the acute stage, the treatment of the constitutional disease must be kept in mind (*vide* Broncho-pneumonia).

2. Intestinal Complications.—Diarrhœa is a

common trouble both in summer and winter, but is more dangerous during the former season. An acute attack may be precipitated by over-feeding, or improper feeding, or a chill, or other simple cause. The treatment during the acute stage is on general lines, but one should not trust too much to sedative measures in the convalescent or chronic stage. Starvation, and medicines like bismuth, castor oil, etc., are all very well for a time, but what the patient really wants is treatment for the rickets. Fats and cod-liver oil should be given as early as possible, in small doses at first, and it will often be found that the catarrh and diarrhoea are checked more efficiently by this means. In summer weather the purity of the food must be specially attended to in rickety children, owing to this tendency to diarrhoea, and if possible they should be sent out of town. If the milk is not absolutely fresh and sound, it may be advisable to use condensed milk as a temporary measure.

3. Nervous Complications.—Certain nervous disturbances common in rickets call for notice—namely, convulsions, laryngismus, and tetany. They are intermittent in character, and come and go on apparently slight provocation, owing to the fact that the underlying cause is not cerebral disease, but nervous debility from rickets. “Laryngismus stridulus, tetany, and general convulsions are the positive, comparative, and superlative of the convulsive state in children.”—(CHEADLE.)

Convulsions are of common occurrence. The immediate exciting cause is some form of peripheral

irritation, which may take the form of the cutting of a tooth, of an overloaded stomach, or of intestinal disturbance. The immediate treatment is discussed elsewhere (*vide* Convulsions), but the recognition of the underlying rickets should lead to treatment which will diminish the frequency of the attacks and ultimately cure the nervous instability.

Laryngismus Stridulus, or "child-crowing," is another of the nervous manifestations. This is one of the phenomena peculiar to rickets. It may take the form of acute attacks, coming on suddenly in the day or the night, and accompanied by a considerable degree of distress from the obstruction of the breathing. In other cases, the condition is chronic, and apart from the noise produced, there is nothing to suggest any distress or discomfort. As the condition is one of spasm of the vocal cords, and not of catarrh, measures such as steam-kettles are not called for. One will often find that a change from a stuffy atmosphere to fresh cool air leads to a sudden cessation of an attack. Plenty of fresh air is therefore of the first importance. In an acute case, a dose of castor oil, 1 to 2 drachms, should be given. A dose of chloral hydrate (2 to 4 grains) and of bromide of potassium (5 to 10 grains) should be given at bedtime, and can be repeated during the night if necessary. On the occurrence of an acute attack a hot fomentation may be applied round the neck, and if this does not relieve the child, a hot pack may be given. A hot pack consists of a blanket wrung out of boiling water and wrapped round the child as hot as the skin will tolerate. Round this, one or two dry blankets are wrapped.

The child lies in this for ten or twenty minutes, and when the skin acts well, the blankets are removed and a dry hot one is wrapped round the child. Sleep and relief from the spasm usually follow, the whole process is soothing, and there is little disturbance of the child involved. In cases associated with an overloaded stomach, an emetic such as sulphate of copper, 1 to 2 grains in 1 drachm of water, will often check the attack. It is very rarely that death occurs from spasm of the glottis, but the possibility of such an occurrence must be kept in mind, and the acute attacks relieved as quickly as possible. In all cases the employment of anti-rachitic treatment will in time remove the trouble.

Tetany is a peculiar and painful spasm of the muscles of the hands and feet, accompanied often by œdema. The attacks are usually of short duration, but tend to recur. In the presence of such a condition one has to pay special attention to the state of the alimentary tract. Gastric and intestinal catarrh is usually present, and dilatation of the stomach and bowels is often marked; in short, the "pot-belly" of rickets will be well shown. This condition of atonic dilatation must be treated by a spare diet, by the use of non-fermentative foods, and by evacuants. The quantity of fatty and farinaceous foods must be cut down. Small doses of grey powder ($\frac{1}{2}$ grain) with sulphocarbolate of soda (3 grains) should be given three times a day, to improve the tone of the stomach and bowels, and as anti-fermentatives. If more thorough cleansing of the bowel is necessary, as shown by the presence of diarrhœa and undigested motions, the *mistura*

ricini should be used. The abdomen should be supported by a firm flannel bandage, and abdominal massage may be employed once or twice a day for five minutes at a time. The hands and feet should be wrapped in cotton wool. If signs of nervous irritability are present, one can give chloral and bromide, but as a rule these are not necessary in ordinary cases.

4. Bony, Muscular, and Ligamentous Affections.—Changes in the bones, muscles, and ligaments are amongst the most marked phenomena of rickets. The bones are soft and bend easily, the muscles are weak and flabby, and the ligaments stretch readily and fail to give proper support. The bony changes in the skull indicate the need for anti-rachitic, but not for special treatment. An antero-posterior curvature of the spine in the dorso-lumbar region is common, and is due more especially to muscular and ligamentous weakness in the back, and inability to support the weight of the head. In such cases standing and sitting must be stopped. The child must be kept lying down night and day. For day use a well-padded board may be prepared, on which the child lies at full length when in the perambulator, or in the garden. Shoulder straps can, if necessary, be fixed on this, which will allow of the free use of the upper and lower extremities. Massage of all the back muscles should be carried out thoroughly twice a day, and cold douching or spraying of the back is also useful if the child is over eighteen months. Before that age it is too terrifying a process to be advised.

Fresh air, sunlight, and a full anti-rachitic dietary are of the greatest importance, and although a complete cure will follow, patience and time are indispensable, for the process of recovery is slow. The ribs show great softening in rickets, and as the result are apt to be much distorted from atmospheric pressure. The sinking in of the ribs also causes diminished respiratory power and space, and is often a factor in inducing serious pulmonary complications. While it is difficult to employ ordinary massage to the small chest of an infant, friction with a stimulating liniment does good. For this purpose the following may be used:—

R. Linim. Belladonnæ, Linim. Terebinth. Acet., Olei Dulcis, āā ʒ j. Sig.—To be rubbed on to the chest twice daily.

In these cases one observes a marked sinking in of the costal parietes during inspiration, and exaggerated diaphragmatic breathing. An effort may be made to increase the power of the costal muscles in inspiration by applying a bandage tightly round the abdomen for half an hour or an hour at a time. This, by impeding the action of the diaphragm, will make the child use the thoracic muscles as much as possible. The patient must be carefully watched so as to prevent dyspnœa—from too much work being thrown on the weakened muscles. The lower extremities are a source of much trouble in rickets. According to the severity of the affection and the date of onset, a rachitic child may not be able to stand or walk at the usual age; may not be able to walk at all until two or three years old; may have

learned to walk and then "go off its legs" entirely; or may in the process of walking develop knock-knees, bow legs, coxa vara, and many other bony deformities. These conditions are all preventable, and in the early stages are all curable. If the deformities arising in the softened bones are allowed to increase and to persist until the bones begin to harden—say, after the age of four years—they will not be amenable to medical treatment. The difficulty in using the lower extremities may be due to weakness of the muscles, or to weakness of the ligaments, or to softening of the bones, or to several of these factors in combination. In the earlier years it is wonderful what a power Nature has in removing deformities if she is only given an opportunity. The first essential in the treatment of rachitic weakness in the lower extremities is to take the child off his legs. He is not to be encouraged to use the legs, with a view to strengthening them, as is sometimes done. If he shows a disinclination to walk, or if he has lost the power of walking, or if the bones are beginning to bend, he must not be allowed to bear any weight on the lower extremities. Sometimes it is advisable to reduce the weight of the superstructure, as in the case of over-fat children, for the fatter the child the greater will be the tendency of the leg-bones to yield. The patient, therefore, must not be allowed to rest his weight on the lower limbs for a month, or three months, or six months even, according to the severity of the case. In the house he can sit up, or lie on a couch, well propped up, and he can be out in the open air in the same positions. If he is under close

observation, it may not be necessary to use splints, but in cases where children are left alone it is absolutely necessary to prevent the use of the limbs by means of splints. These should be well padded, and extend from the middle of the thigh to some 6 or 8 inches beyond the foot.

Opinions differ as to the use of splints at night, but considering the way in which these patients often flex the lower extremities on the abdomen during sleep, the employment of splints is probably quite as serviceable at night as during the day. Attention must also be paid to the muscles and ligaments of the lower extremities, which are already weakened, and under the rest treatment will tend to get more so. Bathing with salt water and douching the limbs with the same—hot in the case of babies, and cold in older children—are useful. Thorough massage of the muscles, along with bending of all the joints, should be persevered with regularly. With the child lying on his back, he may be encouraged to move about the limbs to his heart's content. When these precautions have not been taken, and the bones have become hardened in deformed positions, the only available treatment is surgical.

Scurvy.—It is found that over 75 per cent. of the cases of scurvy occurring during the whole period of childhood arise between the sixth and twenty-fourth months, and hence the term “infantile scurvy” is fully justified. The leading feature in connection with scurvy is hæmorrhage. This may take the form of bleeding at and around the epiphyses of the long bones, producing a painful,

tense, subperiosteal swelling. Hæmaturia may be the only sign, and this is specially apt to occur in the case of infants under twelve months. Bleeding and sponginess of the gums may be present after the period of dentition has begun. Hæmorrhage may occur about the orbit, in the skin, from the nose, or from the bowel. The patients are usually anæmic—sometimes markedly so—and the bloodlessness is aggravated by extensive hæmorrhages, such as those in connection with the long bones. The infants are frequently very listless and apathetic, show a disinclination to move the limbs actively, and sometimes develop a condition of pseudo-paralysis in the limbs affected. The following facts in connection with the etiology of scurvy may be borne in mind: (1) Scurvy is a disease of defect, not of excess. (2) The defect consists in the absence from the diet for a prolonged period of a sufficient amount of the anti-scorbutic element in food. (3) Although the exact element is not known, the foods which contain it are known. (4) The anti-scorbutic element is found most abundantly in fresh or living food, more especially in fruits and vegetables, and the further we get from fresh food as the regular diet, the greater is the tendency to scurvy. (5) There is a class of prepared foods for infants (tinned foods, “proprietary foods,” “infants’ foods”) in which, during the process of preparation, the anti-scorbutic element has been entirely destroyed.

The **preventive treatment of scurvy** may be briefly summed up as the employment of a fresh food diet, suitable in quantity and quality to the

age of the child. This has already been described (*see* Chapter I). Cows' milk must be fresh, and must not be altered by prolonged boiling or pasteurizing. Many cases of scurvy have been traced to the use of sterilized or pasteurized milk. This risk has recently been increased by the action of several of the large dairy companies, which are supplying pasteurized milk to all their customers, without any intimation that the milk has been so treated. As many of the customers proceed to boil the milk on delivery, the vital element in it will be in an extremely attenuated condition by the time the milk reaches the infant. The custom referred to is a recent one, but Dr. Coutts has already recorded a case of an infant suffering from scurvy who failed to improve on the dairy milk supplied. It was then discovered that this milk had been pasteurized, and on changing to fresh cows' milk, rapid improvement took place. Cases have also been traced to the use of milk from municipal dépôts, where undoubtedly the milk had been treated in some injurious way. While the risk of scurvy is increased by prolonged pasteurizing or sterilizing, the domestic method of boiling the milk for a few minutes, or scalding it, is probably harmless. Sometimes over-dilution of the milk leads to scurvy. It is said that a quart of milk contains as much citric acid as an orange, and this citric acid is looked on by many as the anti-scorbutic element. But if an infant receives only one-quarter or one-half of a pint of milk daily, the amount of anti-scorbutic material may be so small that scurvy develops. It is therefore necessary to see that there is a sufficient quantity

of fresh milk in the dietary—namely, 1 to 2 pints daily. Another curious fact about scurvy is that it often develops as the result of the prolonged use of some special food ordered for the cure of another disease or disorder. Thus, owing to indigestion of some form, an infant may have been put on peptonized milk, and after some months of this diet scurvy is produced. Or some kind of condensed milk has been prescribed for gastro-intestinal disturbance, and after some months scurvy appears. It must be remembered that predigested milk and condensed milk are liable to induce scurvy if employed as the sole diet for any length of time.

The direct connection between the employment of a diet consisting of condensed milk or other patent “infants’ food,” and the subsequent appearance of scurvy, has led all writers on the subject to regard such a diet as the chief cause of scurvy. Some of these foods are more frequently associated with scurvy than others, but this pre-eminence is due (1) to the larger sale of the food, or (2) to its use during the earliest months of life, or (3) to its exclusive use without the addition of any fresh milk. It is daily becoming clearer that these artificially prepared and preserved foods are not to be depended on in the feeding of infants, and in the preventive treatment of scurvy they must be abolished entirely from the diet, as it is practically impossible to confine their use within safe limits. After the age of two years scurvy becomes much less common, because fruit and vegetables almost invariably form part of the diet. In rare cases one finds that there is a positive dislike to fruit and vegetables in any

form, and in the absence of any anti-scorbutic material in the diet scurvy may appear. In such cases the special dislike must be overcome by firm treatment.

The curative treatment proceeds on the same lines as the preventive. In the case of infants fresh milk is to be given, and in order to secure the most prompt effect, it should not be treated by heat in any way. Raw meat-juice has been recommended by Dr. Cheadle and Sir Thomas Barlow for the anæmia which is usually present. It is not of great anti-scorbutic value, as meat is used in this country, but is easily retained and digested. For an infant of twelve months, half an ounce of expressed meat-juice may be given daily, in divided amounts, and well diluted with milk or water. The more special part of the dietetic treatment consists in the free administration of fresh fruits and vegetables. The full list of these is a large one, but the following will be found the most useful—namely, oranges, lemons, grapes, potatoes, and cabbages. In the case of infants under one year, the juice of oranges or grapes may be expressed, and half an ounce may be given in water three times a day. In older infants, boiled and sieved potato, mixed with milk, is a most effective anti-scorbutic. Dr. Hutchison recommends that the potato should be boiled in its skin, and that the floury part just beneath the skin should be used, as this is richest in potash salts. Another plan, suited to those with weak digestive powers, is to administer the vegetable juices through the medium of beef-tea or chicken-

tea, in which potatoes and carrots have been boiled and strained off (Cheadle).

Care must be taken that the amount of fruit or vegetables is not in excess of the infant's digestive powers, in which case sickness, flatulence, diarrhoea, etc., may follow and interfere with the recovery.

The effect of this special treatment is one of the most striking in medical therapeutics. Improvement is often noted within a couple of days, and recovery from acute manifestations within a week, provided that the disease has not progressed too far. The child begins to brighten, milk is taken with avidity and relish, the hæmorrhages cease, the swelling of the gums subsides, the tenderness in the limbs becomes less marked, and there is not that look of anxiety, from fear of movement, on the approach of an attendant.

As regards medicines, most of them are of no special value, and some are distinctly injurious. Owing to a mistaken diagnosis of syphilis, mercury has frequently been employed, and has undoubtedly done harm. Iron tonics and hæmostatics are not called for if the dietetic treatment is thoroughly carried out. Rickets is frequently present along with scurvy, and the former may be evidenced by gastric catarrh, bronchitis, etc., which call for careful treatment. Great prostration must be combated by the use of stimulants, of which brandy and strychnine are the most useful. If much pain is present, small doses of opium may be given to secure rest and sleep. Five minims of paregoric or half-minim doses of nepenthe may be given occasionally until relief is secured. Complete rest in

bed must be enforced during the active stage, both for the prevention of suffering and in order to avoid the risk of cardiac syncope. In cases with extensive subperiosteal effusion of the extremities, the limbs must be wrapped in cotton wool, and handled very carefully, as fractures are apt to occur. In cases of orbital hæmorrhage the proptosis may be so marked that the patient is unable to close the eyelids. Corneal ulceration and extensive inflammation of the globe may follow unless the eyes are carefully cleansed and protected from exposure.

CHAPTER III

GENERAL DISEASES OF INFECTIVE ORIGIN

TUBERCULOSIS—SYPHILIS—RHEUMATISM

Tuberculosis.—Tuberculosis in childhood presents certain differences from the same disease in adult life. The striking feature is the tendency for a localized form of tuberculous disease to infect the whole system, producing a widespread miliary tuberculosis or the equally fatal tuberculous meningitis. Very often before the onset of the acute disease the presence of local trouble has been unsuspected, being situated in some internal lymph gland, and having produced no symptoms. This suggests the chief **preventive line of treatment** in tuberculosis, namely to remove any peripheral irritation which may lead to glandular enlargement. The three glandular areas of special importance are the cervical region, the thorax, and the abdomen. In children who are at all predisposed to tuberculosis, it is necessary to protect these regions. The sources of irritation and absorption for the cervical glands are the teeth, the tonsils, the adenoid tissue in the nasopharynx, the scalp, and the ear. All these tissues must therefore be kept healthy, and on the appearance of any glandular enlargement must be carefully examined and treated if necessary. The larynx, trachea,

bronchi, and pulmonary tissues are the sites of entrance of tubercle bacilli to the glands at the root of the lungs and around the trachea. Neglected colds, chronic bronchitis, and pneumonia may allow of the penetration of bacilli which pass to the glands and develop there. They may continue to grow long after the pulmonary or bronchial trouble has passed off entirely. Hence comes the importance of treating respiratory disorders thoroughly so as to maintain the respiratory passages in a healthy condition, and thus prevent the entrance of tubercle bacilli. Amongst the infectious fevers measles and whooping-cough take a prominent place in the development of tuberculosis. The pulmonary complications of these diseases may (1) light up a latent tuberculosis in the glands at the root of the lungs, or (2) may cause inflammation in these glands of such a character as to render them peculiarly liable to tuberculous invasion, and unable to resist the attack of the tubercle bacillus. Similarly the development of tuberculous mesenteric glands is to be traced to a weakened condition of the mucous membrane of the bowel from catarrh, etc. If it were possible to maintain the alimentary canal and the respiratory passages in a healthy condition we should have made great strides in the prevention of tuberculosis in early life, even amongst that class of the population where the surroundings as regards light and fresh air are far from satisfactory. Within recent years the preventive measures, in the case of infants, have largely centred round the attempt to provide them with tubercle-free milk, the belief being that the chief danger of tuberculous disease was through the

food and the bowel. The results of post-mortem experience, which is the only reliable test, show that the thoracic glands are much more often primarily affected, and are more extensively diseased than the mesenteric. This points to the chief danger in early life being in the air and not in the food. It emphasizes the fact that if an infant is supplied with cool, fresh, pure air, night and day, he will be less likely to develop tuberculosis than if he is kept in a stuffy hot atmosphere which induces colds, and allows of the entrance of the tubercle bacillus. None the less the importance of a pure milk supply, which can only be secured when cows and milk are under the supervision of independent authorities, cannot be over-estimated in connection with the rearing of healthy and tubercle-free children. The chief indications in the preventive treatment of tuberculosis in early life are to furnish the child, as far as possible, with tubercle-free air and food, and to maintain a healthy condition of the respiratory passages and of the alimentary canal.

The **general treatment** of tuberculosis in childhood is to be carried out on the same lines as in adult life. The open-air treatment, either at home, or at the seaside, or in a sanatorium, is of great value. The child should be supplied with plenty of nutritious food, but should not be overfed. The fatty foods, such as milk, cream, butter, yolk of egg, and cod-liver oil are of great service, and the proteids, such as beef, mutton, fowl, and fish, should also be given freely. The carbohydrates, such as bread, potatoes, and puddings, are to be given in moderation, as their therapeutic value in this affection

is not comparable to that of the other two. The dietetic regimen must be carefully regulated according to the state of the digestion, and the indications will be found described in connection with tuberculous peritonitis. During the acute stage of tuberculosis rest in bed is always advisable, but even although pyrexia is present it is not necessary to restrict the diet to sloppy food. If the digestion is good a full diet may be taken with benefit. With an evening rise in temperature lassitude and disinclination for food may arise, and the patient should not be forced to eat at this time. During the apyrexial period of the day it will often be found possible to administer large quantities of nourishing food, and this must be taken advantage of.

The **specific treatment** of tuberculous disease in its localized forms by means of tuberculin has now been on trial for some years. The method of controlling the results by the indications supplied by the opsonic index, which was introduced by Wright, seems to have fallen into disuse as being both unnecessary and uncertain. Many forms of tuberculin have been employed, but those in common use are the new tuberculin (T.R.) and the bacillary emulsion (B.E.). Some have used the human strain of bacillus and others the bovine, but the former seems the more popular. For ordinary purposes the administration by hypodermic injection is to be preferred, but in the case of children repeated injections have obvious drawbacks, and the method of giving the drug by the mouth on an empty stomach in the early hours of the morning, which was introduced by Latham, has much to commend

it. By the latter method the definite reactions of the drug seem to be produced in the same way as by the hypodermic method. The amount of the dose and the frequency of administration are still matters of discussion, and it may be that more successful results will be obtained when these two points have been accurately determined. For children the usual method is to begin with a dose of from $\frac{1}{200000}$ to $\frac{1}{100000}$ milligramme of T.R. hypodermically, and to gradually increase the dose up to $\frac{1}{50000}$ or even $\frac{1}{5000}$ milligramme. The tendency at present is to persist with the smaller doses for a prolonged period. A marked reaction to the tuberculin is not desirable, so that if a rise of temperature follows the dose should be reduced. An interval of from seven to ten days has usually been allowed between the injections, but more recently it has been suggested to try the effect of shorter intervals between the doses. If given by the mouth, double the above amounts may be used, and the drug is best given in normal saline fluid at an early hour in the morning when the stomach is empty. The presence of active tuberculosis with pyrexia and a considerable amount of auto-inoculation is a contraindication to the use of tuberculin which is to be reserved for the afebrile or slightly febrile conditions.

It is clear that exact observations on the results of tuberculin treatment can best be made on the external or surgical forms of tuberculosis, such as affections of the cervical glands, bones, and joints in which definite changes can be seen and felt much more readily than in the case of visceral affections. Yet although many surgeons have had their cases

treated with tuberculin under skilled bacteriological supervision, there is not yet any consensus of opinion as to the benefits obtained. All these forms of tuberculosis tend to run a prolonged course; the treatment by tuberculin must also be carried out for a long time; and so it is difficult to say whether any improvement is due to the tuberculin or to the other measures employed. In the case of visceral tuberculosis the clinical recognition of any benefit from tuberculin is much more difficult, so that until surgeons can point to some clear and uniform results in their cases physicians must remain in doubt as to the benefits of tuberculin in medical cases of tuberculosis.

Regarding the generalized forms of tuberculosis—miliary tuberculosis and tuberculous meningitis—little can be done in the way of treatment. One can only render the patient as comfortable as possible by good nursing, by the use of bromides and opium, and by refraining from meddlesome interference.

Tuberculous Glands.—An early condition of tuberculous glands is to be treated first of all by the removal of any source of irritation in the regions connected with the glands. Whenever possible the child should be sent to the seaside, the east coast and Margate especially possessing a good reputation in such cases. Local treatment by means of iodine is of little use in the case of cervical glands and may do harm. Small doses of iodide of potash (grs. j–jss) and of arsenic (Fowler's solution, ℥ j–jss) may be given for a month at a time. Iron has been poured in from time immemorial, but it is so apt to

upset the digestion, in the common mixture of syrup of the phosphates and syrup of the iodide, that more digestible preparations are advisable. If there is definite anæmia then iron may be administered in a preparation like the following—

R. Ferr. et Am. Citr., grs. ij; Potass. Citrat., grs. ij;
Glycer., ℥ x; Aq. Dest. ad ʒ j.—T.D.S.

Or—

R. Ferri Sulphat., gr. $\frac{1}{4}$; Sodii Sulphat., grs. x; Ac.
Sulphur. Dil., ℥ $\frac{1}{2}$; Glycerini ℥ x; Aquam ad
ʒ j.—T.D.S.

The medicinal ingredients of the compound syrups of iron and the hypophosphites can be prescribed in tablet form, and will cause less gastric disturbance than in the syrupy preparations. The persistent use of cod-liver oil with hypophosphites will often lead to the disappearance of tuberculous glands.

If breaking down and abscess formation occur in a tuberculous gland in the neck, or if the enlarged glands fail to yield to medical and hygienic treatment, then surgical interference is called for. The whole of the diseased glands should be thoroughly removed, to prevent as far as possible extension of the disease, and also the ugly scarring of the neck which will follow from the bursting of local abscesses.

Pulmonary Tuberculosis.—While in the case of adults this term is practically limited to chronic phthisis pulmonum, in childhood its significance is much wider. The most important factor in connection with the development of pulmonary tuberculosis in children is a pre-existing condition of tuberculosis in the tracheo-bronchial lymphatic glands. Tuberculous pleurisy may also be the starting-point of a

pulmonary lesion. The type of the disease in childhood is as a rule acute and takes the form of acute broncho-pneumonia. An equally fatal although more chronic form is known as massive pulmonary tuberculosis, which extends from the glands at the root of the lung and converts the pulmonary tissue into a solid yellow mass of caseating matter. It is not until after the age of eight or ten years that one finds the adult type of pulmonary tuberculosis popularly known as "consumption" beginning to show itself with any frequency.

The acute forms of pulmonary tuberculosis are always fatal and little can be done in the way of treatment save to relieve symptoms. In all the more chronic forms the best chance of securing the healing of a tuberculous lesion in the lungs is by increasing the natural resistant powers of the patient through rest, fresh air, and good food. The direct treatment of the disease in the lungs or thoracic glands has not yet been successfully accomplished. The inhalation of volatile antiseptics, either from an oral inhaler, or by living in an atmosphere impregnated with them is depressing to the patient, and cannot be said to be productive of much good. Apparently also pulmonary tuberculosis proves more resistant to tuberculin treatment than most of the other forms of localized tuberculosis.

Tuberculous pleurisy occurs frequently as an apparently primary disease, or it may be associated with tuberculous peritonitis. It is advisable to recognize that an attack of tuberculous pleurisy setting in acutely, will usually run a definite course, in the absence of complications, and that this course

will not be shortened by any active treatment. Effusion usually takes place, and if the fluid is withdrawn early it often reaccumulates. Consequently it is better to wait until the pyrexial stage has subsided before withdrawing the fluid, unless urgent symptoms are caused by the quantity of fluid. In many cases, under rest in bed, the cessation of pyrexia will be followed by reabsorption of the fluid. If active pulmonary tuberculosis is present on the same side the question arises whether the fluid should be withdrawn or not. Opinions differ on this subject, but my own experience has been that delay does not seem to do any harm, and that the enforced rest to the lung from the presence of the fluid has sometimes seemed to benefit the pulmonary tuberculosis.

Abdominal Tuberculosis will be found discussed in another chapter.

SYPHILIS

Syphilis is a disease which presents itself under various aspects in infancy and childhood. The acquired form is comparatively rarely met with and is manifested in the same way as in adult life. The congenital type of disease is quite common, and under certain of its clinical aspects may be easily overlooked. If the mother is suffering from active syphilis it is extremely important that she should be treated during the whole period of pregnancy, so that the foetus may also get the benefit of the mercurial course. When syphilis is recognized in an infant, all precautions must be taken to prevent the extension of the disease to relatives and attend-

ants who may come in direct contact with the infant. At the same time it is not common to find examples of direct contagion, and the liability to this mode of extension of the disease has probably been exaggerated. The mother should suckle her infant whenever possible, as the nutrition of these babies is most easily maintained on breast-milk. Owing to the risk of her contracting syphilis through inoculation by the nipple a hired wet-nurse must not be employed.

Medical advice will usually be sought some time during the first month of life for a skin eruption, or snuffles, or wasting. In many cases the early symptoms are described as "thrush," which may be in the mouth, or about the buttocks, and is popularly regarded as of no importance, being incidental to infancy. This fact should lead the practitioner in every case to make a thorough examination of the infant, if syphilis is even suspected. The skin generally, the mouth and nostrils, the anal region, the palms, and the soles should be carefully inspected.

Constitutional treatment must in all cases be adopted, and mercury is the important drug. No more striking therapeutical results are obtained than those from mercury in congenital syphilis. In many cases the improvement secured, even in apparently hopeless conditions, is little short of marvellous. The important things to remember are that it must be given in sufficiently large doses, must be persevered with for a long time, and must be combined with special attention to the general health. Many of these patients, if so treated, will at the end of twelve months be thoroughly well

grown and in the best of health. Cases of idiosyncrasy in which the drug is not well tolerated are very rare. It may happen, as Guthrie has suggested, that in the presence of syphilitic nephritis elimination is defective, and symptoms of poisoning may arise. In such cases one must use only minute doses of mercury. In a well-marked case, however delicate or young the infant may be, it is well to commence with one grain of mercury with chalk three times a day, as in the following powder—

R. Pulv. Hydrarg. c. Cretâ, gr. j; Sodii Bicarb., grs. iv.

The soda is given with a view to checking any irritating effect in the alimentary canal, but it is doubtful whether this is a real danger in infants. Far from inducing diarrhœa, the mercury seems at times to produce constipation, if the maternal statements on the subject are to be credited. In slighter cases, and when the nutrition of the child shows an absence of constitutional effects, half a grain of grey powder may be given thrice daily. Mercury is a drug which is so well tolerated as a rule by infants and children that symptoms of overdosage are rare. If they appear, and the first sign is usually diarrhœa, it is better to reduce the dose than to try to check the diarrhœa by means of opium. Merely to check the diarrhœa will not prevent the development of mercurial overdosage. The advantage of giving mercury by the mouth instead of by inunction is that in the former the exact amount entering the system is known, in the latter it is not. A further advantage lies in the local effect which mercury has on the alimentary canal, in stimulating the secretions, and

frequently in removing some of the results of improper feeding. Mercurial inunction is preferred by certain practitioners, and as a rule its action is quite satisfactory. Blue ointment and lanolin, half a drachm of each, may be rubbed into the abdomen every morning after the bath, and covered with the flannel binder. This remains on until the following morning, when after the bath a fresh supply is applied as before. It is very important that the ointment should be thoroughly rubbed into the skin so as to procure as much absorption as possible. If there are signs of irritation, which may occur in infants with delicate skins, or those suffering from a rash (sudamina, eczema, etc.), the site of inunction may be changed at times to the axillæ, or the back, or the thighs. In some severe cases, where quick results are desired, it will be found useful to employ both methods of treatment, by the mouth and by inunction. Various other means of administering mercury are in use, *e. g.* by calomel (gr. $\frac{1}{6}$ – $\frac{1}{8}$ T.D.S.) or liquor hydrargyri perchloridi (℥. x–xx T.D.S.), or calomel fumigation, but they possess no advantage over those already described. The duration of the mercurial treatment will vary with the condition of the patient, both locally and generally, but in many cases it is stopped too soon owing to the fact that when the active signs disappear the patient disappears also. It is always well to tell the parent at the commencement that a prolonged course of treatment will be necessary, even although the health seems quite satisfactory. If the patient can be kept under observation and treatment, the initial dose of from half to one grain of grey powder may with

advantage be kept up for three months continuously. If symptoms of mercurial irritation appear during that time the dose may be reduced one half. After three months of treatment smaller doses are required and less continuous administration. One half the initial dose may be given for a week and then intermitted for a week, and this ought to be continued for nine months. If active signs of the disease reappear during this period, the full dose should be resumed and given continuously for a time. At the end of twelve months of treatment, and in the absence of any active signs of the disease during the last six months, the patient may be regarded as cured, so far as that term can be applied to syphilis. It simply means that in all probability there will be no further symptoms of the disease, but one cannot guarantee their non-appearance.

Salvarsan has also been used successfully in the treatment of congenital syphilis, the dose for an infant being 0.05 gramme, and for a child of six years 0.2 gramme. As there are certain risks in connection with the administration of this drug, it is better to reserve its use for cases which prove intractable to the ordinary mercurial treatment.

Syphilitic infants require also very careful dietetic and hygienic treatment. Some of them are well nourished and appear to be in good health. These are the exceptions. The majority are wasted, puny infants, with weak digestion, defective powers of assimilation, and poor nutrition. A diet of a "feeding up" kind will therefore produce disastrous results and aggravate the condition. The food should be of a simple, easily digested kind, and therefore

peptonized milk, whey, albumen water and raw meat-juice will prove useful until the general health has been restored. Brandy (ʒ j-ij daily) will often give a useful fillip to the poisoned system, and tincture of nux vomica (℥ j-ij T.D.S.) or liquor strychninæ (℥ j T.D.S.), will also be found useful. In children who have passed the age of infancy the general health must also be supported by dietetic and medicinal measures. In all cases plenty of fresh air and sunshine, warm clothing, rest, and sleep are requisite in the successful management of this disease.

The **syphilitic cachexia** is often well manifested and calls for special treatment. Anæmia of a marked kind may be present and is best treated by the addition of raw meat-juice (ʒ j-ij T.D.S.) to the diet. Iron should not be administered until the digestive organs are in a healthy condition, and it will often be found that mercury will remove the anæmia most effectively. In other cases a small dose of the saccharated carbonate of iron (grs. j-ij) may be given twice a day with the grey powder. Restlessness and sleeplessness may increase the debility of the infant. For these bromide of potassium (grs. v) may be given at night, and repeated if necessary during the day. If pain seems to be present, as manifested by restlessness and moaning, half a grain of Dover's powder may be given once or twice a day. The persistent wasting which is so often met with in this affection does not call for the disuse of mercury, but rather for its steady use, while at the same time one tries to improve the nutrition of the patient by appropriate diet.

Certain local conditions call for special treatment. **Syphilitic rhinitis**, which is commonly known as "the snuffles," may seriously interfere with the infant's breathing and feeding, owing to the amount of nasal obstruction. A sanious and irritating discharge is often present, which leads to excoriation about the nostrils and upper lip. The nostrils should be carefully cleansed by irrigation with a warm alkaline lotion, so as to remove all crusts, blood, and mucus. A few drops of warmed black wash (*lotio nigra* one part, lime-water three parts) should then be dropped into the nostrils and allowed to reach the nasopharynx. The entrance to the nostrils and the skin around should be protected with white precipitate ointment (one part diluted with nine parts vaseline). This process should be carried out twice a day, and oftener if the obstruction is very marked. The relief afforded by keeping the nasal passages clear will often materially help in securing benefit from the other measures adopted.

The **erythematous eruptions** do not call for local treatment, but certain **ulcerations** must be considered. Specific ulcers are most commonly found at and around the anus. Under conditions of neglect these tend to spread over the buttocks, across the perinæum, scrotum or vulva, and down the thighs, and may coalesce to form large ulcers. Great care should always be taken to protect these regions by preventing any soiled or wet diapers from remaining in contact with them. One can usually tell from the condition of the ulcers how far these precautions have been observed. After the infant has passed water or a motion the buttocks should be washed

with warm water, dried thoroughly, and then dusted with a powder consisting of equal parts of starch and calomel. This will usually lead to the rapid healing of the ulcers. If fissures or condylomata are present about the anus, the powder is to be applied thoroughly to these lesions, and a small quantity of dilute white precipitate ointment may be passed inside the bowel.

A very characteristic syphilitic lesion is **epiphysitis**, which is usually first detected by the presence of pain in the affected limb when it is handled or moved. Owing to the pain, the infant does not move the limb voluntarily, and a condition of pseudo-paralysis develops. The long bones of the upper limbs are affected more frequently than those of the lower, and the condition may be bilateral or unilateral. On examination the epiphysis affected is found to be enlarged and tender, effusion tends to extend along the shaft under the periosteum, and the limb below may be œdematous from interference with the circulation. The disease does not occur after the age of six months, and the great majority of cases are found during the first three months. Scurvy can therefore be excluded, owing to the age, and the only disease with which this condition may be confused is septic epiphysitis. The latter is accompanied by pyrexia and constitutional disturbances which are not present in syphilitic epiphysitis. The treatment, in addition to the internal administration of mercury, consists in the application of a Scott's dressing, and the fixation of the limb in a splint. An ounce of unguentum hydrargyri compositum is spread over lint and applied to the

arm or leg affected. A poroplastic splint is then moulded to the limb, padded, and applied over the Scott's dressing, the arm being fixed at a right angle and the leg in an extended position. This dressing is continued for a week, the limb being kept carefully at rest, and at the end of that time the limb will probably be freely movable, and all trace of the effusion will have passed off after another week of the same treatment. The local treatment by mercury seems to have a directly beneficial effect, for I have seen epiphysitis develop while mercurial medication by the mouth was going on, and yield rapidly to mercurial inunction.

Syphilitic Meningitis is an affection of intra-uterine life, or it may occur after birth, usually during the first six months of life. It is a chronic affection, and the only disease with which it is likely to be confused is posterior basic meningitis. The latter form has usually an acute onset, with vomiting, head retraction, and pyrexia, while syphilitic meningitis has usually a gradual onset with wasting and drowsiness, and it may not be suspected until the development of hydrocephalus attracts attention. The conditions to be treated are first the meningeal effusion, which tends to be at the base of the brain, and to form adhesions there which block the exit of cerebro-spinal fluid from the ventricles, and secondly hydrocephalus. Even in the absence of confirmatory signs of syphilis in other parts of the body, if meningitis occurs during the first six months of life, and is not the characteristic basilar meningitis of infants, it is advisable to give mercury in full

doses and for a lengthened period. There is no other treatment which is at all likely to do good, and striking results often follow the use of mercury, even in those cases where hydrocephalus has developed. In order to secure the best results it is well to combine the treatment by the mouth and by inunction as already described. If the hydrocephalus does not yield to mercurial treatment, other measures may have to be employed (*vide* Hydrocephalus).

The chief manifestations of congenital syphilis are to be met with during the first year of life. **Recrudescences** of these **may occur later** and are to be treated on the same lines. It will seldom be found that larger doses of grey powder than three grains a day are required, but if the lesion does not yield to that dose, it may be increased gradually until six grains a day are being taken. Usually the combination of inunction with treatment by the mouth is to be preferred to large doses of grey powder. Certain other lesions may develop after the age of two years. **Periostitis** of the long bones, accompanied by pain and localized thickenings, is one of these. In such cases, in addition to mercurial treatment one can give with benefit iodide of potassium (grs. v T.D.S.), or combine it with iodide of iron (syrupus ferri iodidi 3 ss T.D.S.). During the active stage it is advisable that the patient should be kept in bed. **Gummata** may form, either in the viscera (liver, etc.) or on the periosteum or pericranium, or in the subcutaneous tissues. They usually yield to the combined treatment by mercury and iodide of potassium. A characteristic affection, occurring between the ages of six and twelve years, is a

painless form of synovitis with effusion, usually bilateral, and very often affecting the knees. The diagnosis is easily made from the nature of the swelling, but additional evidence of the syphilitic origin will often be found in some other parts of the body (notched teeth, scarring about the mouth or anus, etc.). **Interstitial keratitis** develops at the same period of life and is often present along with syphilitic synovitis. While one naturally employs treatment by mercury and iodides in this arthritic condition, and while many writers report benefit from such treatment, my own experience has been that it is of little use. The effusion in cases coming under my own care has seemed to run its own course uninfluenced by such treatment, by rest, by fixation, and by massage. The method of interrupted circulation which consists in rendering the limb bloodless by elastic pressure, and then releasing it suddenly so that a thorough arterial flush takes place, has removed the fluid only for a time. A case has come under my notice in which the joints had been opened and drained for a time, without any benefit accruing. So that my own experience of syphilitic synovitis has been that this affection, like interstitial keratitis, tends to run a prolonged course, over several years it may be, with temporary improvement, with possibly a period of cessation, and then a relapse, and that no treatment, mercurial or otherwise, will have any direct effect. As some cases have, however, benefited from such treatment, as the published records show, it is advisable both in synovitis and keratitis of this nature to employ treatment by mercury and iodide of potash.

Certain other late lesions of congenital syphilis do not seem to yield to specific treatment. Amongst these may be classed **interstitial nephritis**, **hæmoglobinuria**, **labyrinthine deafness**, and **degenerative lesions of the central nervous system**. All that one can claim for treatment by mercury and the iodides in such cases is that possibly the progress of the lesion is thereby delayed. It is still uncertain whether salvarsan will do more for these special syphilitic lesions than mercury has done.

Rheumatism.—Rheumatism is a disease which is practically unknown during the first two years of life and which is very frequently met with after that age. The importance of this age incidence is that during infancy one should not treat as rheumatic a case of arthritis or tonsillitis, but should carefully exclude every other local or constitutional disease before making a diagnosis of rheumatism. In childhood rheumatism may appear as rheumatic fever, a disease similar to but not identical in its course with the form met with in adult life. In other cases the disease may be manifested by some local rheumatic lesion, which again may run either an acute or a chronic course. We shall consider the treatment of rheumatism under these various aspects.

RHEUMATIC FEVER

Rheumatic fever is as a rule characterized by pyrexia, usually of moderate type, *i. e.* not above 102° F. or 103° F., by general malaise, by headache, by pains about the limbs, and possibly by arthritis with slight effusion. The importance of an attack

is not to be measured by its acuteness, but by the extent to which the heart is involved. The patient should at once be put to bed, in a flannel nightdress, and should lie between blankets, in order to prevent any chilling of the surface. These precautions must be observed all through the illness, and in the convalescent stage care must be taken that the child does not get a chill by exposing its limbs, as children in bed are very apt to do. The diet ordered should be light and nourishing, and should be given in as full amount as the appetite and inclination of the child will allow of. Milk and barley-water, milk pudding, bread and milk, cocoa and milk, eggs, chicken and mutton soups are to be allowed, unless the condition of the alimentary tract indicates a more limited diet. As in all febrile affections in children, a dose of calomel (grs. ij), or grey powder (grs. iij), followed by a saline may be given at the outset and repeated occasionally. The tender limbs or the parts of them affected are to be wrapped in cotton wool. It will be found, however, that rest in bed is usually sufficient to relieve the pains quickly, especially when combined with the following medicinal treatment. Salicylate of soda should be given in full doses, as in the following prescription—

R. Sodii Salicylatis, grs. x; Sodii Bicarb., grs. x;
Tr. Aurant., ℥ x; Aquam Destill., ad $\bar{3}$ ss. Sig.—
 $\bar{3}$ ss every four hours for a child of ten years, and
half the amount for one of five years.

At the end of twenty-four or forty-eight hours the frequency of administration is reduced to every six hours, and when the temperature has reached normal it is further reduced to three times a day. The

drug should be continued for some weeks after the temperature has reached normal, and if a recrudescence of the acute symptoms occurs, the full dose should be resumed. As a rule under this treatment the temperature will reach normal within a few days, and the pains will vanish. The natural salt is preferred by some, but its price renders it prohibitive in many cases, nor does it seem to have any special virtues. Symptoms of poisoning by large doses of salicylates have recently been described by Dr. Langmead, and his record of cases ought certainly to induce caution in the administration. In the case of the doses recommended above, bad effects will arise only in cases of idiosyncrasy, which is present but rarely in children. In such cases salicin (grs. v) may be substituted. The combination of an alkali with the salicylate is always advisable, and it should be pushed until the urine is faintly acid or even alkaline. After the cessation of the salicylate treatment it is advisable to continue with an alkaline mixture (bicarbonate of soda or citrate of potash, in 5 or 10 grain doses T.D.S.) for some weeks.

Within recent years acetyl-salicylic acid or aspirin has been used in place of salicylate of soda. It does not seem to possess any special advantages in the case of children, and it has the drawbacks that it is insoluble and cannot be given along with alkalies. If, however, salicylate of soda causes gastric disturbance or does not seem to produce the expected results on the temperature and pain, aspirin may be tried in doses of 5 or 7 grains every four hours for a child of five years. We have come to look on

rheumatic fever as a definite infective disease, and on salicylate of soda as a specific. At the same time, it must be recognized that although the salicylate quickly reduces the temperature and relieves the pain, it is by no means always effective as regards certain results of the rheumatic infection. Active inflammatory lesions of a local character, such as arthritis, pericarditis, and pleurisy, are undoubtedly benefited by salicylates. Active carditis and valvulitis are not so appreciably affected, but none the less are indications for a continuance of the salicylate treatment, which, if it does not directly affect the myocardium or valve, will at least diminish the risk of further infection of those parts. Certain other results of rheumatism, such as chorea, would appear to be toxic rather than directly bacterial in their origin, and here the salicylates are much less effective.

Within recent years it has been asserted that salicylate of soda is not usually given in sufficiently large doses to obtain the greatest benefit. The moderate school have maintained that by means of from 40 to 60 grains daily in the case of a child of ten years suffering from rheumatic fever, thoroughly effective treatment results in the majority of cases. The other school have said that at least from 100 to 200 grains of salicylate of soda should be given daily, and in some cases the amount given has exceeded 400 grains. This tendency to push the dosage in the case of valuable drugs, probably on the principle that one cannot give too much of a good thing, seems to be a recurring one in the history of medicine. It has already been well exemplified

in connection with mercury, with quinine, and with diphtheritic antitoxin. As a rule, however, the pendulum swings back, and most practitioners rest satisfied with such doses as will procure satisfactory results without injury to the patient. Now the dangers in connection with excessive doses of salicylate of soda are admitted by all who have used them. In many cases in early life the patient promptly becomes sick and nauseated, and so escapes the risk of poisoning. In other cases the drug is excreted so rapidly by the kidneys that no harm follows. If the drug is retained in the system, then the risk of acid intoxication is so marked, and a fatal issue will so definitely follow, if the drug is persisted with, that elaborate precautions have to be carried out to guard against this. It is recommended that from 200 to 400 grains of an alkali (bicarbonate of soda) should be given daily to counteract the tendency to acid poisoning, and that the salicylate should not be given when the bowels are constipated. In a hospital, with resident physicians and nurses watching the patient day and night, such precautions may be carried out, but in private practice one does not wish to run unnecessary risks, and the use of salicylate of soda in moderate doses calls for no such watching of the patient and no such antidotes along with the drug.

If in a case diagnosed as rheumatic fever, one does not get the usual satisfactory result with moderate doses of salicylate of soda, what is the reason? One possibility is that the case may not be one of rheumatic fever at all, but the illness may be due to some form of septicæmia or pyæmia, or to rheumatoid

arthritis. Or again, there may be a mixed infection present, a secondary infection grafted on the original rheumatic one. In all of these cases salicylate of soda fails to act in what is recognized as its typical manner in rheumatic fever, and it will not act any better by giving the patient four or five times the ordinary dose. Again, the toxæmic effects of rheumatism vary with the virulence of the organism and the resistance of the patient, and may in some cases be so pronounced that one does not get the usual prompt relief from salicylates, which act specially on the infecting organism. Because the patient is already in a seriously toxic condition from rheumatic infection it does not follow that he will benefit from toxic doses of salicylate of soda. Even in those severe cases it seems more reasonable, and it is certainly safer, to persevere with moderate dosage as described above.

A first attack of rheumatic fever will usually yield readily to treatment, and the continuance of precautionary measures in bed is dependent on the presence of cardiac complications. If at the end of a fortnight after the temperature has reached normal there has been no evidence of cardiac trouble (endocarditis, pericarditis, or dilatation), and no other rheumatic symptoms persist, the patient may be allowed to sit up in bed and in another couple of days to get out of bed. A careful examination should still be made daily as to any indication of cardiac trouble, and if at the end of a week none has appeared he may be considered well. Certain precautions as to his future life have now to be ordered which will be considered later.

From the outset of an attack of rheumatic fever one continues to examine the heart daily for evidences of **carditis**. The appearance of slight dilatation of the left ventricle, of blurring of the first sound, or of a faint systolic murmur will indicate some involvement of the heart. This is the commonest of all the complications in childhood, and the one of gravest importance. At the same time, it may be stated as a strong justification for the careful treatment of rheumatic fever by rest and salicylates that it is only in a limited number of cases thus treated from the outset that cardiac disease will be found to develop. The great majority of cases of cardiac disease met with in children have developed at some unknown time, or during some illness of a rheumatic nature which was undiagnosed. While the inefficacy of the salicylate treatment in curing rheumatic endocarditis may be admitted, its power in preventing carditis should also be recognized. Recurring now to the onset of cardiac trouble in a case of rheumatic fever, we have to decide as to the treatment. The indications for the salicylate treatment as outlined above are not altered by this complication, as the drug is directed to the general constitutional condition.

The onset of **endocarditis**, which usually affects the mitral valve, is not accompanied by any symptoms which call for relief. Local treatment or any general treatment which will influence the valvulitis is unknown. The great measure we have to fall back on is rest—perfect rest of mind and body, so that the circulation may go on in a steady, uninterrupted manner, and the natural healing of the

valve may take place under the most favourable conditions. Therefore the duration of the rest after any attack of rheumatic fever is to be regulated in the presence of this complication by the cardiac condition. In favourable cases one will note three periods: first, that in which the cardiac murmur develops; secondly, that in which it persists unchanged; thirdly, that in which it disappears. This will in any case be at least a matter of weeks. If at the end of six weeks, for instance, the cardiac murmur has disappeared, are we to conclude that the valve is normal in structure and function? By no means; for if the patient gets out of bed and moves about, the increased cardiac action will probably reveal a murmur. The valvulitis may have gone, but the healing process has left a damaged valve. Still, one cannot keep the patient in bed indefinitely in the hope of restoring the valve to normal, and if the murmur is absent when he is at rest, he may be allowed to be up and take gentle graduated exercise. The second condition of affairs to which reference was made, that in which the murmur persists, may be the final stage. We have here again to fix a time limit to the period of absolute rest, and if the murmur has persisted unchanged for three or four weeks, there is no reason for keeping the patient longer in bed, provided there are no indications of active cardiac disease, such as a feeble and dilated left ventricle, irregular cardiac action, etc. In the absence of such signs the prolongation of rest in bed will weaken the patient unnecessarily and will not benefit the valvular condition. But the increased action of the heart entailed first of all by

the patient's sitting up, then by his being up in a chair, and finally by his walking, must be carefully regulated by the condition of the heart, and this will necessitate frequent examination.

The presence of **myocarditis** is shown by weakness of the cardiac muscle and dilatation of the left ventricle, with or without a systolic murmur. In recent myocarditis it is doubtful whether digitalis is of any value, and if given at all it should be in small doses. *Nux vomica* and strychnine are more useful at this stage, but the important part of the treatment, and what will suffice in most cases, is prolonged rest. The heart muscle will gradually recover its tone, the dilatation will pass off, and the state of the cardiac sounds and the pulse will show when the patient may be allowed out of bed.

It is not uncommon, after the acute attack of rheumatic fever has passed off, to find that the temperature shows a daily range of from one to one and a half degrees. This may be evidence of a chronic infection, calling for further treatment. On the other hand it may be associated with the prolonged rest in bed entailed by cardiac complications. To distinguish between those two conditions it is advisable to get the patient out of bed, provided that the heart condition is satisfactory. If the diurnal variations of temperature are increased by movement out of bed, then in all probability the rheumatic infection is still active and further rest is required. If, on the other hand, the diurnal variations diminish or cease, then one may assume that the prolonged rest was the cause, and that moderate exercise will prove beneficial.

Acute Pericarditis is one of the lesions which seem to be directly benefited by salicylates. In the presence of this complication, with or without effusion, full doses of salicylates may be given along with alkalies. The inflammation may be latent, and discovered only on examination, or it may be accompanied by extreme pain, dyspnœa, restlessness, and sleeplessness. In the latter case one or two leeches may be applied with benefit to the præcordium. The application of cold in the form of an icebag, as suggested by Dr. Lees, may give relief. This treatment is sometimes strongly objected to by young subjects and should not be persisted with if it causes any restlessness or struggling. If the pain is very severe, an injection of morphia (liquor morphinæ, ℥ ij) should be given, and repeated every four hours until relief is obtained.

The above hints will serve to indicate the complexity of the conditions associated with rheumatic carditis, and how impossible it is to lay down hard and fast rules as to the duration of rest. The important points are that rest should be absolutely maintained during the whole period of active carditis, as judged by the cardiac strength and regularity, the condition of endocardial and exocardial murmurs, and the presence of dilatation, and for some time afterwards for the purpose of cardiac recuperation. Beyond that period continued rest will tend to debilitate the patient, and even predispose to further rheumatic attacks when he does get about.

The **convalescent stage** calls for some consideration. A liberal diet is to be allowed, of nutritious and digestible foods. A fresh attack will often

be induced by overfeeding, and in all rheumatic conditions special attention should be paid to the condition of the digestive organs. Constipation must be avoided. The following mixture will be found useful in maintaining a healthy condition in the stomach and bowels—

R. Pulv. Rhei, grs. ij; Magnes. Carbon., grs. iij;
Syr. Zingib., ℥ viij; Aq. Carui ad ʒ j.—T.D.S.

If the digestive organs are sound, then a mixed dietary of beef, mutton, fowl, fish, green vegetables, puddings, and eggs may be allowed. A pint of milk daily should be ordered. Some authorities regard beef and mutton as injurious in rheumatic cases, but if they are not given in too large quantities, they are beneficial. On the other hand concentrated beef-tea or soup, and meat essences, when given with a view of strengthening the child, are probably injurious, as they overload the blood with extractives. A condition of anæmia usually follows an attack of rheumatic fever, whether cardiac disease is present or not. It is not advisable to commence the treatment of this condition with iron. In rheumatic subjects iron will often induce a recurrence of pains and indigestion. It is better, therefore, to trust to diet, to fresh air and sunlight, to cod-liver oil with malt or hypophosphites, and to some raw meat-juice for some weeks, until the system is free from all rheumatic poison. If the anæmia still persists, iron may be given in small doses of the citrate of iron and quinine, or sulphate of iron, or the saccharated carbonate of iron. Another useful tonic at this stage is quinine, of which one to two

grains may be given three times a day in an acid mixture, with strychnine.

A first attack of rheumatism, treated under favourable conditions, will usually be recovered from. There may be a slight mitral murmur persisting, but in the course of years this may also pass off entirely, as the valve grows. The great danger, however, to which such a patient is exposed is the recurrence of rheumatic trouble, either in the form of a similar attack of rheumatic fever, or in the more insidious form of rheumatic manifestations such as tonsillitis, "growing pains," erythema, chorea, pericarditis, or pleurisy. Any one of these forms may not be recognized as rheumatic, and may not be treated as such, and may lead to fresh cardiac complications. It is, therefore, of the first importance that special measures should be taken, in connection with any rheumatic manifestations in a rheumatic subject, to carry out thorough treatment, however trifling the symptoms may appear to be.

The **preventive treatment of recurrences** of the disease will require careful supervision of the patient throughout the whole period of childhood. After the age of fifteen the liability is not so great. The diet will not necessarily be a restricted one, but care must be taken that the digestion is not impaired, and that the bowels do not become confined. Residence on a gravel or sandy soil, and in a dry, bracing atmosphere is advisable. Sometimes town life is unnecessarily considered bad, because if the surface drainage is good the damp in winter is not nearly so great as in many country places. Seaside air is not so good as that of an

inland and upland district. The clothing next the skin should be of flannel, and this should be worn during the summer and winter. The question of school life is a serious one. As a rule, except at schools where the treatment of delicate children is specially attended to, ordinary school life is not suited to rheumatic children, owing to the risks involved. While one does not wish to mollycoddle these children, and make invalids of them, the necessary restrictions are not successfully carried out in the rough-and-tumble existence at school. Therefore, unless the school is one where special supervision can be given, it is better to keep the children at home, or to have them at a day school. In cases where the heart is damaged, while exercise in the fresh air is most necessary to maintain the general health, all muscular strain such as is involved in running competitions, football, cricket, etc., must be forbidden. There are two dangers associated with these sports, namely, the risk of chill from overheating, and the risk of cardiac injury from overstrain. Gentle cycling, walking, golf, and croquet are the physical exercises suitable. At the same time, if four or five years have elapsed without any fresh rheumatic symptoms, and without any evidence of cardiac trouble, one may consider the possibility of allowing the child to engage in school life, sports, etc., like other children. One must not condemn every rheumatic child to a life of invalidism merely because of one attack of rheumatism, and the progress of the patient must decide the future lines of treatment.

Damp is especially liable to bring on an attack,

so that exposure to rain and wet feet must be guarded against. Cold baths are apt to produce depression in such patients, and tepid or hot ones are preferable. The use of a hot or tepid bath will not expose the skin to the danger of a chill afterwards, provided that soap is not used to wash away all the natural protective secretion. If the child has a bath every day, even the greatest purist may rest satisfied with the use of soap to the body once a week, say on the time-honoured Saturday evening. A storm signal in the shape of an excess of urates or uric acid in the urine may sometimes be discovered in these patients. This probably points to defective hepatic action, and should be treated by a spare diet, plenty of water to drink, and a couple of grains of calomel at night. All the minor manifestations of rheumatism must be regarded as serious in these patients, and careful treatment carried out.

(1) **Tonsillitis** is one of the commonest of these. Rest in bed with salicylate treatment should be employed as described above. The heart must be carefully examined daily, and the patient should not be out of bed until some days after the temperature has reached normal.

(2) **The Erythemata.**—Certain of these are common in rheumatic subjects, viz., *E. nodosum*, *E. marginatum*, and *E. exudativum*, although they are not by any means to be regarded as peculiar to rheumatism alone. Another allied skin affection is *peliosis rheumatica*, a form of purpura. *Erythema nodosum* will usually persist for a week or ten days,

with possibly the addition of fresh patches. As the erythemata tend to run a brief course, quite apart from any treatment, it is difficult to draw any certain inferences as to the value of drugs or other remedies. If one or other of them occurs in a rheumatic subject, then rest in bed and careful observation are called for, as cardiac complications may occur. If a condition of pyrexia is present, then the salicylate treatment may be carried out for a week or ten days. If the temperature is normal, salicylates are not called for. The pain of erythema nodosum may be such as to call for the application of glycerine and belladonna to the tender areas, and the fixation of the limbs in well-padded splints.

(3) The so-called "**growing pains**" of children are in many cases real rheumatic manifestations. A careful examination of the extremities will usually reveal some slight arthritis (with or without effusion) or tenderness in the muscles or tendons. In other words, "**growing pains**" are usually due to **arthritis** or **fibrositis** or **tenosynovitis** of **rheumatic origin**. The temperature should be ascertained in order to test the severity of the condition. Even in apyrexial cases a course of treatment by salicylate of soda (grs. v T.D.S.) should be begun and kept up for some weeks. In addition, one may order a grain of grey powder at night, massage to the affected limbs, and a pint of Contrexéville water daily. The child must be kept under treatment, and under careful observation as to the cardiac condition, as long as any of these local symptoms continue. Although often slight, and often fleeting, they are a warning

as to the presence of the rheumatic poison in the system.

(4) **Chorea.**—The problem of the treatment of chorea is inseparably connected with the problem of the treatment of rheumatic infection, especially in its chronic forms. Until the latter, both in its preventive and in its curative aspects, has been settled, there can be no finality as to the question of the best treatment for chorea, nor is there likely to be any one method as to which all are agreed.

An attack of chorea, however mild, should be treated from the outset with rest in bed, isolation from all but the nursing attendants, and a full diet of nourishing and digestible food. The excitable brain which is always present in choreic subjects is not to be stirred by exciting conversation or tales, but is to be soothed by quiet talk, simple tales, and simple games. This is usually much better carried out by a trained nurse than by any member of the family circle, and the recovery will probably be much more speedy if the friends are kept entirely away from the patient. It is as well to warn the parents at the onset that under any treatment an attack usually lasts for a month or six weeks at least. If it lasts longer, the doctor will not have committed himself, and if it lasts a shorter time, he will get all the credit of the result. The diet ordered should consist of milk, milk foods, eggs, fish, and chicken. The fatty and carbohydrate foods are better in the acute stage than the stimulating proteids of beef and mutton. The food should be given in small quantities at regular intervals, and

the digestion must not be overtaxed. The bowels should be regulated by a daily dose of infusion of senna pods and sulphate of soda, or of cascara, so as to produce at least one full evacuation. In violent cases the bed must be padded and the limbs must, if necessary, be covered with cotton wool, so as to prevent any abrasions from friction or injury. A careful examination must be made of the whole body for evidences of arthritis or other painful inflammation which will maintain the choreic disturbance unless treated. A quiet room, a quiet nurse (for an unsuitable nurse may aggravate the choreic symptoms), quiet occupations, an absence of excitement or fright or worry or anxiety, regular meals, and complete rest in bed for at least a month or six weeks will in the majority of cases do more for the patient than any more active treatment. As the emotional disturbance is often very great an attendant in sympathy with and liked by the child is essential.

As regards the **special treatment**, the first point to be settled is as to whether anti-rheumatic remedies are to be employed or not. In the presence of (a) a previous history of rheumatic fever or rheumatic manifestations, or (b) of active rheumatic lesions, or (c) of cardiac trouble, or (d) of pyrexia, it is advisable to adopt full treatment by salicylate of soda. In some cases the improvement will be marked, in other cases it will be nil, and in the present state of our knowledge of chorea it seems impossible to predict the result beforehand, or to explain the different results. In the other class of case where the evidence of definite rheumatism is

absent the salicylate treatment does not usually produce any benefit. Under the rest and isolation system, the symptoms may subside more or less steadily, and recovery follow without the use of any drugs at all. This is quite a common type of case in hospital, and the favourable course is largely due to the fact that we can seclude the patient and exclude the relatives. In more severe cases, the exhausting effect of the choreic movements must be checked if possible. A mixture containing chloral (grs. v), and bromide of ammonium (grs. v), given every four hours will be found a useful sedative. This may be pushed until the movements are quieted or until the patient becomes drowsy, when the medicine may be stopped for a day or two, and resumed if necessary for a second period. If the movements are so violent that the patient cannot be fed, it may be necessary to administer chloroform and feed by the stomach tube, until the chloral has checked the violent movements. Another sedative which is sometimes useful is brandy or whisky, and to secure an effect full doses must be given, four or five ounces daily for a child of five years. This is not to be continued through the whole course of the illness, but for three or four days at a time. A combination of the bromide-chloral with the brandy treatment, the two being carried on simultaneously, will sometimes be found efficacious in a severe attack. Another sedative measure which sometimes proves useful is hot sponging or a hot pack followed by gentle massage of the trunk and extremities.

The great variety of drugs which has been recommended in chorea rather suggests, as is actually the

case, that our knowledge of the pathology of the affection is still very defective. Certain features stand out in connection with the drug treatment of chorea. One is that at times the most surprisingly good results seem to follow from the use of some drug which, however, soon fails to stand the test of prolonged experience. Another is the tendency to give excessively large doses of by no means innocuous drugs in the treatment of this affection. As there is no doubt about the disturbed state of the central nervous system it is not surprising to find that the chief remedies used belong to the class of nervine sedatives. It is one thing to quiet an excited nervous system by moderate doses of sedative drugs, but it is quite another thing to poison the nerve-cells with excessive and toxic doses and thus bring their activity to an end. A patient suffering from mania may require to be kept under restraint, but it is not good treatment to knock him senseless with a blow. To stupefy the brain with narcotics may be necessary in very severe cases of chorea as a temporary measure, but in ordinary cases the enfeebled brain centres will never be strengthened by such treatment. So far as my own experience goes the treatment of chorea as a disease by means of drugs has proved a failure, and I have been led to confine their use to the relief of troublesome symptoms, and their amount within such bounds as prevent any injury to the nervous system.

Many methods of treatment have been recommended in this affection. Dr. Essex Wynter strongly recommends chloretone in 5-grain doses dissolved in petroleum or cod-liver oil emulsion. This is given

every four hours for the first two days; then every six hours for the next two days; and then three times a day for one day, after which the dose may be halved. As the effects of the drug pass off quickly this course of treatment may have to be repeated at frequent intervals. Under this treatment he claims to have had an average duration of nine days of choreic movement for all cases, and three weeks in all before convalescence is definitely established. Arsenic is by many regarded as a specific. In small doses it has never seemed to me to have any appreciable effect. In larger doses, when the amount has been gradually increased to 15 minims of Fowler's solution three times a day, my own experience has been that vomiting and diarrhoea have led to a cessation of the treatment before any good had followed. A very grave risk attending these large doses of arsenic is that of peripheral neuritis, a disease which is much more serious and lasts much longer than chorea. For these reasons the arsenical treatment, if it is employed, should only be used according to the ordinary medicinal dosage. It is, however, open to grave doubt whether in any toxic condition of the nervous system, arsenic, which is another nerve poison, should be administered. Dr. Eustace Smith has found benefit from the liquid extract of ergot (in doses of 3 ss-j thrice daily), combined with nux vomica. In some cases of chronic chorea I have seen improvement follow from this treatment, but the question of *post hoc* or *propter hoc* must necessarily arise. Dr. Lees has recommended salicylate of soda in large doses (one to three hundred grains daily).

Antipyrin, cannabis indica, hyoscine, trional, and veronal are amongst other drugs advised by various writers. In fact every narcotic or antipyretic or analgesic drug, soon after it comes on the market, is pretty sure to be vaunted for a time as a cure for chorea, and then to be displaced by the next newcomer.

In certain cases of chorea the symptoms are not active, but passive (*chorea mollis v. paralytica*). The choreic jerkings may be accompanied by great muscular weakness (*paresis*), or the jerkings may be absent and the patient's only manifestations may be inability to use the muscles (*paralysis*). The voice may be lost, the power of standing or sitting up may disappear, and all the muscles of the trunk and extremities may appear to be paralysed. In such cases more stimulating treatment is called for, such as strong massage twice a day for half an hour at a time and liquor strychninæ either by the mouth (℥ ij–iij T.D.S.), or hypodermically (℥ j bis die). The tonic treatment should not take the form of cold baths or blisters or electricity, which are not conducive to strengthening the nervous system in the case of a highly strung child.

Relapses are not uncommon in this affection, and each fresh attack necessitates a repetition of the same careful treatment. Some cases of chorea tend to become chronic, that is to say, the acute manifestations subside, but a certain amount of mental instability and muscular twitching persists. This result would appear to follow more commonly in those cases in which treatment was not early begun or was not sufficiently prolonged. They are very

commonly met with in hospital practice where, although on discharge the patient may have been free from all symptoms of chorea, the return to the home life is quickly followed by a recrudescence of symptoms. In all these relapsing cases it is very important to look out for fresh manifestations of the rheumatic affection (carditis, arthritis, pyrexia) which demand constitutional treatment at once. In such chronic cases the patient should, if possible, be sent away from home to a quiet country place in charge of an old nurse or sensible relative, and allowed to live an open-air life, without excitement, and with a full nourishing diet of eggs, milk, and cream. It is especially in chronic cases that one must seek for any source of peripheral irritation such as eye-strain, adenoid growths, worms, etc., and remove it if possible.

After an attack of chorea the mode of life of the child must be carefully regulated. There should be at least six months' absence from school, although home lessons may be allowed under a teacher who will not allow the instruction to be a burden or worry to the child. The whole system, and more especially the nervous centres, require time for recuperation and building up. Hence good food, cod-liver oil and hypophosphites, fresh air, and exercise are of the first importance. If rheumatism has been present, the special precautions already given in connection with rheumatic subjects must be attended to. The excitements which are so freely provided for children in the present day, such as parties, shows, theatres, etc., must be strictly forbidden. In any case it will take years before the

tendency to cortical irritation engendered by one attack of chorea will subside. If the child does return to school eventually the effect must be noted, and under no circumstances should the strain of competition be allowed a choreic child. Even after childhood, the question of how far ordinary school life is advisable can only be settled by the length of time during which there has been complete absence of symptoms.

CHAPTER IV

THE ACUTE SPECIFIC FEVERS

General lines of treatment—Measles—German measles—Hooping-cough—Scarlet fever—Enteric fever—Diphtheria—Mumps—Chicken-pox—Influenza—Acute cerebro-spinal meningitis.

It is during the period of childhood that specific fevers prevail to the greatest extent. Infants under the age of one year escape for the most part, partly owing to a natural immunity at that age, and partly from the fact that they are not exposed to contagion from direct contact with infected persons so much as older children. School life, children's parties, and all indoor gatherings of children contribute greatly to the spread of infectious diseases. Hence, during the presence of an epidemic it is always advisable to keep a child as far as possible from intercourse with other children.

There is much that is common to the treatment of all acute infectious disease and there is little that is specific. In the case of diphtheria we have a very successful form of specific treatment by antitoxin, and in that of cerebro-spinal meningitis we have a promising method in Flexner's serum, but as regards the other fevers here discussed no specific has yet been discovered. In many of them the cause is unknown, although in all there is probably some specific micro-organism at work. None the less the treatment although but preventive and palliative is

of great importance. It is preventive as regards the means taken to check the spread of the disease to others. Measures have to be taken to prevent the occurrence of complications. The good results in this matter are shown very strikingly in the freedom from broncho-pneumonia in cases of measles and hooping-cough carefully treated as contrasted with the frequency of that complication in untreated cases. The palliative treatment will often be the means of affording much relief to the patient's discomfort, and of tiding over successfully an illness which threatens life itself.

The first thing to do in the case of infectious disease, suspected or diagnosed, is to **isolate the patient** and to take precautions that infection will not be spread from the sick room by persons or things. The top floor of the house is always the most suitable one for isolation purposes. It must be remembered that children are much more liable to infection than adults, and that special precautions should be taken as regards the healthy children in a family. The plan sometimes adopted in the case of the milder fevers, such as measles and chicken-pox, of exposing the healthy children to infection, so that all may have the disease and be done with it, is not to be recommended. A trifling infection in one patient may lead to a very serious condition in another, and the physician's duty is to prevent disease.

During the **feverish stage** the patient should be kept in bed, in the largest room available. The temperature of the room should be maintained as steadily as possible at from 60° to 62° F. Some authorities recommend a higher temperature, 65° or

even 70° in the case of children, but such a temperature is distinctly enervating, and will probably be accompanied by a stuffy atmosphere. Stuffiness and draughts should be carefully avoided. The sick room should be well ventilated and visitors should be rigidly excluded. The body warmth of the patient is to be maintained by a sufficiency of body and bedclothes, but sweating from overclothing is to be avoided. If sweating occur in the course of the fever the skin should be thoroughly dried, as often as necessary, with a warm dry towel and freshly aired body clothing put on. It is necessary to see that the feet are kept warm by means of hot bottles, and more especially does this apply in the case of young children.

The diet during the acute stage should be fluid and light. The appetite will probably be in abeyance for a time and the digestive secretions are inactive owing to the pyrexia. A dietary consisting of milk, freely diluted with plain water, barley-water, or lime-water, weak chicken or mutton broth, cocoa with milk, and Benger's food with milk will fully meet all the requirements. If there is much gastric disturbance the diet may with benefit be limited to water, or very dilute milk-and-water, or peptonized milk. Much more harm is usually done during the acute stage by over-feeding than by under-feeding. The total amount of food in the twenty-four hours should be fixed in accordance with the age of the child, and should not be exceeded. For instance, a child of five years may be ordered one pint of milk and half a pint of weak chicken broth. These amounts are then to be divided up so that the patient has a fixed

amount every two or three hours during the day (from 6 a.m. until 10 p.m.) with perhaps one feed at night. The feeding times must be strictly adhered to, and there should be no irregular meals because the child wakes up or wants a drink or seems hungry. The common habit of letting a child drink milk at all hours because it is thirsty is specially bad, as tending to upset the digestion and destroy the appetite. On the other hand water should be given freely as a drink at any time, and the patient should be encouraged to drink, as this means of eliminating the poison from the system is one of the chief forms of treatment. Children do not as a rule care for effervescing drinks, but thin barley-water, or lemonade, or imperial drink flavoured with lemon or barley-sugar will often prove very palatable. Iced drinks are not to be recommended, but it may be left to the child's taste as to whether the fluid should be taken hot or cold. The juice of grapes and oranges is usually appreciated by feverish patients and may be given freely.

The dietary as suggested above is composed of fresh and weak foods. In the domestic circle, however, the practitioner will often meet with suggestions as to the great value of the concentrated foods, and is pressed to give something more "strengthening." Beef extracts, tinned soups, patent infants' foods, dried milk, and all the advertised nostrums are supposed to have curative properties which the same food materials do not possess in a fresh condition. This is, of course, an entire mistake and even in using these foods the first thing one has to do is to dilute them again into something like their original condi-

tion. In practice it will be found much more easy to suit the food to a child's digestive powers, than to make the digestive powers suit the food. In ordinary cases of fever these concentrated foods are not required. In prolonged cases of fever and in severe cases there may come a time when they have a value for a patient exhausted by the fever or toxæmia or gastric disturbance.

During the acute stage the **cleansing of the skin** must be carefully attended to. Amongst the poorer classes the onset of any illness is regarded as an indication to stop even the moderate ablutions which had been indulged in. But in all fevers the free action of the skin as aided by the application of water, and more especially hot water, is an important part of the eliminative treatment. It is difficult to see any advantage in using soap for a bed-ridden child. As the skin can be thoroughly cleaned with hot water the only result of using soap in addition is that more of the natural secretions and of the epidermis will be removed, and that in consequence the patient will be more liable to suffer from chilling of the surface of the body. The use of soap may be postponed to the period of health when grubby hands and face again call for stronger cleansing measures. Washing all over with hot water should be carried out at least once a day, preferably twice. As part of the ritual in the treatment of infectious disease it is customary to add some disinfectant such as Sanitas or Condy's fluid to the water. During the acute stage these ablutions should be carried out in bed as being more restful to the patient than a bath and causing less exposure of the surface of the body.

At the same time in the early stage, when a slight rash is present which it is difficult to identify, or a definite rash which it is desired to bring out more thoroughly, a hot bath with friction afterwards by means of a warm towel will be found very useful in bringing out the rash as fully as possible.

From the outset the **toilet of the mouth** should be carefully attended to. Many of the secondary complications are due to the spread of micro-organisms from the mouth, *e. g.* streptococci, staphylococci, and pneumococci. On a fluid diet the natural cleansing of the mouth is not so efficiently carried out. In the presence of a specific fever the organisms in the mouth and throat increase in number, may take on a markedly pathogenic character, and produce local inflammation. They tend to spread to the ear, to the cervical glands, to the lungs, and in some cases over the system generally. The mouth should be washed thoroughly with some mild antiseptic lotion containing boracic acid or listerine or Condy's fluid. This can be carried out by the nurse using a piece of linen rag or cotton wool, and applying it with her fingers or with a pair of forceps. If the mouth is already in an unhealthy condition it is advisable to follow up this washing with the rubbing in of some antiseptic ointment. Equal parts of boroglyceride and glycerine form a useful mixture for this purpose, and other drugs may be added, such as chlorate of potash, tannic acid, or carbolic acid, if there are special indications. At the Edinburgh City Hospital an ointment is used composed of boracic acid (3 j), oil of peppermint (℥ v) and vaseline. In the case of children this may be made up

with two ounces of vaseline. In many of the fevers the tonsils and nasopharynx are involved and one or other of the above ointments may be used for systematic painting of the throat all through the acute stage. Although vigorous painting of the throat with strong antiseptics used to be employed it is very questionable whether the effect was at all beneficial. Probably more good is accomplished by simply cleansing the throat with some non-irritating and mildly antiseptic lotion or ointment. When the nasal passages are healthy it is better to avoid any direct interference. Sometimes from the presence of adenoids the posterior nares tend to become blocked with inspissated mucus, and a mildly alkaline lotion should be used daily or twice a day, such as the following—

R. Sodii Carbonatis, Sodii Chloridi, Sodii Biboratis, āā
grs. v; Aquam Destillatam, ad ℥ j. Sig.—℥ j to be
mixed with an equal quantity of hot water.

When a nasal discharge is present, as so often happens in the case of fevers, the nose should be washed out frequently. Complete irrigation through the nares by means of a syphon douche is very difficult to carry out except in the case of older children. For those under the age of six years one may use a small glass syringe or a glass dropper. It should be remembered that it is cleansing rather than disinfection that is to be aimed at, and that any violence used or violent struggles during the procedure may lead directly to infected matter being driven into the Eustachian tubes with subsequent otitis. After the nasal washing a little vaseline or weak boracic ointment may be introduced along the

floor of the nostrils by means of a small camel's-hair brush. If the patient is unable to swallow, and feeding by the stomach tube is rendered necessary, it is always advisable to introduce the tube through the mouth and not through the nostril. The feeding tube does no harm in its passage through the mouth and pharynx, whereas it almost invariably leads in a short time to an irritating nasal discharge if introduced through the nostril.

Medicines play a secondary part in the routine treatment of fevers; and if indulged in freely are apt to do more harm than good. An ordinary febrifuge mixture, directed especially to encourage a free action of the skin and kidneys, may be ordered during the febrile stage. The drugs in common use for this purpose are the liquor ammonii acetatis, the spiritus etheris nitrosi, citrate of potash, and salicylate of soda. The enforced rest in bed and the pyrexia tend to induce a sluggish condition of the bowels, and the comfort of the patient will be much increased by the use of aperient medicines. During the acute stage a dose of calomel (grs. j to ij) or grey powder (grs. j to iij) may be given every second night, and a dose of fluid magnesia or sulphate of soda every morning. After the pyrexial stage has passed it is better to use some gentle laxative, such as cascara or senna or sulphur to produce a daily evacuation.

In former days it was usual to attack a fever as if the lowering of the **temperature** was the chief desideratum. Now the feverishness is regarded as an indication of the reaction of the system to the specific poison, and as by no means necessarily injurious to the patient. We do not therefore attempt to lower

the temperature by artificial means as long as the thermometer does not indicate a condition of hyperpyrexia (*i. e.* above 106° F.) or as long as the patient does not seem to be suffering from the pyrexia. As a rule the temperature chart shows an irregular condition of pyrexia so that a temporary rise to 105° or 106° calls for no treatment, provided that the patient is otherwise comfortable. But if such symptoms as restlessness, sleeplessness, unusual dryness of the skin or delirium are present, and if, on examination, there appears to be no cause for the symptoms save the pyrexia, then it is advisable to interfere. The most speedy method of lowering the temperature in children is by means of cold water, but experience has shown that it is almost impossible to regulate the application of cold without producing an undesirable amount of depression and weakness afterwards. Antipyretic drugs of the nature of the coal-tar products have fallen into well-merited disuse for a similar reason. Quinine is usually of no practical value save in toxic doses, and has been discarded. Full doses of the liquor ammonii acetatis, one to three drachms, are of use in so far as they tend to produce a free action of the skin, and are otherwise harmless. One good dose of salicylate of soda, ten to fifteen grains, has a similar action but tends to be rather depressing. The best means of relieving the disturbance accompanying pyrexia is by a hot bath or a hot pack, preferably the latter. A blanket wrung out of boiling water should be wrapped round the patient when the blanket has cooled to a bearable heat, and then dry hot blankets and hot bottles are to be placed round the patient. At the end of fifteen

or twenty minutes free perspiration will have been established, the patient is rubbed dry with a hot towel and then covered with hot blankets. The usual result is that the symptoms of restlessness disappear and he settles into a comfortable sleep. A bath of hot water, to which mustard may be added in the proportion of half an ounce to each gallon of water, also acts well, and after the skin has been thoroughly reddened, it is quickly dried and the patient placed in warm blankets. A condition of hyperpyrexia may occur in which the temperature is high only for a few hours and the symptoms are not such as to cause any alarm. This is sometimes seen before the rash is fully developed. No special treatment is called for. In severe cases of fever, the toxic and septic cases, **hyperpyrexia** may occur and is of grave prognostic significance. The real danger, however, lies in the toxæmia or sepsis which has overwhelmed the system, and of which the very high temperature is a symptom. Treatment is usually of very little use. One may apply cold-water cloths to the head and hot bottles to the feet. Sponging with cold water or a cold pack may be employed, the temperature being closely watched, and the treatment being stopped when it has fallen one or two degrees. Full doses of brandy are useful both in combating the prostration and in lowering the temperature. In some patients the **temperature may become subnormal** even during the acute stage of the illness. This may be associated with a very mild infection, as the condition of the patient will show, but on the other hand it may be indicative of a feeble reaction on the part of the system and

be accompanied by signs of acute illness and great prostration. In the latter case stimulants and nourishing foods are urgently called for.

The **complications** occurring during the acute stage are chiefly those associated with infection spreading from the mouth and throat, namely swelling of the cervical glands, nasal discharge, otitis media, and mastoid abscess. Cervical adenitis is best treated simply by a pad of cotton wool or Gamgee-tissue round the neck. If there is much pain present an occasional hot fomentation may be applied. If suppuration occurs the glandular abscess should be opened as early as possible. Secondary infections of the nose and ear must be actively treated, as the results may be permanently injurious to the patient, and the specific infection may persist in the discharge for an indefinite period. Vomiting may be exceedingly troublesome during the period of invasion, and is best treated by the cessation of all feeding and the administration of sips of hot or cold water. Many patients, especially those of a highly strung nervous temperament, suffer from sleeplessness. In the early stages when the poison of the fever seems to act as an excitant of the nervous system, and when the soothing effects of a hot bath or a hot pack have proved ineffectual in producing sleep, one can give a dose of ten grains of chloral hydrate to a child of five years. If any actual pain is present, two grains of Dover's powder, or two drops of liquor morphinæ may be added. During the course of the illness the best drug for sleeplessness and the least harmful is bromide of soda or ammonium. Ten grains may be given at bedtime and repeated at the end of two

hours if necessary. A hot drink with from two to four drachms of brandy often induces sleep. Drugs of the nature of veronal, trional, chloralamide, etc., are rather uncertain in their action during childhood and are better avoided. Headache if persistent may be relieved by a few grains of citrate of caffeine, or phenacetin, or antipyrin, or aspirin.

In the **convalescent stage**, *i. e.* after the temperature has reached normal, the dietary may be considerably augmented. In two of the specific fevers, namely typhoid and scarlatina, there are special reasons for restricting the diet, which will be referred to later. In the other fevers the best indication as to the dietary is supplied by the appetite of the patient. If the patient shows no desire for more food or for solid food, the best plan is to wait until the appetite is restored, and even the youngest child will manifest this stage in a most unmistakable manner. To coax to take food and to stuff with food before the digestive secretions of the mouth, stomach, and bowel are again in a normal condition is to delay and not to hasten the return to health. On the other hand when a child is clamorous for food, the mere fact that he has just had a fever is no reason for withholding solids and a nourishing diet. A return to the normal lines of feeding may be quickly instituted, and the only precaution to be observed is that too large meals should not be taken. It may be advisable for a time to give more than the normal amount in the twenty-four hours, and this is to be done by giving the food at more frequent intervals than usual. It is impossible to over-estimate the important effect that the mastication of

solid food has in keeping the mouth and throat in a healthy condition, and thus preventing the risks of oral sepsis and general infection, which are still present during the period following the pyrexial stage. Another important factor in restoring health during the convalescent stage is an abundance of fresh air. Food and fresh air are the best restoratives and the best means of preventing subsequent complications. While in the case of measles and whooping-cough more especially pulmonary complications are usually present, and require that great care should be taken in protecting the surface of the body from chills, in all cases fresh cool air to breathe will do nothing but good. In summer weather the patient may be treated out of doors as soon as the temperature is normal, resting on the balcony or in the garden, protected from draughts and with a sufficient amount of body clothing to prevent a chill. In winter a few days after the feverishness has gone the patient will make much more progress if allowed to be out of doors, except on wet or foggy days. As a rule, except in the case of very mild attacks, exercise in the open air should not be allowed until the convalescent stage is completed.

The special points in the individual fevers which seem to call for further notice will next be considered.

Measles (*Rubeola*).—Measles is a disease of importance chiefly because of the serious complications which accompany it. Many of these are brought about by the difficulty in making an early diagnosis, so that secondary troubles may arise from the absence of initial precautions before the

rash develops. The first symptoms, which may exist for four days before the typical rash appears, are often those of a common cold, with some pyrexia, and possibly a prodromal rash of an indefinite character. Before the rash has appeared there may be acute laryngitis with marked symptoms of laryngeal obstruction. In the presence of an attack of acute laryngitis in a child, with pyrexia, and without any obvious cause, measles should be suspected. The treatment called for is rest in bed, steam inhalations, hot fomentations to the neck, and hot baths or hot packs to bring out the rash. This initial laryngitis usually subsides rapidly on the appearance of the exanthem, so that although the dyspnoea may be severe, it is not necessary to perform tracheotomy, as has sometimes been done.

From the onset of the illness the eyes and nose must be carefully cleansed twice a day, whether any symptoms of coryza are present or not. By this means troublesome conjunctivitis and rhinitis may be prevented. The eyes may be bathed with warm boracic lotion, five to ten grains to the ounce, and the lids anointed with vaseline or diluted boracic ointment. If the eyes are acutely infected they may also be painted with nitrate of silver solution, ten grains to the ounce, once every day or second day. If definite inflammation of the eyes occurs, the room should be darkened, and the patient's face directed away from the light. The systematic cleansing of the mouth and throat is also very important. Otitis media and mastoid trouble are serious complications which require active treatment.

A certain amount of bronchitis is usually present.

The more important pulmonary complication is broncho-pneumonia, especially in the case of wasted or delicate children, and every effort should be made to prevent its occurrence. The careful observation of the toilet of the mouth, nose, and throat is one means. Another is the avoidance of all chilling of the surface of the body by unnecessary exposure, by draughts, by too thin body and bed clothing, or by cold feet. The debilitating effect of a stuffy room or of an overheated room will conduce to this complication. On the other hand if the room is filled with fresh cool air the lungs are much less likely to become infected. The treatment of broncho-pneumonia in measles is to be carried out on the lines laid down for that disease (*see* Broncho-pneumonia, p. 271). It would appear that the broncho-pneumonia of both measles and whooping-cough has a special infectious character, so that other measles patients or sick children in the same room are apt to develop pneumonia of a similar type. For this reason cases of broncho-pneumonia in measles, even after the normal period of infectivity has passed, should always be kept strictly isolated until the lungs are free from active disease. The value of the open-air treatment of broncho-pneumonia in measles has been specially emphasized by Dr. Claude Ker, whose results have been most encouraging.

Another risk in connection with measles is the lighting up of a tuberculous focus in the thoracic glands, or a tuberculous infection of these glands during an attack. For this reason the building up of the system in the convalescent stage by means

of nourishing food, cod-liver oil, etc., is advisable, and if coughing persists a change to a dry and warm part of the country.

In an uncomplicated attack of measles the infective period is short, and a fortnight after the onset the patient may be allowed to mix with other children. In complicated cases with otitis, or broncho-pneumonia, or any persistent nasal or other discharge, the patient should be isolated until the complication is cured. Disinfection of the room occupied can be sufficiently carried out by means of fresh air.

German Measles (*Rubella*).—This is a mild form of fever usually running its course in a few days and requiring only the general treatment of fevers already outlined. There is no tendency to complications. The patient may be allowed out of bed when the pyrexial stage and the rash are over, but should be isolated for another week. Fresh air and sunlight are sufficient for the disinfection of the room.

Whooping-Cough (*Pertussis*).—This is a common affection of childhood, and is of importance because of the great distress it causes to the child, and of the serious complications which may follow in neglected cases. Various suggestions have been made as to the origin of the characteristic “hoop.” It has been traced to irritation proceeding from the nose, the larynx, the ear, and the bronchial glands. Methods of treatment directed to local disturbance in these regions have been carried out, but have failed to secure general approval as to any beneficial effect on the normal course of the disease.

At the same time any marked source of reflex irritation, such as adenoid growths or tonsillar hypertrophy, ought to be removed in order to mitigate the severity of the illness, and diminish the risk of pulmonary complications.

As regards the general treatment the tendency to bronchitis and broncho-pneumonia, often of a serious type, must be kept in mind. Young and delicate children are specially liable to these complications, but healthy children suffering from a mild attack do not as a rule require much special treatment. In ordinary cases it is advisable to keep the patient in bed for ten days or a fortnight, and after that the question of further confinement to one room must be settled by the state of the child and the weather conditions. If there is bronchitis or broncho-pneumonia, or if the paroxysms of coughing are severe and exhausting, the patient should be kept in bed until convalescent. Fresh air, whether indoors or out of doors, is of the first importance all through the illness.

The paroxysmal attacks of severe coughing, often followed by vomiting, call for special treatment. It is to be recognized that the nervous system, in which probably lies the disturbance which evokes the attacks, is in an explosive condition, and that an outbreak may occur from a comparatively trivial cause. A draught striking the patient, cold feet, or irritation about the throat or nose may excite an attack. Changes of temperature in the air and the irregular breathing of active exercise may, while the pulmonary passages are in a sensitive condition, tend to excite more frequent paroxysms. Hence the

great value of rest in bed in marked cases. Any overloading of the stomach or indigestible food or constipation tends to excite the attacks. The direct treatment of the coughing and hooping is aided by the administration of drugs which are sedative to the nervous system. The use of ordinary expectorants, and cough medicines, are of little use in this disease except as regards pulmonary and bronchial complications. Amongst the great variety of drugs recommended for these paroxysmal attacks it will be found that all have a sedative action on the nervous system. Many act by stupefying and dulling the patient, with the result no doubt that the paroxysms are diminished in frequency, but at the same time the appetite is impaired, the secretory functions of the body suffer, and the patient's health generally is weakened. The poisoning of the patient with drugs or the further weakening of nervous centres already affected is not a method of treating hooping-cough which is to be commended. The course of the disease is such that in isolated cases one or other drug may have appeared to act like a charm, and has consequently been strongly recommended by the practitioner using it. When tested by others it is usually found that no such brilliant results can be obtained. The aim of the practitioner should be to calm the irritability of the nervous centres, without doing any harm to the patient. The bromides have such a sedative action, and are very well tolerated by children. In the acute stage from twenty to thirty grains may be given in the twenty-four hours, in divided doses, to a child of five years. In cases in which the attacks

are nocturnal chiefly, with comparative freedom during the day, it may be advisable to give a single dose only, say ten to fifteen grains at bedtime. The following is a useful prescription—

R. Ammonii Bromidi, Sodii Bromidi, āā grs. ij ss;
Tr. Digitalis, ℥ j; Tr. Nucis Vomicae, ℥ ij; Sp.
Chloroformi, ℥ v; Aquam ad ℥ ij. Sig.—℥ ij to ℥ iij
six hours.

The bromide mixture may be continued until the child is distinctly drowsy, and then the dose may be diminished by one half. The anxiety and distress caused by the violent spasms are also much relieved by the use of the bromides. In individual cases further benefit may be derived from the addition of some other drug, given in small doses, such as chloral hydrate, antipyrin, belladonna, or hyoscyamus. Opium is, of course, the most powerful sedative, but has so many drawbacks that its use, and that of chloroform (by inhalation), are to be reserved for the extremely violent forms of paroxysm producing great exhaustion or threatening internal hæmorrhage. Quinine has been regarded by some as a specific, but its value is slight unless pushed to a toxic effect. Veronal, trional, choralamide, and bromoform are of little use unless given in doses which act injuriously on the child. The paroxysms tend to be most severe in debilitated children in whom the nervous centres are weak and irritable, *e. g.* from rickets, and will often be mitigated by stimulant and tonic treatment. In all such cases cod-liver oil holds a foremost place, and I believe that more benefit is derived from it in the case of delicate children than from any of the so-called

sedative medicines. It may be prescribed along with two old-fashioned remedies, sulphur and aniseed oil, as follows—

R. Sulphuris, gr. ʒ; Olei Anisi, ℥ ss; Ol. Morrhuæ,
3 ss-ʒ. T. D. S.

Port wine is also an excellent tonic in such cases.

The effect of the inhalation of the coal-tar products, such as carbolic acid or creosote, is regarded by most observers as distinctly tending to diminish the number and violence of the paroxysms. Cresolin is a useful form, and is supplied with an apparatus for volatilization, and carbolic acid or creosote may be similarly used by heating over a spirit lamp. This is preferably used once daily in the evening so as to aid in securing unbroken sleep, but may be used oftener if desirable. From one to two drachms may be used at a time, and it is not advisable to develop too strong a carbolized atmosphere, as from absorption carboloria and carbolic acid poisoning may supervene. Another method of checking the paroxysms which is favourably spoken of is the firm application of a belt round the abdomen. This should not be used if there are pulmonary complications affecting the breathing.

The vomiting which so frequently follows a paroxysm of coughing calls often for special attention to the feeding. The ordinary fever diet does not require alteration, but the feeds should be small and given at more frequent intervals. When the paroxysms occur with any regularity it is often advisable to feed soon after an attack, and then keep the patient resting quietly for a time. The best way

to treat the vomiting is to allay the violence of the coughing attacks.

Isolation should be maintained for a period of six weeks. Probably in the majority of cases the patient is free from infection long before that, but there is a prejudice against allowing a hooping child to mix with other children, which must be respected. Thorough disinfection of the room and clothes should be carried out. Frequently the attacks of coughing persist at intervals, and are the only sign of disease. In such a case a change to the seaside is called for, and will prove the most effective means of finally getting rid of the cough.

Scarlet Fever (*Scarlatina*).—Fortunately the type of this disease now usually met with is of a mild character, and the treatment required is rather one of prevention as regards complications than curative as regards severe sepsis and toxæmia. The severely toxic and septic cases call for energetic stimulation, but as a rule treatment has very little effect. On the other hand, if treatment is carried out carefully from the beginning much can be done in preventing those complications.

As regards the general treatment, a very strict quarantine and careful disinfection of all the feeding vessels, towels, bed-linen, etc., in use are called for. During the period of the rash there may be considerable skin irritation, which may be alleviated by sponging with warm carbolic lotion (one per cent. strength), or by a dusting powder composed of equal parts of starch, bismuth, and oxide of zinc. After the rash has subsided it is usual to anoint the skin all over with a mildly antiseptic oil or ointment.

This tends to prevent the dry scales of the skin from spreading through the air, and at the same time hastens the completion of the peeling process. Salicylic acid ointment, two and a half grains to the ounce, is specially useful for this purpose. Other applications in common use are weak boracic ointment (grs. x to $\bar{3}$ j), or eucalyptus oil in olive oil ($\bar{3}$ ss to $\bar{3}$ j), or simply vaseline or olive oil. It is not advisable to use carbolic acid for this purpose owing to its irritant effect on the kidneys. The inunction may be carried out once a day or every second day.

From the outset the cleansing of the mouth, throat, and nose must be carefully attended to, as previously described. In mild cases Dr. Claude Ker uses a non-irritating gargle of listerine, two drachms in a tumblerful of hot water. Dr. William Hunter insists on the importance of removing as far as possible every source of oral sepsis by daily swabbing of any septic focus in the mouth, with 1 to 40 carbolic acid lotion throughout the earlier course of the disease. For the pain often accompanying the sore throat Dr. Knyvett Gordon recommends packing the neck externally with ice-bags and giving ice to suck, or frequent irrigation of the throat with very hot water. He is not an advocate of any germicidal treatment of the throat in ordinary cases, but believes in free irrigation with a warm alkaline solution. Should these measures fail to prevent the occurrence of otitis media, this complication must be carefully treated and the ears syringed with warm boracic lotion. If there is redness, tenderness, or fluctuation behind the auricle, Dr. Claude Ker finds that a free

incision dividing the periosteum over the mastoid bone, followed by hot fomentations for a few days, will usually check any spread of the disease in that direction.

During the febrile stage the diet is to be of the usual fluid variety, preferably diluted milk only, with plenty of water to drink. After the temperature is normal the diet must be limited to farinaceous foods, *e. g.* puddings, porridge, bread, biscuits, and to milk, butter, and sieved potato, for a period of two to three weeks. The object is to prevent as far as possible any irritation of the kidneys through food materials, or an excess of food, which might increase the tendency to the toxic nephritis of scarlet fever.

Scarlatinal nephritis may develop during the febrile period, or during the convalescent stage, when it will probably show itself during the third week of the illness. For this reason it is a good rule to keep every case of scarlet fever, however mild, in bed for three weeks. Care must also be taken to prevent any chilling of the surface of the body or unnecessary exposure. The urine should be examined daily from the outset for the presence of albumin. Should albuminuria occur, and tube casts or other evidence of nephritis be determined, the case is to be treated on the lines suitable for acute nephritis, as regards diet and drugs.

Arthritis may occur in the course of an attack of scarlet fever, and is to be treated by rest and hot fomentations to the joints. It is held by some to be toxic in origin, and by others to be really rheumatic. Poynton has found other evidences of

rheumatism in a large proportion of cases. Salicylate of soda or aspirin should be given, but as a rule the salicin compounds have not such a marked effect as in acute rheumatism.

At the end of three weeks in an uncomplicated case the patient may be allowed out of bed, but should be kept in the same room for another week. Fish, chicken and meat soups may be added to the diet. At the end of a month the patient may be considered fit to go out and to have full diet, but as the quarantine period should last for six weeks from the onset, it may not always be possible to allow an open-air life and at the same time keep up the quarantine regulations. The persistence of some desquamation is not a bar to freedom from quarantine after six weeks, but if the salicylic acid ointment has been systematically used there will very seldom be any desquamation at this time. On the other hand, the presence of any discharge from the nose, throat, ear, or vagina, or of any open wound (cervical glands, mastoid disease) must be regarded as a clear indication to continue the strict quarantine until the discharge has ceased or the wound healed. Many cases of infection are caused by patients with a persistent discharge mixing with other children.

Typhoid Fever (*Enteric Fever*).—The important features of the treatment of typhoid fever may be summed up as good nursing, a fluid diet, and rest in bed. As the patient is to be on a fluid diet for some time the toilet of the mouth must be carefully attended to. Aperients are not to be given with the freedom which may be beneficial in other fevers. At the onset of the illness and during the first week

many hold that a dose of calomel (grs. ij—iij) every second or third night acts beneficially in cleansing the bowel. There certainly does not appear to be any harm in this, but probably equally good results can be obtained without calomel, unless the initial signs point to considerable gastro-intestinal disturbance. During the whole illness constipation is a much more common condition than diarrhoea, and it is advisable that the bowels should be opened, if necessary, by a soap-and-water enema every day or second day. If the bowels are not regularly opened tympanites is apt to develop, and any over-distension of the bowel is injurious. The stools and the urine should be mixed with some strong disinfectant (carbolic lotion 1-20) before being thrown away. After each motion the skin around the perineal region should be washed with a mild antiseptic lotion, dried, and powdered. In the case of delicate children more especially the buttocks and back must be carefully protected from any soddening of the skin, or continued pressure which may lead to bed-sores.

The dietary should be strictly regulated all through the illness as to its nature, the quantities at a feed, and the frequency of feeding time. For a child of five years one may order a pint of milk and half a pint of chicken or mutton soup daily. This may be divided into eight feeds of five ounces, given at two-hourly intervals during the day and four-hourly intervals during the night. The six milk feeds are to consist of three ounces of milk and two ounces of plain water or thin barley-water, and the other two feeds of five ounces of weak soup. If there is any

tendency to diarrhoea, the soup should be stopped and replaced by milk feeds, which may be diluted with lime-water instead of plain water. The soup should be plain, without any barley or vegetable thickening. These amounts represent an average amount for an average child. If less is desired, then less should be given until the appetite improves. If more is desired it should not be given, but in certain cases the milk feeds may be strengthened by the addition of albulactin, or plasmon, or egg albumin, up to half an ounce in the day. The patient should be encouraged to drink freely between the feeds, and for this purpose a flavouring of lemon or cinnamon may be added, or the fresh juice of grapes or oranges.

Some patients do not tolerate or take milk well, and undiluted whey may be substituted, up to one and a half pints daily. It must be remembered, however, that whey is of very poor nutritive value and cannot be regarded as a complete substitute for milk. In other cases peptonized milk will be well tolerated, but as a rule patients lose weight on whey or peptonized milk, and their use should be temporary only. As regards those enteric patients who are said not to be able to take milk, this difficulty has in my experience always melted away when a trained nurse was installed or the patient was admitted to hospital. For debilitated subjects, disinclined to take much food, the meat extracts—such as Brand's jelly, Valentine's meat-juice, and raw meat-juice—have a distinct value as stimulants. If cardiac or general weakness is pronounced a mixture of brandy and egg albumin is both stimulating and nutritious.

The pyrexial period will probably last for a fortnight or three weeks, and during the whole of that period no solid food should be given. At the end of three weeks if the general condition is satisfactory, the patient will probably be decidedly clamorous for food. The semblance of solid food may be secured by giving a small plate of junket, flavoured with cinnamon, and solemnly described as a pudding. The reality may be accomplished by giving half an ounce of chocolate twice a day, with instructions that it is to be thoroughly well chewed. After a couple of days of normal temperature the quantity of milk may be increased, and the patient may be gradually introduced to farinaceous diet, comprising bread and butter or dripping, toast, and milk pudding. The amount of food must be increased very slowly, and a return to the original fluid diet should be made at once on signs of a relapse appearing or a rise in temperature. There are other causes, however, for a rise in temperature, and any possible source should be carefully looked for. A common cause is an accumulation of hard fæces in the lower bowel, which may form in spite of the regular use of enemata. For this condition an enema of olive oil (℥ ij) may be given at bedtime, to be retained and followed by a soap-and-water enema in the morning. Half-drachm doses of castor oil may be given by the mouth, three in all, at four-hourly intervals. Examination should also be made as to the presence of any boil or abscess about the skin, or any sign of otitis. If such a cause for pyrexia be discovered and relieved the temperature will probably fall to normal again. After the

farinaceous diet has been continued for a week, eggs, fish, and chicken may be added.

It is quite possible to obtain equally good results by more abundant feeding and more solid food during the pyrexial stage, but a method such as that outlined above has stood the test of experience well, and should anything go wrong on a fuller diet one could not help feeling that this might have been prevented. In children the result of a prolonged fluid diet is usually very satisfactory, provided that the case comes under treatment at an early stage, and, further, the recuperative powers are usually unimpaired, as evidenced by the rapid convalescence. In severe cases and in relapsing cases the treatment should be carried out on the same lines, but more stimulation and more stimulating food may be called for. Looseness of the bowels is usually controllable by dietetic measures such as small feeds, the use of whey, and plenty of lime-water. If excessive, diarrhœa may be checked by bismuth or a suppository of morphine (gr. $\frac{1}{12}$), or a few drops of chlorodyne or nepenthe by the mouth. Meteorism may cause trouble and is to be relieved by a turpentine enema, and turpentine fomentations to the abdomen. For this condition irrigation of the bowel with hot water through a long tube is also useful. If the abdominal distension seems to be associated with intestinal fermentation, a mixture containing castor oil (℥ xv) and salol (grs. iij) may be given thrice daily. Intestinal hæmorrhage is rarely met with, and is best treated by a hypodermic injection of morphine and cold cloths to the abdomen. Perforation as a complica-

tion can only be successfully met by surgical treatment.

Rest in bed should be maintained for at least a fortnight after the temperature has reached normal. During this time the urine should be cleared of typhoid bacilli by giving urotropine (grs. ijss-v) well diluted with water three times a day. It is usual during the acute stage to keep the patient absolutely lying down with at most one pillow. When the temperature has reached normal an extra pillow may be allowed, but there should be no sitting up for another week. In the treatment of typhoid fever the great secret of success is care in the management of the patient and his diet, and this is to be carried out through convalescence as well as during the acute stage. The infective period may be said to terminate with the usual convalescent period, *i. e.* three weeks after the temperature is normal.

Diphtheria.—The fact that we possess in antitoxin a specific method of treatment in diphtheria does not mean that the general rules for the treatment of a patient suffering from an infectious fever should not be rigidly carried out. The care of the mouth and throat is of great importance, and although strong antiseptics and caustics are not now applied to the visible membranous parts, they should be painted regularly with some non-irritating lotion such as equal parts of glycerine and boroglyceride.

Although antitoxin is to be given at whatever stage of the illness the diagnosis is made, it has been found by experience that while almost invariably

successful when given on the first or second day, the prospect of recovery diminishes with each day that elapses before the treatment is begun. Therefore even in a doubtful case, seen at an early stage, an injection of from 1500 to 2000 units may be given at once, and if the bacterial examination shows no evidence of diphtheria, no harm will have been done. If the disease should prove to be diphtheria, this early injection may be of the greatest value in mitigating the severity of the attack. For the details of the antitoxin treatment we naturally turn to the experience of clinicians at a fever hospital, and the following rules of practice are taken from the writings of Dr. Claude Ker, of the Edinburgh City Hospital.¹ The skin and instruments used must be carefully sterilized as for a surgical operation. The injection may be made into the subcutaneous tissues of the flank or between the shoulder-blades. The smallest dose which he is in the habit of giving is 1500 units, and this chiefly to cases which are more bacteriological than clinical diphtheria. So far as infants are concerned he seldom gives more than 4000 units at a single dose, but to children of over one year he gives 6000 units without hesitation, provided that such a liberal dose be called for. As regards the day of the illness, second-day cases which are purely tonsillar receive 3000 units, and an additional 1000 units are added for third-day cases. As regards the situation and extent of the lesion, he adds 1000 units to the above if the pillars of the fauces, or the uvula, or the posterior pharyngeal wall, be also involved. Cases of laryngeal combined with faucial lesions

¹ *Infectious Diseases*, by Claude B. Ker, M.D. London, 1909.

receive not less than 6000 units, and if the nose be involved as well he gives his maximum dose of 8000 units. In cases of diphtheria affecting the vulva or the conjunctiva large doses should be given. As regards nasal diphtheria, he makes a distinction between the cases in which there is merely a chronic dirty discharge containing bacilli, which hardly require serum treatment, and the cases with actual membrane and well-marked toxæmia, which require large doses. In all cases of severe toxæmia, of great glandular swelling, and of marked albuminuria it is advisable to give full doses. As regards the question of further injections, which are not as a rule necessary in cases treated early in the attack, he gives a second injection in from six to eight hours if the patient is extremely ill, and if the symptoms are less urgent in from twelve to twenty-four hours. As a general rule a twenty-four hour interval may be allowed between the doses until improvement has taken place, and the membrane has disappeared. There may be no visible improvement until the patient has received over 20,000 units, but he has never pushed the total amount beyond 64,000 units, although this has been far surpassed by other clinicians.

One of the great dangers in connection with diphtheria is the tendency to cardiac failure, which is present during the acute and also during the convalescent stages. For this reason it is necessary to maintain the recumbent position during the whole course of the acute stage. No pillows should be allowed unless the breathing calls for some elevation of the chest, and in the case of restless

children it may be necessary to fix down the shoulders with straps lest they sit up suddenly. The heart must be carefully watched for any signs of weakness, such as tachycardia, faint sounds, or dilatation; and stimulation by means of brandy and strychnine should be carried out on the first appearance of any such weakness. After the end of the second week a pillow may be allowed, and later a second one. If the general conditions are favourable the patient may be allowed to sit up after the end of the third week, and a few days later to be out of bed in a chair. If the attack has been a severe one it may be necessary to prolong the period of rest up to six or eight weeks from the onset.

When the larynx is affected a steam-kettle used at regular intervals affords great relief, and by checking the tendency to laryngeal spasm may give time for the antitoxin to act and thus avoid the necessity for tracheotomy. If the obstructive symptoms are marked, namely dyspnoea, stridor, and cyanosis, the operation of tracheotomy should not be delayed, as the patient will rapidly lose strength and cardiac failure may supervene suddenly. Intubation of the larynx for obstructive symptoms is of service only when skilled hands are available to introduce the tube and to reintroduce it at any time should it be coughed up.

The progress of the convalescent stage may be interrupted at any time by the onset of post-diphtheritic paralysis, the first symptoms of which usually appear from the fourth to the sixth week. While those may be slight and evanescent in many cases, there is always a possibility of the paralysis

affecting the medullary centres. As regards the preventive treatment of this extension of the paralysis there is no more important factor than rest. Even if the paralysis is but slight, affecting the palate, or the ocular muscles, or the diaphragm, the patient should at once be replaced in the recumbent position and kept there by means of shoulder straps. One who has not had experience of the terrible suddenness with which cardiac failure may come on and death ensue in some cases of diphtheritic paralysis where the patient has sat up or been taken out of bed can hardly realize the great importance of complete rest during this stage. Even while resting, the symptoms of medullary disturbance may come on and develop rapidly. Free stimulation should be carried out in the form of brandy and strychnine and atropine in full doses, the latter two being given hypodermically. Dr. J. D. Rolleston strongly recommends the oral administration of adrenalin solution as a prophylactic against cardiac paralysis. He gives ten-minim doses every two hours during the first fortnight. At the South Eastern Fever Hospital Dr. E. F. Coghlan has found the following combination very valuable in cases of cardiac failure—

Atropine Sulphate, gr. $\frac{1}{100}$; Strychnine Hydrochloride, gr. $\frac{1}{100}$; Adrenalin Chloride Solution (1-1000), ℥ v; Water to ℥ x.—To be administered hypodermically every four hours.

When the palatal and laryngeal muscles are involved swallowing may be difficult, and the risk of food entering the larynx and producing septic pneumonia is great. In such cases feeding by the

stomach tube should be carried out until the power of swallowing is restored. Uncontrollable vomiting is a symptom of grave significance, and mouth feeding should be stopped for a time. Saline fluid may be administered *per rectum*, along with brandy, and if necessary saline subcutaneous injections may be given. In the case of children nutrient enemata or suppositories are of little value. The paralysis may extend to all the muscles of the limbs, so that the patient may be unable to move. Provided that the medullary centres are not seriously involved this condition usually passes off in time, and in the later stages massage and electricity may be applied with advantage to the weakened muscles.

Strict isolation of the patient should be maintained during the whole course of an attack of diphtheria, and all vessels and utensils used by the patient must be carefully disinfected, as well as the room after he has left it. The duration of infectivity is said to be measured by the period during which the bacilli are present in the throat, but this in some cases will last for many months. When the patient is clinically well, *i. e.* from four to eight weeks after the onset, it is always advisable, in cases of faucial diphtheria at least, to examine the throat for Löffler's bacillus. If this proves negative, and if there is no nasal discharge or otitis or discharging sinus, the patient may be declared free from infection. If, on the other hand, the swab be positive, the throat should be thoroughly irrigated and painted with some mild antiseptic. Should the tonsils be enlarged and ragged it may be advisable to excise them as the only means of getting the parts

cleansed. A weekly examination of the throat should be made for bacilli, and a negative finding will at once bring the isolation period to a close. Even if the finding is still positive at the end of four weeks of this treatment, the patient may be allowed freedom, as the degree of infectivity has probably by this time become extremely slight, and there is no means known at present by which the bacilli can be eradicated in such cases. In the case of school children it is not advisable to allow a return to school until the throat has been proved to be free from infection. All open wounds or discharges (nasal or aural) must be cured before the patient is freed from quarantine.

Mumps.—This affection calls for little special treatment. If the pain and swelling of the parotid glands are marked, hot fomentations, sprinkled with liniment of belladonna may be applied at intervals, and at other times the neck and face should be swathed in cotton wool. The bowels should be kept open with a mixture of sulphate and phosphate of soda, or other saline. The cleansing of the mouth should be attended to. Rest in bed is advisable for a week, after which the patient may be allowed to be up in the room. These precautions are called for more particularly to prevent the occurrence of orchitis or ovaritis. The patient should be isolated for three weeks and then have a disinfecting bath. The disinfection of the room may be carried out by means of fresh air through open doors and windows.

Chicken-pox.—There is no special treatment called for in this usually very mild fever. In young children there is a great tendency to scratch the

vesicular areas and make open sores. This must be prevented by allaying irritation with a dusting powder of equal parts of starch, zinc, and boracic acid, and if necessary by splinting the arms of the child so that it cannot reach the spots. The period of isolation should last until the last crust has come away, and usually runs to about three weeks.

Influenza.—The general treatment of all fevers is called for in influenza, rest in bed from the onset being specially important. It is usual to give a mixture containing salicylate of soda or aspirin during the first few days. The ammoniated tincture of quinine in half-drachm doses, and Dover's powder in doses of one to two grains are also useful during the acute stage. Sweating is to be encouraged by means of hot drinks and, if necessary, a hot pack. The complications of this trouble are usually determined by the constitutional or local weakness of the patient, and may show themselves as pulmonary, alimentary, or nervous disturbances, which are to be treated on general lines. Rheumatic or tuberculous lesions may be stimulated into fresh activity during an attack of influenza. Prostration is often very marked and should be counteracted by nourishing foods, brandy, and strychnine. A troublesome cough may persist for some weeks after the acute attack, and may not yield to hot steaming, with benzoin, or to an opium mixture. For this condition and for the nervous exhaustion which so often follows an attack, the best treatment is a change to the seaside or to some warm spot where the patient can be out in the open air for the greater part of the day.

Acute Cerebrospinal Meningitis.—In a sporadic form this disease is known in infants as posterior basic meningitis, and is referred to in another section. Acute epidemics of the disease have occurred in this country and to a much more pronounced extent in America. The infectivity of the individual in a house does not appear to be great, and it is believed that infection is spread by carriers who have the organism in the nose and throat. In the acute form strict isolation should be maintained until the patient has recovered and is free from all discharge about the nose or ear.

The general treatment of the acute form is the same as that described in connection with the sporadic form, with the special precautions employed in all cases of infective fevers. One great advance on this purely symptomatic and expectant line of treatment has been made by the introduction of Flexner's serum. Other sera are on the market, but the best results have been obtained by the former. As soon as possible lumbar puncture should be performed and from 20 to 30 c.cm. of cerebro-spinal fluid removed, for bacteriological examination. If the fluid is at all turbid, and if the clinical diagnosis is that of acute cerebro-spinal meningitis, then from 15 to 20 c.cm. of Flexner's serum should be warmed and injected at once into the spinal canal. If the bacteriological examination shows the meningococcus, the process of tapping the spinal canal and injecting the serum should be repeated daily for four days. Care is to be taken that more fluid is removed than the amount of serum to be injected, otherwise headache and an increase of symptoms

may follow. The earlier in the disease this treatment is given the better are the results. At the end of four days an interval of two or three days may be allowed to elapse, and if the symptoms persist, another course of injections may be given. If, on the other hand, the temperature falls to normal and the symptoms improve, one can wait for any signs of a relapse before repeating the treatment. Claude Ker has observed that some children scream persistently for an hour or longer after the injection of the serum.

CHAPTER V

DISEASES OF THE ALIMENTARY SYSTEM

Thrush—Ulcerative Stomatitis—Disorders of Dentition—Tonsillitis—Pharyngeal Abscess—Disorders of the Stomach—Chronic Gastro-intestinal Catarrh—Acidosis.

Thrush is due to a parasitic growth (*Oidium albicans*) occurring in white patches on the mucous surfaces of the mouth and tongue in debilitated infants. It is to be regarded as an indication of the profound state of exhaustion into which the patient has fallen rather than as a disease. The important part of the treatment is therefore to build up the general health as quickly as possible, and to treat any underlying disease. Stimulants such as brandy are useful, and tonics such as quinine and strychnine. When the tissues are restored to a healthy condition the thrush will soon disappear. To expedite matters, and to prevent the extension of the trouble, the mouth should be cleaned carefully after each feed with a warm bicarbonate of soda solution (grs. v to the ounce). This will remove some of the thrush and all loose particles of milk, etc. The mouth should then be painted or rubbed over with glycerine of borax or mel boracis. By this means the patches of thrush which are often very adherent will be gradually removed. In this and in all other infective diseases of the mouth it is very important that all the feeders should be

scrupulously clean, and that no "comforters" be allowed, as they are simply disease carriers.

Ulcerative Stomatitis is a common affection in children, and occurs most frequently after some teeth have been cut. It would appear to be an infectious disorder, as several members of the same family are often affected at the same time. The ulceration, at first patchy and around the teeth, tends to spread to the tongue, and to the mucous surfaces of the cheeks. Larger patches of ulceration may be formed by the coalescence of smaller ones. The mouth is extremely tender, the teeth are often loose, the salivation is profuse, and the breath is most offensive. The ulceration may extend as far as the tonsils. Any source of infection about the house should be looked for and removed, and any habits which may have led to the direct transference of the poison to the mouth must be corrected. The diet should be such as not to irritate the mouth, which is extremely sensitive. Milk, milk gruel, and boiled bread-and-milk are sufficient during the acute stage. One grain of calomel on three successive nights, followed by a dose of saline in the morning, will help in relieving both the constitutional disturbance and the local condition. The most useful drug is chlorate of potash, which may almost be regarded as a specific. If used locally it causes extreme pain, and does not do so much good as taken internally. It appears to be aided in its action by iron as in the following formula—

R. Potass. Chlorat., grs. ij; Liq. Ferri Perchlor., ℥ iv;
Syrupi Simplicis, ℥ x; Aq. Destill. ad 3 j.

One drachm may be given thrice daily to an infant of twelve months, and two drachms to a child of five years. This medicine ought to be given in milk or with barley-water so as not to cause pain in the mouth. Local treatment does not appear to be really necessary, apart from a mouth wash of Condy's fluid and water, or Sanitas and water. In severe ulcerative cases local treatment may be found advisable to check the extension of the disease. In such cases the following lotion is both sedative and antiseptic—

R. Liq. Hydrarg. Perchlor., $\frac{3}{4}$ jss; Boroglyceride, $\frac{3}{4}$ ij;
Glycerini, $\frac{3}{4}$ j; Aquam ad $\frac{3}{4}$ iv. Sig.—To be painted
on thrice daily.

The acute condition will usually yield to treatment in three or four days, and the whole attack will probably be over in a week. The chlorate of potash should not be continued longer than is necessary owing to its depressing effect, but the iron may be given for another week. After a cure has been effected the teeth should be examined by a dentist (who will probably find some carious teeth which require treatment), in order to maintain a healthy condition of the gums and prevent further infection. Ulceration of the gums is sometimes associated with scurvy, but the great swelling and sponginess in the latter affection show that something more than simple ulceration is present.

Disorders of Dentition.—The process of dentition in a healthy infant who is properly fed is seldom, if ever, more than the cause of slight temporary discomfort. In weakly infants, however, and in those who are improperly fed, many

disturbances are apt to be present during the period of dentition. These are not necessarily due to "cutting the teeth." An eight-months old infant begins to get "fretty" and its cry is interpreted as implying hunger. Food and feeding times are increased until stomach and bowels are completely upset, and then the doctor is called in to confirm the diagnosis of teething and to lance the gums. Or it may be that at the teething time an infant has been weaned and cows' milk and solid food have been given. A certain amount of gastrointestinal disturbance follows, and again the diagnosis is teething. Many other illustrations of the so-called "disorders of dentition" might be given, which all point to the important rule, that one should never ascribe an illness to teething until other sources of disturbance have been excluded by a careful examination. The cause of the child's illness may be found in the ear, the throat, the lungs, the brain, etc., but most frequently it is in the alimentary canal. Dr. Leonard Guthrie says: "The mouth is part of the alimentary tract, and the teeth and gums are part of the mouth, and therefore share in the general disturbance caused by indigestible and irritant matter in the intestines."

It is never advisable to make a diagnosis of teething disorder unless there are definite objective signs about the gums. If they are swollen, inflamed, tender, dry, and hot, one may naturally conclude that they are a source of discomfort to the infant. Even in such cases it is doubtful whether the teeth are the cause of the trouble. Certainly, in many cases, one can bring the gums

into a healthy condition without the eruption of a tooth taking place. Swollen gums do not always mean a teething process, and acute gingivitis is more frequently the result of some local infective disorder.

In all disorders which are popularly ascribed to teething, the first part of the *treatment* is to leave the teeth severely alone. Dietetic errors and gastrointestinal symptoms should be looked out for and treated. Rickety children are supposed to be specially liable to teething disorders, but here also the teeth are probably less to blame than the stomach and bowels. If one has excluded any definite disease outside the alimentary system, the following lines of treatment may be adopted. For a few days the diet should be reduced by one half, and should consist of equal parts of milk, lime-water and barley-water. Two grains of grey powder or one grain of calomel may be given to an infant nine months old, and this may be followed by the *mistura ricini* (p. 29), 1 drachm thrice daily. If much restlessness is present, 3 or 4 grains of bromide of ammonium may be added to each dose. Great attention should be paid to the disinfection and cleanliness of the mouth. After each feed the mouth should be thoroughly cleansed with hot boracic lotion and cotton wool. Dr. Eustace Smith recommends that the swollen and inflamed gums be rubbed with lemon-juice, which causes some smarting at first, but afterwards has a sedative effect. Should the gums be lanced? Lancing will have no effect in bringing on the teeth, and will only relieve symptoms by the process of blood-letting. If the practitioner cannot procure rest to

the child by other means, he may be justified in incising the gums, but it is a proceeding which is very seldom called for, and it is not without danger, as septic infection may follow. We should advise rather 5 minims of paregoric for the relief of pain. Sometimes advice is sought because teething is delayed beyond the normal period. In such cases, if the delay is real, the child should be examined as to its general condition, and some accompanying disease will usually be found. The most common causes are rickets and defective cerebral development.

Tonsillitis is a very common affection in children. One attack seems to predispose to another, and the result of repeated attacks is a chronic enlargement of the tonsils. The affection is usually pyrexial, and frequently a temperature of 103° or 104° F. may be the only sign of disease. The child may complain of no pain and of no difficulty in swallowing, and unless one remembers that tonsillitis is frequently a cause of pyrexia, the condition may be entirely overlooked. The association of tonsillitis with many of the eruptive fevers is so marked that it is advisable in every case of sore throat to examine for a rash, and in every case of a doubtful rash to examine for tonsillitis. An attack of tonsillitis is often rheumatic in origin, and unless the nature of this form is recognized, very serious results may follow. Although the associations of tonsillitis are numerous, it is impossible to differentiate them from the appearance of the tonsillar inflammation. The common distinction to be made is between acute tonsillitis and acute follicular tonsillitis.

Acute Tonsillitis is usually the result of some infection from without. One tonsil may be involved at first, and later the other. The attack lasts for from three to seven days. The patient should be kept in bed during the whole of the pyrexial stage, and for some days longer in cold weather. The diet should consist of milk and barley-water, milk gruel, boiled bread-and-milk, and simple milk puddings. It will sometimes be found that milk thickened with solids is swallowed more easily than the plain fluid. A sharp mercurial purge should be given at the outset, 2 or 3 grains of calomel at night, and 2 drachms of sulphate of soda or magnesia in the morning. This treatment, in half-doses, may be repeated with benefit on the two following nights. If much pain is present, or much glandular swelling in the neck, the use of intermittent hot fomentations or poultices will give relief. In older children cold applications may be used instead of hot. Much relief is afforded by irrigation of the mouth and throat by means of a fountain syringe. The fluid used should be a hot alkaline lotion (sodium bicarbonate, grs. v to 3 j) which will prove both soothing and cleansing. Gargles and sprays are not suitable for use in childhood, and it is doubtful whether painting the tonsils is of much benefit in simple tonsillitis. For the relief of pain, glycerine or bismuth lozenges, or carminative magnesia tablets may be used. Whether the tonsillitis is rheumatic or not, the following medicine acts beneficially, and should be given throughout the acute stage—

R. Sodii Salicyl., grs. v; Sodii Bicarb., grs. x; Syr. Zingib., ℥ iii; Aquam ad 3 j.—T.D.S., vel quartis horis.

Follicular Tonsillitis, or "ulcerated sore throat," is a form of tonsillitis in which the follicles are specially involved. The inflammatory products are exuded, and appear as small yellowish-white specks on one or both tonsils. Later, these specks may increase and coalesce to form large, soft patches, covering a large part or the whole of the tonsil. The condition may often be difficult to distinguish from diphtheritic tonsillitis. The exudation in the former is usually yellower in colour, softer in consistency, and can be stripped off more readily. Further, in the former the fever is higher, the illness develops more acutely, and the patient at an early stage looks more severely ill than in diphtheria. The treatment consists of rest in bed, simple diet, and purgatives, as in acute tonsillitis. Chlorate of potash and iron should be administered in full doses as follows—

R. Potassii Chloratis, grs. ij; Liq. Ferri Perchloridi, ℥ iv; Aquæ Chloroformi, ℥ xxx; Syrupi, ℥ v; Aquam Destillatam ad ʒ j. Sig.—ʒ j to ʒ ij every four hours according to age.

After two days the frequency may be reduced to three times daily. Local disinfection of the throat should also be carried out by means of some lotion, such as the following—

Liquor Hydr. Perchlor., ʒ jss; Boroglyceride, ʒ ij; Glycerini, ʒ ij; Aq. ad ʒ iv. Sig.—To be painted on the throat thrice daily.

Rheumatic Tonsillitis is usually to be diagnosed from the presence of other signs of rheumatism, or from the persistence of the tonsillitis. Pain on swallowing is usually a prominent symptom, and there may be some stiffness of the neck, or pains

about the legs, or a valvular murmur. When a simple tonsillitis does not yield to treatment, and the temperature persists, rheumatic tonsillitis should be suspected, and suitable treatment adopted (*vide* Rheumatism).

The treatment of chronic enlargement of the tonsils will be discussed later in connection with the subject of post-nasal adenoid hypertrophy.

Suppuration — peritonsillar abscess — does not occur nearly so frequently in connection with the acute tonsillitis of childhood as in adult life. The treatment is the same, viz. as soon as the presence of pus is diagnosed, to use a knife or sharp sinus forceps for its evacuation. There may be great glandular enlargement in the neck in connection with acute tonsillitis. In childhood, suppurative adenitis—the result of tonsillitis—is very common, much more so than in adult life. When one or more glands have suppurated, the only treatment is by operation.

Pharyngeal Abscess.—This is a not uncommon affection even during the first year of life, and may seriously imperil an infant's life if not diagnosed. According to Mr. Waugh¹ there are three forms of abscess about the pharynx: (1) the result of some inflammatory affection of the tonsil; (2) the result of a broken-down cervical gland; and (3) the result of tuberculous disease of the cervical vertebræ. The last two call for somewhat extensive operations, and are to be opened externally. The first is associated with some local infective disorder of the tonsil, often slight, so that the patient may not

¹ *The Lancet*: "Pharyngeal Abscesses." (Sept. 26, 1906.)

come under observation until the symptoms due to the abscess have caused alarm. These symptoms are due to the obstruction caused by the abscess as it extends from the tonsil round the back of the pharynx, possibly even to the other side. Swallowing is interfered with. Respiration is impeded, and in addition to dyspnoea attacks of cyanosis may occur. The spluttering character of the breathing is usually diagnostic. From the absence of any special nasal sniffing or laryngeal stridor one can usually identify the throaty breathing as due to pharyngeal obstruction. Much saliva is secreted and may be poured out freely from the patient's mouth. The diagnosis is made absolutely certain by a digital examination, when one can feel a bulging swelling of the pharynx directly continuous with one or other tonsil. If seen sufficiently early the ordinary treatment for acute tonsillitis may be effective in preventing the formation of pus. When an abscess has formed, Mr. Waugh recommends that it should be opened immediately through the mouth with a guarded scalpel. An anæsthetic is required and the head should rest well over a sand-bag so that the pus may not pass into the larynx. The incision should extend from below upwards and from end to end of the abscess so as to leave no pocketing. Relief is usually immediate and the subsequent treatment consists of a fluid diet and a mixture containing chlorate of potash and salicylate of soda.

Disorders of the Stomach.—On entering on the subject of affections of the stomach and bowels in early life it may be stated at once that the great majority of these are distinctly dependent on the

diet and the feeding. They are therefore preventable by the use of proper foods, properly administered. They are to be treated by giving rest temporarily to the digestive organs, and then gradually working up to a proper dietary as the disturbed organs recover their tone. These facts are well known to all who practise amongst children, but it is safe to say that they will not be recognized by the majority of parents in this generation. The general principle to be followed in connection with the treatment of the various symptoms of indigestion, namely vomiting, flatulence, colic, diarrhoea, and constipation, is to attend first of all to the diet. No one will deny that there is such a thing as idiosyncrasy as regards diet in infancy, but the cases are fewer than is commonly believed. The stomach of most infants and children is quite capable of dealing with ordinary food, and the common forms of indigestion are not due to hereditary tendencies or acquired diseases, but to improper feeding. In the following pages it will not be necessary to split up the disturbances of digestion into a large variety of ailments, and we shall consider only the temporary measures needed to restore peace before a full physiological diet can be used. The treatment of certain diseases of the stomach and bowels will be specially considered.

The stomach is the source of much trouble in infancy, and the leading symptoms of disturbance there are vomiting and flatulence. The belching of wind and the regurgitation of food are not necessary postprandial sequelæ during infancy, although many nurses hold a contrary opinion. Such errors

as too rapid or too frequent feeding, which are apt to induce vomiting, must be corrected. The regular regurgitation of food after a meal implies that too much has been taken, and that the stomach has been over-filled. If this is allowed to become habitual, dilatation of the stomach will follow. The treatment should be to reduce the amount given at each meal.

When vomiting occurs an hour or two after a meal, it is probably due to incomplete digestion of the food, which is refused exit by the pylorus. This is a condition which, if it becomes chronic, is apt to be accompanied by pain, flatulence, and wasting. The fault may lie in the nature of the food or possibly in some idiosyncrasy in the infant's stomach. With these evidences of gastric trouble, which is often called gastritis or gastric catarrh, it is essential to find out the cause. In the case of breast-fed infants this may entail an examination of (1) the mother, (2) the breast-milk, and (3) the child.

(1) It is but too common to find that a woman who does not habitually take alcohol will consume a couple of pints of beer or stout daily when she is nursing, in the belief that she thereby increases her nursing power. My own experience has been that alcohol is of no value as a milk producer in women, and that it may lead to indigestion in the infant. The substitution of cows' milk for alcohol will often enable the infant to digest the breast-milk satisfactorily. If the mother is leading too strenuous a life, as represented in the upper classes by social gaieties, and in the lower by severe physical labour, the milk may be so altered as to become indigestible.

The habits and diet of the mother must be carefully regulated.

(2) An examination of the breast-milk may show that it is too rich in proteids, in which case Dr. Eustace Smith recommends plenty of farinaceous and vegetable food for the mother, and a few ounces of barley-water for the infant before taking the breast. If the milk is too rich in fat a distinct diminution in the amount of food taken by the mother is indicated. In somewhat rare instances the gastric trouble arises from an unusually large size of the fat globules, a fault which cannot be remedied.

(3) An examination of the infant is always called for in order to find out whether there is any local or constitutional disease present which is the cause of the gastric symptoms.

As regards bottle-fed infants one must inquire into the quantity and quality of the meals and the frequency of the feeding times. In many cases when these are properly regulated the stomach disturbance will cease. A common fault is to give the milk too concentrated. The use of improperly prepared barley-water is a frequent cause of gastric disturbance. In some cases whole barley is used and boiled down into a thick mass which is added to the milk. In other cases ground barley is boiled and added to the milk. Both these methods are unsuited for infants under the age of nine months, who cannot digest a quantity of unconverted starch.

The barley will not only remain undigested itself, but will cause so much gastric disturbance as to interfere with the digestion of the milk. The use of

tinned foods and "infants' foods" is also a common cause of gastric trouble, although as a rule they are more apt to induce intestinal indigestion. Reference may also be made to the habit in certain classes of giving young infants a taste of what is going at the family table, some potato, or sausage, or a drop of beer. This method of feeding must be put a stop to.

In other cases it will be found that neither a cessation of improper feeding nor a return to physiological feeding will relieve the gastric symptoms. Other measures will then be called for and will be discussed later in connection with chronic gastrointestinal catarrh.

In children over two years of age acute gastric catarrh is usually traceable to some error in diet. This may take the form of a surfeit of raw apples, ice-cream, strawberries, pineapple, sweets, etc.—one cannot tell what the vagaries of a boy's appetite may be. As a rule the first symptom is pain, and vomiting follows. From the nature of the vomited material it is often possible to tell what the cause of the disturbance is. If vomiting does not afford relief it is advisable to give an emetic of sulphate of copper (grs. ij in half an ounce of water) so as to empty the stomach thoroughly. The stomach should then be rested by a total abstinence from food for twelve hours, only sips of hot water being allowed. Rest in bed and hot fomentations to the abdomen will complete the cure. Food should be resumed in small quantities at first, and should consist of some light chicken or mutton soup.

In other cases an attack of acute gastric catarrh

may be induced by a severe chill. This may be due to a wetting, or cold feet, or some prolonged exposure. The temperature may rise to 103° or 104° F., and the child may look very ill. All appetite is lost, digestion is much weakened, and any strong food leads to vomiting. In the acute stage it is not advisable to give much food, as it will simply increase the gastric disturbance. Peptonized milk, albumin water, weak chicken or veal soup may be given in feeds of three or four ounces at a time. If these are not retained, then champagne (half an ounce every four hours) and sips of hot water should be given for a time. Rectal feeding is rarely called for, as the disturbance is only temporary. Hot fomentations may be applied to the abdomen. A sedative mixture will be found useful in the early stages, such as the following—

R. Liq. Opii sedativi, ℥ j; Ac. Hydrocyanici diluti, ℥ $\frac{1}{4}$; Inf. Gentianæ compositi, ℥ xv; Aq. Chloroformi, ad ℥ j.—T.D.S.

Chronic Intestinal Indigestion.—(*Syn.* Chronic gastro-intestinal catarrh. Chronic indigestion. Marasmus.) We pass from the more acute disturbances of the stomach to those more chronic affections in which the functions of the stomach and bowels are interfered with. In many cases the correction of errors in diet will serve to restore the disordered functions. In others one has to employ for a time a special diet, suited to the individual case, in order first of all to rest the stomach and bowels and allow of the gradual recovery of the disordered secretions.

I. In Infancy. — In the case of breast-fed infants chronic gastro-intestinal indigestion is not common, save from gross neglect of the rules of feeding. In the case of bottle-fed babies the condition is an extremely common one, and may call for much skill and patience in treatment. The great cause of chronic indigestion in babies is over-feeding. Whenever the infant cries the tendency is to assume that he is hungry and to give more food. The very temporary relief produced by this is soon followed by more discomfort, more crying, and more food. Even if the food is vomited, it is thought that the loss must be made up, and so more food is given. The marvel is not that the child does not thrive, but that he manages to survive. Sooner or later the overtaxed digestive powers break down. The infant wastes, becomes restless and peevish, and sleeps badly. Colicky pains, vomiting, flatulence, diarrhœa or constipation, and offensive motions with mucus or undigested milk are common accompaniments.

One must make a thorough inquiry into the history of the past feeding. The freshness of the milk, the cleanliness of the feeding bottles, the amount of diluent, cream, and sugar used, the temperature of the milk, the frequency of the meals, the time spent at a meal, the state of the appetite—all these points must be inquired into so as to detect any fault which may have originated or maintained the indigestion. One of the most prolific sources of intestinal trouble in infancy is the use of condensed milk and proprietary “infants’ foods.” These foods are easily prepared, do not

quickly go bad, and "stay down" as a rule without much difficulty, so that by a large number of ignorant mothers they are preferred to fresh foods. The infants generally thrive on them for a time, become fat and beautiful in the maternal eyes, and are duly admired by relatives. They are not, however, suited to an infant's digestive powers, and being largely composed of sugar and starch, they tend to ferment in the intestine, so that flatulent indigestion is a common result. As we are not yet able to adapt an infant's digestion to the ideas of artificial food manufacturers, the best plan for the present is to follow the guidance of Nature as far as possible. The safest and the simplest method of treatment in these cases of patent food indigestion is to discard the food altogether and to return to physiological feeding.

In the presence of chronic gastro-intestinal catarrh which does not yield to simple dietetic treatment, or which is in an advanced stage, some modifications in the ordinary feeding are called for. Further **dilution of the milk** may be tried. One part of milk may be mixed with two or three parts of lime-water, and given in small quantities every two hours by day and every four hours by night. In some cases it will be advisable to give nothing but lime-water during the night so as to rest the alimentary tract more thoroughly. As toleration is established the strength of the milk mixture may be gradually increased. In other cases the **citrate of soda method** as suggested by Wright and practised by Poynton, seems to be of service. It consists in the addition of citrate of soda to the milk,

one or two grains to each ounce of milk in the mixture as diluted for use. The curds formed in the stomach are believed to be rendered more digestible, and the vital properties of the milk are not injured in any way.

Special measures may be required to overcome the indigestibility of the proteids of cows' milk. For this purpose **whey** may be used. It is prepared by adding a drachm of liquid rennet to half a pint of warm milk. After the mixture has been thoroughly stirred it is allowed to stand until firmly coagulated. The curd is then broken up thoroughly, and the whey is strained off through muslin or a strainer. When whey is kept any time, or is to be mixed with other food, it is advisable to heat it to 160° F. in order to destroy the rennet ferment. One can begin with equal parts of whey and water, and give small quantities every two hours by day. Whey is usually well tolerated by the youngest infants, and one can gradually increase the strength of the food by giving it undiluted, then by the addition of some sugar or malt extract, and later of cream. The proteid element in the diet may be increased by adding ten to fifteen drops of raw meat-juice or white of egg to each feed or alternate feed. Another method of meeting the difficulty which these patients have in digesting the milk albumins is by the use of **peptonized milk**. This may be done by a pancreatic extract, or by peptonizing powders, or by peptogenic milk powders. The details of the method of preparation are supplied with each packet. The last named is the most suitable for young infants, as the resulting product resembles

closely breast-milk in its chemical composition. As a rule the peptonizing process should not be prolonged beyond half an hour, and whole milk without any extra cream should be used. Infants take and digest peptonized milk well, but its nutritive properties are certainly inferior to those of fresh milk. As the digestion improves the peptonizing time should be gradually reduced from thirty to twenty and ten minutes. Langmead has successfully employed a method of citration without any dilution of the milk, in cases of marasmus and difficulty in the digestion of ordinary milk. A mixture is prepared containing twice as many grains of citrate of soda in each drachm as there are ounces of milk in each feed ordered. The mother is instructed to bring the milk to the boil and while it is cooling to add one teaspoonful of the citrate of soda mixture to the feed. Thus, if four ounces of whole milk are given every three hours, there will be eight grains of citrate of soda added each time.

One or other of the above methods will usually prove effective, but in exceptionally difficult cases one may employ **condensed or dried milk**. A good brand of sweetened condensed milk, with all the original cream present, should be obtained. It must be given well diluted to begin with, one teaspoonful of the milk to four or six ounces of water, according to the age and state of the infant. The strength is to be gradually increased as toleration is established. Again, one of the dried milks, such as plasmon, glaxo, or sanatogen may prove useful. The dilution to begin with should be one teaspoonful of the powder to six ounces of water.

Why it is that milk in these forms should apparently be better tolerated than fresh preparations is difficult to explain, but it is probably due to some change in the proteids which are rendered more digestible. In the case of infants under six months starchy foods are not to be recommended for digestive troubles. After that age they may sometimes be found useful, possibly from their mechanical action in reducing the size of the curds. The flour of barley or oatmeal or wheat may be used. A tablespoonful of one of these is to be boiled in a pint of water for an hour. Of this half to one ounce may be mixed with an ordinary feed of milk and water. At this age also one may sometimes aid the digestion of the milk by adding a small quantity of one of the converted starch preparations, such as Mellin's food, care being taken that not more than a half to one teaspoonful be given at a meal.

These are some of the more common dietetic methods now employed for meeting the digestive difficulties of infancy. At the outset one must not only decide on the food, but proceed to give it a fair trial. The effect will not be seen all at once, and if the food is varied every few days there will probably be no improvement. A week or ten days at least are required to test the effect. At the same time it is often quite a good plan to combine two of the methods, giving for instance a diet of peptonized milk by day and of whey by night. Both of these preparations are for the same purpose, namely, to reduce the amount of proteid digestion in the stomach; and one may be able to tell from the symptoms which is most effective and to act

accordingly. A little variety in the diet may also aid the stomach and bowels in recovering their tone. Perhaps more important than the food is the degree of dilution. The digestive powers are weakened and inactive and only the weakest foods will be tolerated. Hence the most excellent foods may prove useless simply because they are too strong. At the same time the stomach must not be flooded by large quantities of fluid food. Small amounts frequently repeated are better than larger quantities less often. It is best to begin with one to two ounces every hour, or two to three ounces every two hours. One may sometimes be at a loss to know whether the food is really agreeing with the infant. Favourable signs are a cessation of the whining and restlessness, the recurrence of smiling, and longer and quieter periods of sleep. The subsidence of the active gastro-intestinal symptoms, flatulence, colic, etc., and an improvement in the quality of the stools are favourable indications. A gain in weight is not to be looked for at once, as the diet in the early stage is one to rest the alimentary tract, not to fatten the child. It is not until all active signs have subsided and a more nourishing food has been adopted that the nutrition of the infant will improve. In the early stages also the amount of fat must be reduced to a minimum, owing to its indigestibility. In the convalescent stage, on the other hand, cream and cod-liver oil are of the greatest benefit in building up the patient. The duration of the special feeding will depend on the severity and length of the illness. It must always be kept in mind that however

useful as temporary measures, these methods of feeding should not be prolonged further than is necessary, because dangers lurk in the way. As soon as possible the infant should return to a diet of fresh cows' milk and other materials suitable to its age, as already described. The return to normal diet must be made gradually, by introducing one or two feeds of fresh milk in the course of the day.

The extreme form of malnutrition from gastrointestinal catarrh is known as **marasmus**. So far as is known there is no recognizable constitutional or local defect, apart from the alimentary tract, in this condition. Dr. W. J. Simpson has found pathological changes in the thyroid gland in marasmus; and in the belief that thyroid insufficiency was a factor he has employed thyroid treatment. The extract in doses of gr. $\frac{1}{4}$ to $\frac{1}{2}$ was given thrice daily. The results in six cases were satisfactory. Some infants are born with a very low vitality and with an alimentary tract which is apparently incapable of dealing with any form of food, but such cases are rare. In the great majority of marasmic patients the underlying cause is improper food and feeding. In some cases it will be found that the infant is actually being starved. This may be due in the breast-fed infant to the fact that not enough of milk is being secreted, as may be determined by weighing the child before and after a feed. In the case of bottle-fed infants, the food may be of such an unsuitable character that, although abundant in quantity, it cannot be assimilated by the child. The vital powers of the infant may be at the lowest before advice is sought, and a diagnosis of *tabes*

mesenterica is often made. This condition, however, is of great rarity in infants. The methods of feeding as already described may fail. In such cases a wet nurse is the best line of treatment. If the infant is too weak to take the breast, the milk may be drawn off and given with a spoon. Failing to obtain a wet nurse one has to depend for a time on brandy and meat-juice. A drachm each of brandy and fresh meat-juice may be mixed with six ounces of water. Of this mixture one ounce may be given every hour for an infant of three months, eighteen feeds being given in the twenty-four hours. In place of the meat-juice one may use weak chicken or veal soup. After a few days' trial of this some whey or peptonized milk may be given occasionally, and an attempt made to establish toleration of milk food. Another mixture which may be tried in these cases is composed of white of egg, two drachms, brandy and malt extract, of each one drachm, and water to six ounces. This may be given in the same quantities as the meat-juice mixture. When, as often happens, the mucous membrane of the alimentary tract has become atrophied and functionless, the results of treatment are very disappointing.

In addition to the dietetic measures the infant suffering from chronic gastro-intestinal catarrh must be kept warm and clean, and must have plenty of fresh air. The presence of diarrhoea or constipation will call for the treatment special to these disorders. Persistent vomiting, colic and flatulence are conditions which may require more than dietetic treatment.

(i) When **Vomiting** persists in spite of a carefully

regulated diet there is probably always present in the stomach a residuum of food which is refused exit by the pylorus. Food remaining in the stomach is apt to decompose and not only to irritate the mucous membrane but also to set up spasm of the pylorus. This is best treated by washing out the stomach once or twice a day. The process in babies is a very simple one, and can usually be carried out without any disturbance of the patient. The apparatus required is a No. 10 or 12 soft rubber catheter, with a few feet of rubber tubing, the two being connected by a glass rod. A small glass funnel is fitted to the other end of the rubber tubing. The fluid to be used may be normal saline (one drachm of sodium chloride to a pint of boiled water) or soda solution (one drachm of bicarbonate of soda to the pint). The fluid used should be hot, so that it feels quite warm as it passes out of the catheter, a test which should always be made. The best time to carry out the lavage is two hours after a meal, so that one can determine from the stomach contents how complete the digestion has been. The infant having been enveloped in a thick towel, so as to fix the arms, is laid on the nurse's lap or on the edge of the bed with the head slightly dependent. The catheter is then passed straight into the middle of the pharynx, when swallowing movements and gentle pushing will carry it into the stomach. The infant soon learns to swallow the catheter without much assistance. The length of catheter passed is from twelve to fifteen inches, measuring from the gums to the stomach, and it is not advisable to fill the stomach with coiled-up catheter, as severe

retching will be induced. The danger of the catheter passing into the larynx is slight, but after a few inches have been passed one waits to hear if the infant can cough or cry, and if the laryngeal tone is present, it is clear that the tube is not in the larynx. Some ounces, four to eight according to the age of the infant, of the warm lotion are then passed into the funnel, which is elevated a couple of feet above the child's head. When the funnel is almost empty it is lowered over a basin on the floor, into which the fluid with any stomach contents will flow by syphonage. The process is to be repeated until the fluid flows back without any stomach contents, when one concludes that the stomach is thoroughly emptied. Vomiting induced by the passage of the catheter will do no harm provided the head is kept low to prevent the passage of the vomit into the larynx. If the catheter becomes blocked by large curds, it is plain that the diet needs correcting. In less severe cases of vomiting one may order a sedative powder such as the following—

R. Bismuthi Carb., grs. v; Pulv. Ipecac. co., gr. ss;
Sodii Sulphocarb., grs. iij.—T.D.S.

(ii) **Colic and Flatulence.**—Colic is a frequent and troublesome symptom in infants, more especially during the earliest months of life. The accompanying pain is manifested by screaming, restlessness, sleeplessness, an anxious expression of the face, and the drawing-up of the lower limbs. In predisposed subjects colic may even induce convulsions. The part of the bowel affected is usually the colon, but any part of the intestine may be the seat of disturbance and pain.

The local changes associated with colic are two in number : (1) paresis or paralysis of a portion of the bowel from over-distention or obstruction; and (2) irregular and severe muscular contractions in the bowel immediately above. The temporary weakening of the bowel wall is usually due to over-distention from flatulence, or from irritation of the bowel contents, or from an accumulation in the bowel.

There are various forms of colic which must be differentiated. The most common type is that associated with intestinal disturbance from some dietetic error. Another variety is associated with definite intestinal obstruction, *e.g.* from intussusception or strangulated hernia. In a third class of case there is no real colic, but the pain experienced is produced in some organ other than the bowel, *e. g.* renal colic.

An acute attack of colic in an infant calls for immediate relief of the urgent symptoms, and this must be followed by a careful inquiry into the dietetic and other habits, so as to ascertain and remove the cause of the trouble. The abdomen is usually distended and hard from the presence of much flatus in the bowel and rigidity of the abdominal muscles. At times, if the abdominal wall relaxes, it is possible to feel the bowel wall standing out firmly in parts as strong muscular contractions take place. It is our aim under such conditions to dispel the flatus and check the excessive peristalsis. With this object an enema of from 10 to 15 oz. of hot water should be slowly administered. The warmth tends to allay the spasm, and a considerable amount of flatus will often be passed, giving great

relief. If the bowels have not acted for some time, soap may be added to the enema, so as to produce an evacuation more certainly than plain water will. The application of fomentations to the abdomen will also tend to check spasm. Flannel cloths, wrung out of boiling water, should be applied as hot as they can be borne over the whole surface of the abdomen, back and front, and changed every quarter of an hour, until the skin is thoroughly reddened. In addition it will be advisable to stop all feeding for from three to six hours so as to give the bowel a much-needed rest, and to give a dose of castor oil (1 to 2 drachms) to clear out any irritating material that may remain. A carminative mixture may be ordered, such as the following—

R. Tincturæ Belladonnæ, ℥ ij; Spiritus Ammoniæ Aromatici, ℥ ij; Sodii Bicarbonatis, gr. v; Aquam Cinnamomi, ad 3 j. Sig.—One drachm every six hours (for an infant of six months).

If the pain has not been speedily relieved, a more powerful carminative may be added, such as $\frac{1}{2}$ drop of laudanum or 5 drops of paregoric.

The next stage in the treatment is to find out the cause of the colic. It will often be found that previous to the acute attack there had been numerous mild attacks, which had been treated in the domestic circle. The diagnosis had been “wind,” and the treatment dill-water. When the baby cried it was thought to be hungry, and more food had been given. The first points to be attended to are regularity in the meals and a sufficiently long interval between feeds. The amount of food must also be inquired into. It is not uncommon to find that infants of

three months old are taking from 25 to 30 oz. of cows' milk in the twenty-four hours. This can be indulged in for a time, but sooner or later a breakdown in the intestinal functions occurs, and colic is the result. Gulping down the food rapidly and swallowing air at the same time are conditions which may require correction. The careless feeding with long-tube bottles, when the infant often gets nothing but air to draw, is a specially common cause of colic in infants. In bottle-fed babies the protein element, from its indigestible nature, is apt to cause fermentation, flatulence, and colic. This must be remedied by dilution of the milk, and by adding citrate of soda (1 gr. for each 1 oz. of milk) to the feeds. Milk which has become soured from contamination is a frequent cause of flatulence and colic in infants. Another possible cause of similar disturbances is the addition of excessive amounts of sugar (usually cane sugar) to the milk. In the present day the abuse of starchy food, which is given to an extent quite beyond the requirements or even the digestive powers of an infant, is frequently manifested by colic. From the earliest months prepared barley, or the whole barley boiled down in water to a jelly, is often added to the milk, or large quantities of some patent (starchy) food are given. The infantile stomach does not tolerate comfortably any but the smallest quantities of starch, and even when converted, as in many patent foods, the starchy element must be strictly limited in amount during the first nine months. It is scarcely necessary to add that gross errors in infant feeding, such as the giving of sausages, potatoes, stew, or "a bit of what is going," are very

frequently followed by severe colic. The correction of a faulty diet will be found the most effective factor in the prevention and cure of colicky attacks.

Many infants are liable to colic through exposure to cold and chilling of some part of the body, such as the feet, or the thighs, or the abdomen. Warm socks and a hot bottle when necessary should always be available. The abdomen should be well protected from cold by flannel. Not infrequently one finds that while the rest of the body is well covered the knees and thighs are much less so, and are in consequence often distinctly chilled. All these forms of surface chilling are apt to induce attacks of colic.

A physical examination of the abdomen may reveal the presence of a fæcal accumulation in the colon. This must be treated by enemata of soap and water, castor oil, etc. A condition of chronic constipation may be present, leading to irregular contractions of the bowel wall, and must be corrected (*see Constipation*). If a persistent distention of the bowel wall is present, a condition of atonic dilatation, it is advisable to employ abdominal massage once or twice daily, which will not only dispel the flatus but will tone up the bowel wall.

II. After Infancy.—In the case of chronic gastrointestinal indigestion in children beyond the age of infancy one must also recognize that probably the same factors are at work, namely, overfeeding and improper food. The course of events is often as follows: A child with a healthy appetite is allowed too full a diet, with an excess of farinaceous foods and sugar. This excess of carbohydrate material is often given in such fluid form that the teeth are

not used, the food is swallowed rapidly, and goes down so easily that much larger quantities are consumed than if thorough mastication had been necessary. By-and-by symptoms of intestinal indigestion appear. The child looks pale, and begins to lose flesh. A course of feeding up is begun, and beef-juices, patent foods, cream, etc., are added to the already over-full dietary. A friend probably suggests the addition of Parrish's food and cod-liver oil. Finally there comes a complete breakdown of the entire digestive system. The course of treatment to be adopted is to give the overtaxed intestine as much rest as possible. Peptonized milk, or whey, and freshly made mutton, veal, or chicken soup are to be given in small quantities every few hours. A word of warning must be given to the cook that she is not to make the soup as "strong" as possible, but of the strength of ordinary dinner soup. When the intestinal rest has led to the recovery of appetite, solids may be begun in the form of fish, chicken, or mutton, plainly cooked, with a little bread crumb or bread sauce. After toleration for these has been established, some carbohydrates may be added to the dietary—toast, milk pudding, and plain biscuit. Last of all the stage of fatty foods is reached—butter, yolk of eggs, cream, and cod-liver oil, and the building-up process will then go on rapidly. The length of time taken to secure complete recovery will depend on the time during which the improper feeding has lasted. To prevent a recurrence of the condition one must arrange for the future a dietary which contains (1) a sufficient amount of hard food which requires chewing, and (2) a limited amount

of farinaceous foods and sugar. For the former purpose beef or mutton or chicken should not be given to children in a minced or pounded form, but plainly cooked. Toast, rusks, biscuits, and raw apples entail an amount of chewing which is good for the digestion and the teeth. Further, the child's appetite will be satisfied more readily after chewing food thoroughly, and there will not be the same tendency to swallow down large quantities of food as in the case of fluid milk puddings. When a child has had a sufficient amount at a meal and still complains of hunger, a raw apple or a hard biscuit will be better than another helping of sweet pudding. The excessive use of carbohydrates is very marked in the present day. Many children are allowed to consume far too much bread-and-butter and sweets. These must be strictly limited. Finally, the coaxing of a child to eat more food must be absolutely forbidden. No child should ever be coaxed to eat, and much harm is often done by this line of treatment on the part of over-anxious parents and nurses.

The state of the teeth, the gums, the tonsils, and the nasopharynx should always be examined in cases of chronic indigestion. Carious teeth and suppurating gums must be treated. A mouth swarming with pathogenic organisms, which are continually passing into the stomach in countless numbers, is a constant source of danger and may cause gastric catarrh. Similarly enlarged tonsils, with their crypts full of organisms, must be disinfected by local treatment, or, better, removed. A nasopharynx secreting muco-pus must be put in a healthy condition.

Medicinal Remedies will help materially in restoring the disordered functions of the intestine. At the outset a dose of castor oil (two drachms) may be given once or twice at bedtime. If there are signs of liver disorder, light-coloured stools, etc., calomel (two grains) may be given alternately with the oil. The following medicine may then be ordered—

R. Tr. Rhei, ℥ x; Sodii Sulphocarb., grs. v; Tr. Zingib., ℥ v; Aquam ad 3 j.—T.D.S.

This may be given for a week or ten days, and then at intervals if necessary. Chronic constipation must be relieved by the use of small doses of cascara or senna pod infusion, thrice daily.

If the motions continue light-coloured and the urine is loaded with urates a short course of mercury (grey powder, grs. ij o.n.) and salines (phosphate of soda, 3 j or sulphate of soda, 3 j o.m.) may be given. The value of iron and arsenic as drugs in such cases, even in the convalescent stage, is very doubtful. Personally I do not use them in this affection, preferring to give iron, if called for, in the form of food, and more especially of green vegetables.

Acidosis or Acid Intoxication.—The fact that vomiting is such a marked symptom has led me to consider this affection here. The pathology has not yet been definitely determined. A condition of acetonæmia seems to be associated with certain symptoms of acute poisoning in childhood, and to this the term acidosis or acid intoxication has been applied. The pathology of such cases is obscure, for it is not probably the acetone *per se* which causes

the symptoms of poisoning, but some other substances, *e. g.* diacetic and oxybutyric acid, which are formed, like acetone, from the splitting up of fats in the body. There is probably some disorder of metabolism of unknown origin. By some, attacks of periodic vomiting have been ascribed to appendicitis, and by others to adenoid obstruction in the nasopharynx, but the vomiting now referred to has probably quite another origin. Clinically the form of toxæmia under consideration is recognized from the smell of acetone in the breath, from the presence of acetone in the urine and in the vomit, and, in severe cases, from the presence of diacetic acid in the urine. The symptoms of poisoning may be mild or severe, and probably many mild attacks are recovered from without the condition being recognized. In severe cases the leading symptoms are sudden and uncontrollable vomiting, persisting for some hours or days, and accompanied by constant nausea, retching, and great prostration. The patient may remain in a collapsed state, complaining of constant thirst, or a condition of restlessness and delirium may follow, terminating in coma and death. An attack of acid intoxication may arise in childhood (1) without any known cause, as in "periodic vomiting," or (2) as the result of the administration of an anæsthetic, usually chloroform, or (3) from salicylic acid poisoning.

1. Under the various terms "**Fitful Vomiting**," "**Periodic Vomiting**," "**Cyclic Vomiting**," and "**Recurrent Vomiting**," a certain type of disease has been described of which vomiting is the chief symptom. The condition may arise in infancy or

childhood. Whilst apparently in good health the patient is seized with vomiting which usually becomes severe and persistent. The attack may last for a few hours or a few days. The termination is usually as abrupt as the onset, and the restoration to health is rapid, the appetite and digestion being recovered almost at once. These attacks tend to recur at irregular intervals, and may be so severe and exhausting as to lead to extreme wasting and death.

2. Under the title "**Delayed Chloroform Poisoning**," Dr. Leonard Guthrie has described a very fatal series of phenomena which sometimes occur after the administration of chloroform. Further experience has shown that similar results, although much less frequently, may follow the administration of ether, nitrous oxide gas, and ethyl chloride. For some twelve or twenty-four hours after the anæsthetic the child may have been going on comfortably, when suddenly copious, frequent, and persistent vomiting comes on. The nausea, retching, and vomiting are continuous, and after they have lasted for some time a dark "coffee-ground" or "beef-tea" fluid may be ejected. Constant restlessness, thirst, shouting, delirium, and air hunger are often present. Many of the cases terminate fatally. Post-mortem examination has revealed nothing save marked fatty degeneration in the liver, kidneys, and muscles. During life acetone and possibly diacetic acid are present in the urine.

3. The third class, in which we may regard a condition of acidosis as the underlying cause, is **salicylic acid poisoning**. Dr. Frederick Langmead has

drawn the attention of the profession to the occurrence of a special form of "salicylate poisoning in children." The patients were under treatment for rheumatism, and salicylate of soda was being administered at the time of the onset of symptoms. In some cases the dose was quite moderate in amount, but in the majority very large doses were being given. The symptoms of poisoning were the same as those described in the two other types. Recovery usually followed quickly when the salicylate was stopped, and treatment by alkalies was adopted.

The proper **treatment** of an attack of acute acid intoxication is not yet finally settled, and we can only suggest here the lines which seem so far to have been most successful. In a sense, however, it may be said that our knowledge of the treatment has advanced further than that of the pathology of this affection. The treatment is the same in all cases, but in the case of salicylate poisoning the drug should be at once stopped. We shall consider the treatment of an attack of cyclic vomiting.

The first indication is to counteract the acidosis by large doses of an alkali, such as bicarbonate of soda. Twenty grains may be given in an ounce of cinnamon water every two hours until the urine becomes alkaline. Even with large doses of an alkali my own experience is that it is very difficult to render the urine alkaline. When the vomiting is so severe as to render administration by the mouth useless, the alkali may be given by the rectum, forty grains of bicarbonate of soda in three ounces of water every four hours. In urgent cases

the alkali may be given like a saline injection into the subcutaneous tissues, in the strength of two and a half grains of soda to an ounce of sterilized water. Of this from a pint to a pint and a half may be injected daily. In this alkaline treatment other drugs, such as citrate of potash or citrate of soda, may be used if preferred. The elimination of the acids in the system is to be aided by free purgation and free diuresis. As a rule constipation is marked in such cases. A soap-and-water or castor-oil enema should be given at once. The most efficient purgatives to give by the mouth are castor oil and sulphate of magnesia, but often the persistent vomiting renders their employment impossible. In such a case calomel may be given, half a grain every hour until three grains are taken, or an evacuation takes place. In urgent cases elaterium may be used in doses of one-twentieth of a grain. Elimination by the skin is to be aided by means of hot baths and hot packs. A hot pack will often be found to give great relief in such attacks, and is much less disturbing to the prostrated child than a bath. After the pack the skin acts freely, the child will often feel much relieved, and will sink into a restful sleep. The pack may be repeated every four hours with advantage. Sips of hot water should be given freely, even although everything is being vomited. The hot water does not increase the vomiting and it is one of the least irritating substances in the stomach, besides relieving the thirst.

During an acute attack the question of diet hardly arises, because the vomiting is so severe that all appetite is lost, and no food can be retained. At this

stage thirst is the chief complaint, and the patient may be given frequent sips of hot or cold water, soda-water, or barley-water. Even plain fluids are usually quickly vomited, but there is a certain relief supplied to the patient. If after twenty-four hours the patient is still unable to retain any food by the mouth, nutrient enemata composed of peptonized milk (one ounce), glucose (half an ounce of a 10 per cent. solution) and brandy (half a drachm) may be given every four hours. As soon as food can be retained in the stomach it seems advisable to avoid all fatty material, and to give only digestible proteins and carbohydrates. Plasmon, Allenbury's food, and peptonized milk may be given at first, and later one may go on to oatmeal-gruel or porridge, bread, farinaceous puddings, and sugar. As a matter of clinical experience it may be stated that there is no gradual return of the appetite in typical cases of periodic vomiting, but the attack ceases suddenly, and the patient, after sleeping, wakes up ravenous and demands food. Further, whatever food is given will be eaten and retained and digested. It is none the less advisable to maintain the above diet for a few days, and thus aid the elimination of the acids from the system.

After an attack has subsided, and in the intervals between attacks, the diet usually recommended is, one containing an average amount of proteins and carbohydrates and a small amount of fats. All the foods should be simple and digestible, and should be given in such amount as not to overtax the digestive organs. This line of treatment cannot be said to be very efficacious in curing the affection. The fact

that in many cases the attacks are slight and pass off after a few days' low diet, or, if more severe, recur only once in six or twelve months render any exact conclusions as to the effects of diet very difficult. The present writer has had the opportunity of watching closely two cases in children aged seven and twelve years. In them the attacks were very severe and very frequent. The patients were both extremely emaciated and extremely neurotic. Various diets were tried, including those of an almost purely protein character, and those of carbohydrates only. Again, various articles were omitted from the diet for a time, such as milk, then eggs, then meat, etc. No benefit from these various dietetic changes could be observed. When the patients were put on an ordinary full hospital diet they seemed to do just as well as on a restricted one, and, further, they gained some flesh. It was then thought that the latter advantage might be still further increased by the Weir Mitchell system of over-feeding, massage, rest and isolation. The following was the diet taken during a period of six weeks—

FOOD IN 24 HOURS (patient 12 years old)

- 5 a.m. Cocoa and milk, ad lib.; bread and dripping.
- 7 a.m. Cream, $\frac{3}{4}$ ss; milk, $\frac{3}{4}$ iij; water, $\frac{3}{4}$ j.
- 9 a.m. Milk, $\frac{3}{4}$ v; malt extract, $\frac{3}{4}$ ss; water, $\frac{3}{4}$ ij; bread and dripping.
- 11 a.m. Cream, $\frac{3}{4}$ ss; milk, $\frac{3}{4}$ iij; water, $\frac{3}{4}$ j.
- 1 p.m. Meat; pudding, with cream, $\frac{3}{4}$ j; bread and dripping.
- 3 p.m. Milk, $\frac{3}{4}$ v; malt extract, $\frac{3}{4}$ ss; water, $\frac{3}{4}$ ij.
- 5 p.m. Cocoa and milk; one egg; bread and dripping.
- 7 p.m. Cream, $\frac{3}{4}$ ss; milk, $\frac{3}{4}$ iv; water, $\frac{3}{4}$ j.
- 9 p.m. Raw meat-juice, $\frac{3}{4}$ j; water, $\frac{3}{4}$ j; bread and jam.
- 1 a.m. Raw meat-juice, $\frac{3}{4}$ j; water, $\frac{3}{4}$ j.

During this course of treatment the patient increased

in weight from $43\frac{1}{2}$ lb. to 56 lb., a gain of $12\frac{1}{2}$ lb. There were no attacks of vomiting, and she looked the picture of health. This was the longest interval she had had of freedom from vomiting attacks for some years. The patient was not cured, for, on her return to the home surroundings, the vomiting returned, and the wasting again set in rapidly. The above experience in two cases is rather against the view that any special food element (protein, carbohydrate, or fat) is the cause of the trouble, and supports the view, held by many, that the affection is really to be classed as a neurosis, comparable to migraine. That metabolism is at fault may be admitted, and more especially the action of the liver, but it would appear, in some cases at least, to be dependent primarily on a disturbance of the central nervous system. One may do harm rather than good by a spare diet, or by a non-nutritive diet, or by any diet based purely on the chemical problems of this affection. If a chronic case fails to improve under a rigid and limited diet, it may be advisable to try the effects of a full diet as outlined above.

The **preventive treatment** of many of these cases of acidosis presents great difficulty because of our ignorance of the exciting cause. This applies more especially to cases of periodic vomiting. With a history of previous attacks, one may reasonably advise the avoidance of any excess of fat or proteins in the diet, the maintenance of a regular and somewhat free action of the bowels, and a course of alkalies at intervals. An excess of proteins or fats in the diet seems to contribute to the tendency to metabolic disturbance. In the case of delayed

chloroform poisoning, Mr. Beesley has found that a course of alkaline treatment for a week before operation has rendered the tendency to vomiting less marked. He gave fifteen grains of bicarbonate of soda thrice daily for eight days. The chief indication gained from the experience in Mr. Stiles's wards is that in septic cases, and in cases with acetonuria before operation, it is safer to give ether rather than chloroform. Although acetonuria may follow the administration of ether, the constitutional effects are usually absent or but slightly marked. In the case of salicylate poisoning, the first measure of precaution is to avoid large doses. Although in all cases of acid intoxication that unknown factor which we term idiosyncrasy probably plays a part, it is not necessary to begin with doses which may prove poisonous. If one commences with moderate doses, watches carefully for acetone in the breath or urine, and stops the salicylate when this occurs, there will not probably be any marked symptoms of acid intoxication to treat. It is said that if large doses of bicarbonate of soda are given along with the salicylate, and if the bowels are kept freely open, symptoms of poisoning do not appear. This may or may not be the case, but it is better to avoid the necessity for such precautions by giving moderate doses. Again, one of the favourite preparations of salicylic acid, namely, aspirin, cannot be satisfactorily given along with alkalies.

CHAPTER VI

DISEASES OF THE ALIMENTARY SYSTEM

(continued)

Diarrhœa—Acute Ptomaine Poisoning—Mucous Colitis—Constipation—Abdominal Tuberculosis—Worms—Disorders of the Liver—Congenital Pyloric Stenosis—Pyloric Spasm.

Diarrhœa.—One of the commonest symptoms of intestinal disturbance in early life is diarrhœa, which may result from many different causes. In some cases it is led up to by constitutional disease, such as rickets; in others it is due to irritation from the bowel contents, for example, a mass of indigestible food; in others it is due to a lesion of the bowel wall, such as ulceration; and in others it is the result of excessive peristalsis of nervous origin, as in lenteric diarrhœa. In the most marked and fatal form, known as acute summer diarrhœa of infants, we have a definite diarrhœal disease clearly due to an acute infective inflammation of the alimentary tract. In the case of a symptom with such a multiplicity of causes it is essential for successful treatment that a careful examination should be made as to the diet, the condition of the abdomen, and the presence or absence of constitutional disease or symptoms, in order to determine the etiological factor^{or} or factors.

A large number of cases of diarrhoea, both in infancy and in childhood, will be found to be associated with improper feeding. The chief faults are over-feeding, too frequent feeding, bad food, and unsuitable food. The diarrhoea may be acute and occasional, or chronic and persistent. It may be accompanied by vomiting, by colicky pains, and by the passage of blood and mucus. The stools are often green, offensive, and contain undigested particles of food. The affection may be apyrexial in the milder cases, but in the more severe the temperature may be raised for some time, due to active inflammation of the bowel or to the absorption of toxins.

The immediate treatment of such cases of diarrhoea consists in diminishing the amount of food taken, in seeing that it is fresh and sound, and in clearing out any irritating material left in the bowel. In the milder cases the amount of milk taken may be safely diminished by one-half, while in the more severe cases it is advisable to give only some weak veal or chicken broth. If vomiting is at all marked it is a good rule to stop the milk for a time and to wash out the stomach with warm saline solution. The great essential, rest to the bowel, cannot be secured unless the amount of food is severely curtailed, while the essential needs of the infant can be met by giving it freely plain water or barley-water to drink.

The bowels should be cleared by repeated small doses of castor oil (℥ x-xv) every four hours or of magnesium sulphate (grs. v-x) every four hours, for a few days. In cases accompanied by

pain and vomiting one may substitute a mercurial preparation, such as the following—

R. Hydrargyri cum Cretâ, gr. ss ; Pulveris Ipecacuanhæ Compositi, gr. $\frac{1}{4}$; Pulveris Cretæ Aromatici, gr. j.
Sig.—One powder every six hours.

When the diarrhœa is definitely lessened, and if appetite is present, the amount of food may be increased. Equal parts of milk and lime-water or, in the case of infants over nine months, Benger's food and milk may be given, but the feeds should be small and the intervals between feeding at least two and a half hours. Such attacks of food diarrhœa in older children are best treated by a full initial dose of calomel (grs. ij–iij) or castor oil (3 j to 3 ij), so as to ensure the removal of any irritating masses in the bowel. A similar course of low feeding for a few days is ordered, and a mixture containing sodium bicarbonate (grs. v), sodium sulphocarbolate (grs. v), and infusion of gentian is to be ordered. In some cases where the irritation seems to persist, after the bowels have been thoroughly emptied, bismuth in full doses (grs. x–xv) may be given every four hours.

In the preventive treatment of infantile diarrhœa special attention must be directed to the purity and freshness of the milk. Whatever views one may hold as to the relative advantages of boiled and unboiled milk, it may safely be asserted that in hot weather all cows' milk for children's use should be boiled for two or three minutes and then kept on ice in a closed or covered vessel. The greatest cleanliness should be observed in connection with the feeding bottles, and no "dummy" soothers

should be allowed in the infant's mouth. A mild attack of diarrhoea in summer predisposes to the more grave infective forms. The tendency to give young infants some fruit, which is so common with nurses in the fruit season, should be severely discouraged as very dangerous. As chilling of the surface of the trunk or limbs often directly induces diarrhoea, care must be taken that the child is sufficiently clothed and is not exposed to chills. In hot weather the danger often lies not in too few but in too many clothes. If a child is at all delicate or subject to "colds," it is customary to overload it with clothing in summer, with the result that the skin is constantly damp from sweating, and chilling of the surface of the body can scarcely be avoided. Such a chill lowers the resisting powers of the tissues generally, and of the alimentary canal more especially, so that an attack of diarrhoea often follows. The clothing should be light and loose, and a flannel binder ought always to be worn. These precautions are specially necessary in the case of rickety infants.

In no disease of early life will the therapeutic resources of the practitioner be tested more fully than in the case of **acute summer diarrhoea of infants**. As the name implies, it is a disease of hot weather, and interesting observations have been made as to its association with a certain temperature of the soil as the summer heat increases. The essential point, however, is that the disease is due to contaminated food, and more especially milk. If an infant is entirely breast-fed and does not get the poison introduced into its mouth by such means as infected "comforters" or toys, there is no risk

of the development of this disease. The exact organism causing this form of disease is at present unknown, although several have been described, and Gaertner's bacillus has been found in many cases of the disease. In addition, other organisms of the alimentary canal, the bacillus coli and streptococcus, increase in number and acquire a special virulence. These organisms acting locally produce great irritation and inflammation of the bowel, and also produce toxins which are absorbed into the circulation and lead to general toxæmia.

A large mass of evidence has now been brought forward in support of the view that contamination of the food is largely brought about through the **agency of the common house-fly**. Bearing infection from some polluted source, the house-fly settles on the milk supply of the infant and infects it with the particular organism, which seems to flourish abundantly in all forms of milk. Having this in mind, a wise householder will be particularly careful in summer to keep his house and neighbourhood free from all breeding and feeding places for flies, and to prevent any possibility of flies reaching the milk supply. All rubbish, such as bones, stale vegetables or fruit, will attract flies, and should therefore be burned at once or kept in a closed dustbin. All food in the house should be kept covered up and protected from flies. More especially does this apply to milk, and it is not sufficient security to boil the milk, for boiled milk will be contaminated as quickly as that which is unboiled. The experience of institutions has shown that the disease may spread rapidly amongst young infants.

Each case, therefore, should be treated as a possible source of infection, and special feeding vessels should be reserved for each individual patient, while all the stools, the diapers, etc., should be thoroughly disinfected as in the case of enteric fever.

The **onset of an attack** of acute summer diarrhoea is usually sudden, although there may have been slight gastro-intestinal disturbance for a few days beforehand. Vomiting occurs, the temperature rises rapidly, and the motions become loose, the emptying of the bowel being often accompanied by the pain of colic. The condition rapidly becomes worse within a few hours. The motions, loose at first, but with yellow matter in them, become more watery. Some grey or green material may be present, but the chief constituent is mucus or blood-stained mucus. Great constitutional weakness comes on; the pulse is feeble and rapid, the extremities are blue and cold, and the whole of the tissues seem to be shrivelling up.

As regards the **treatment**, the disease is so acute in its course, and presents so many and such diverse symptoms, that no one line of treatment can be laid down as suitable for all cases. In the present day the form of treatment which is most generally adopted may be described as evacuant and eliminative. The first object is to remove the poison from the seat of its active production, namely, the gastro-intestinal tract, and to eliminate from the blood and tissues the organisms and toxins which have found an entrance. At the same time one must prevent the introduction into the body of further doses of the poison, or of food materials which may

prove a suitable medium for the growth of these organisms.

Milk in any form must be at once stopped. It is especially dangerous in this disease, as it adds fuel to the fire which is already going on in the intestinal tract. We have therefore to find some temporary substitute during the time that an effort is being made to obtain a thorough clearing out of the bowel. In very acute cases the best plan is to stop all food entirely, and to give only boiled water or barley-water or rice-water for twenty-four or forty-eight hours. As thirst is usually a marked symptom, this water should be administered frequently, every hour or two hours, but in small quantities (℥ ij–iij), so that vomiting may not be induced. If vomiting is a severe symptom, it may be necessary to give only one or two teaspoonfuls of water at intervals of fifteen or twenty minutes. A little brandy will be found beneficial if given well diluted, a teaspoonful in half a pint of water during the day, and the same amount during the night. At the end of thirty-six or forty-eight hours, or when sufficient time has been allowed for the aperient medicines to act, a beginning should be made with feeding in the shape of albumin-water, or weak veal, mutton, or chicken soup. Here the rule must be to proceed very slowly and gradually, watching the effect. Albumin-water may be made at first of the strength of ℥ ss. of white of egg to half a pint of water, and this may be rendered more palatable by the addition of ℥ ij of extract of malt. Similarly ℥ i of ordinary soup may be diluted with ℥ v of water. This modified diet,

with small feeds at intervals of two or three hours, may be carried on for one or two days, until the diarrhœa is somewhat lessened, and the motions are not of a purely mucous or watery character. The third stage is reached when we commence tentatively a return to milk food. A trial of milk in one or other form should be made by alternating it with a feed of soup or albumin-water. Of the various forms in which milk may be used at this time the following represents a scale of digestibility : (1) peptogenized milk, made with peptogenic milk powders; (2) whey; (3) condensed milk, diluted with twenty-four parts of water; and (4) citrated milk, containing grs. ij of citrate of soda in each ounce of milk. It is not necessary to take every infant through these four stages, and the experience of the doctor and the condition of the patient must decide which form is to be used. If milk in any form provokes a recurrence of vomiting or diarrhœa, its use must be suspended for a time. Toleration will not readily be established, and in no case must an attempt be made to feed up the patient rapidly. The chief points about the dietetic treatment are : (1) to give no food until the stomach can retain and digest it; (2) to begin with very weak foods and very small meals; and (3) to let the patient have as much water as he can retain, so as to compensate for the great loss of fluid from the tissues and to wash out the bowel.

The first part of the **medicinal treatment** consists in the thorough cleansing of the intestinal tract as quickly as possible. The best drug is castor oil, which is more effective if given in small repeated

doses. From 5 to 10 drops of oleum ricini may be given every four hours for a day and a half, and then less frequently. It is usually well tolerated by infants; but if there is much gastric disturbance and vomiting, it may be necessary to wash out the stomach first. Instead of castor oil small doses of mercury may be given, especially if the vomiting is severe, or grey powder (in $\frac{1}{3}$ -grain doses), or calomel (in $\frac{1}{6}$ -grain doses) may be given every two hours until six doses have been taken. Dr. Kerley finds that sulphate of soda is less apt to produce vomiting than castor oil. When given in two-drachm doses, every thirty minutes until four doses have been taken, it produces a free watery evacuation without tenesmus. This is a line of treatment which has proved valuable in Asiatic cholera. When the acute symptoms are subsiding and the motions are becoming less frequent, a sedative and astringent mixture may be given as follows—

Acidi Sulphurici Aromatic, ℥ ij; Tr. Camph. co.,
℥ iv; Tr. Chlorof. co., ℥ ij; Tr. Coto, ℥ iiij; Syr.
Aurantii Floris, ℥ viij; Aq. Menth. Pip., ad ℥ j.
Sig.—One drachm every six hours.

Or—

Sp. Ammon. Arom., ℥ j; Tr. Catechu, ℥ iiij; Tr.
Cardam. co., ℥ iiij; Tr. Opii, ℥ $\frac{1}{4}$; Mist. Cretæ ad
℥ j. Sig.—One drachm every six hours.

Various symptoms may be present which call for special treatment. When vomiting is severe the stomach should be washed out with a weak solution of Condry's fluid, or of bicarbonate of soda (grs. x to 1 pint). Until this has been done it is often impossible to adopt any effective treatment. The

substitution of rectal feeding for stomach feeding is useless, as the bowel is not in a condition to retain or absorb anything. The sedative effect of washing out the stomach will be increased by the application of hot fomentations to the abdomen. When severe colicky pain is present, associated with tenesmus, 4 or 5 minims of paregoric may be given to secure relief. The use of opium in this affection is not without danger, and it should not be given if the patient is in a collapsed or semi-conscious condition. Opium should not be given in a solid form, as in Dover's powder, as it probably will not be absorbed. If opium is contra-indicated, pain may be relieved by giving the tincture of belladonna (in doses of 2 or 3 minims every four hours). Washing out the lower bowel with hot water will also tend to relieve the straining pain, and will at the same time clear out a considerable amount of irritating matter. The water should flow from a fountain syringe at a height of 2 feet, and should enter through a soft rubber catheter introduced as high as possible into the bowel. The motions are sometimes so offensive as to render the air of the room most unpleasant. The addition of gr. j or ij of salol to the castor-oil mixture will help materially in reducing the offensiveness of the motions. By its use also the stools will be rendered less acrid and irritating to the anus and buttocks. The restlessness and sleeplessness of the acute stage will be greatly relieved by the use of hot baths or hot packs. The effect of the bath may be increased by the addition of 3 j or ij of mustard. The value of hot baths in this affection cannot be over-estimated. In addition to

calming the nervous system, and thereby inducing much-needed sleep, they are stimulating, and by their action on the skin help to eliminate the poison from the system. The great loss of fluid produced by the diarrhoea often leads to a condition of collapse, of shrivelling up of the tissues, and of cardiac weakness. This condition is best treated by the subcutaneous injection of normal saline fluid. From 6 to 8 oz. may be injected at a time into the loose tissues of the axilla or the abdominal wall, and the fluid should be allowed to enter slowly, so as to avoid the risks of sloughing or hæmorrhage. One point in connection with these saline injections is very important, namely, that the fluid as it enters the tissues should be not merely warm but hot. Fluid which may enter the tubing at a temperature of 110° to 120° F. may be considerably below 80° F. after passing through some feet of rubber tubing; the most convenient test is to let the fluid pass out of the needle on to one's hand and to feel that it is then really hot (105° to 110° F.). This may require the fluid in the containing vessel to be at a temperature of 120° to 150° F. The injection of cold water has a depressing effect on the patient, while hot fluid is markedly stimulant and much more rapidly absorbed. Various forms of apparatus are now on the market for saline injections, in which the exact temperature can be estimated. Injections of saline fluid serve a further beneficial purpose in aiding the elimination of the toxins from the blood and tissues, and should be repeated as often as necessary to reinforce the fluids of the body. The benefit thus obtained may be increased by giving

small doses of brandy, nux vomica, or strychnine. Strychnine is of undoubted advantage in collapse from cardiac weakness, and is best administered hypodermically in doses of \mathfrak{m} ss of the liquor strychninæ every four hours. The reaction of infants to strychnine in the toxic condition present is very much less than in healthy subjects, and full doses may safely be given. The value of brandy as a stimulant is undoubted if given in small doses, but it is very questionable if large doses are beneficial in this affection. For an infant of six months suffering from summer diarrhoea \bar{z} ss of brandy daily is a maximum amount. If the beneficial effect of brandy is not clearly evident, it is better to limit the amount to 1 or 2 drachms a day. After the subsidence of the attack, a prolonged period of convalescence follows, characterized by impaired nutrition and intestinal weakness. The feeding must be very carefully regulated, and a change to the country or seaside is advisable in the case of town-dwellers.

The astringent treatment of summer diarrhoea has its advocates, but is not to be recommended during the acute stage. Such drugs as catechu, coto, tannigen, chalk, etc., will be found useful in some cases after the bowel has been thoroughly emptied and the diarrhoea is lessening. The anti-septic treatment has also failed to prove a specific for this disease. Carbolic acid, creosote, and perchloride of mercury have been tried as a means of destroying the organisms in the alimentary canal, but without definite success. Both serum and vaccine treatment are at present on trial. These

cannot be expected to prove practical methods of cure until the organism which is the etiological factor has been isolated and cultivated. So far Shiga's bacillus, Gaertner's bacillus, and Morgan's bacillus have all been claimed as the *causa causans*, but the serums produced have not fulfilled the hopes of the discoverers. It is probably on this line of investigation, however, that one may look for a specific curative treatment.

Dr. A. I. Kendall¹ has introduced a method of lactose feeding in "bacillary dysentery," based on a study of the bacillary products in the presence of protein and carbohydrate media. It has been shown that bacteria acting respectively upon carbohydrate and protein produce from the former fermentative products, and from the latter putrefactive substances. The fermentative process takes precedence over the putrefactive if both carbohydrate and protein are simultaneously present in the medium in which the bacteria are growing. The carbohydrate, in other words, is attacked, and must be used up before the protein is acted on to any extent, and in this sense the carbohydrate shields or spares the protein in a similar manner to that obtaining in the animal body where carbohydrate shields protein from metabolism. The products of protein putrefaction were found to be strongly toxic in the cases of the diphtheria and tetanus bacilli; hence the addition of utilizable sugar to a protein medium suited for the development of these bacteria would be indicated if one wished to prevent or inhibit toxin production.

¹ Bost. *Med. and Surg. Journ.*, 1911; CLXIV, No. 9, p. 287.

Applying these facts clinically, Dr. Kendall introduced the feeding with lactose with a twofold object; to furnish to the host a readily assimilable food, requiring a minimum of energy to metabolize it, and to change the character of the metabolism of the dysenteric flora from the proteolytic to the fermentative type. This change in the type of the intestinal flora is particularly desirable to prevent further intoxication of the host, and to give him a better chance of combating the poisons already absorbed. The treatment of acute summer diarrhoea is commenced in the usual way with a dose of castor oil or other cathartic to clean out the intestinal tract, and nothing but sterile water is given by the mouth for twelve or fifteen hours. Lactose feeding should be begun within twenty-four hours, and if possible within eighteen hours. The longer the carbohydrate is withheld, the longer the dysentery bacilli have a free field to produce toxins. Lactose, 5% solution in sterile water, is given by the mouth for several days until the acute symptoms abate, or until it becomes apparent that the patient requires some nitrogenous food. This solution should be given in small amounts and frequently, so as to keep up a stream of the sugar in the alimentary canal, otherwise the proteolytes will be able to attack whatever nitrogenous substances may be present in the alimentary canal between the doses of lactose. The average amount given daily was thirty-six ounces. The return to some form of nitrogenous nourishment must be made cautiously, and at first only small amounts should be given, simultaneously with an excess of utilizable carbo-

hydrate to protect the protein from bacterial attack. Dr. Kendall does not claim that this is in itself a complete treatment, but it is intended to prevent, as far as possible, the production of bacterial toxins in the intestinal tract, to encourage the growth of a more favourable intestinal flora which shall be antagonistic to the putrefactive dysenteric flora, and to furnish a readily assimilable food for the patient during the acute stages of the disease.

Irrigation of the colon is largely used in America. A long rectal tube (soft catheter) is used and at least a quart of normal saline fluid is injected slowly and high up in the bowel. The object is to remove all irritating material from the intestine, so that the irrigation should be continued until the washings come away quite clear. In some cases nitrate of silver (1% to 3%) is added to the lotion because of its astringent effect. While I believe that a daily rectal wash-out with boracic lotion is often beneficial in the early stages and not disturbing to the child, I have entirely discarded attempts to flush out the colon as a whole, which are imperfect as a rule, are very disturbing to the patient, and so far as my experience goes, are unproductive of any benefit as regards the course of the illness.

So successful has been the treatment of Asiatic cholera by means of the injection of hypertonic saline solution introduced by Dr. Leonard Rogers, that reference may be made to his suggested use of this remedy in the treatment of acute infantile diarrhoea.¹ For subcutaneous injection he uses a solution containing grs. cxx of sodium chloride

¹ *Brit. Med. Jour.*, 1911, Vol. II, p. 1404.

and grs. iv of calcium chloride to the pint of water; for intravenous injection, the same with the addition of grs. vj of potassium chloride. The quantity to be used is best regulated by estimations of the specific gravity of the blood by means of a series of small bottles containing mixtures of glycerine and water and differing from each other by two degrees from 1042, 1044, up to 1064, the normal point for infants from two weeks of age up to two years being between 1048 and 1050. The desired point is found by taking a small drop of blood in a capillary tube and blowing it gently into the middle of the bottle and noting if it sinks or rises, and continuing until the bottle is found in which it just floats for a few seconds. If it sinks in one and rises in the next the point is between the two. From five to ten ounces of the hypertonic solution are injected *subcutaneously* in all infants with a specific gravity above normal, and repeated before it is a little below normal point, to leave some margin. In addition to this treatment the stomach and larger bowel may be washed out with a solution of one grain of calcium permanganate to a pint of water, in order to destroy and remove as much as possible of the toxic products in the gastro-intestinal tract. The *intravenous* method is to be used in severe cases with collapse. The best vein for the purpose is the internal saphenous as it crosses over the internal malleolus. A fine cannula for the purpose may be made by drawing out a small glass tube, such as the physiologists use for registering the arterial blood pressure in small animals. It is too soon yet to estimate the value of these proceedings, but the

results obtained from their use in Asiatic cholera appear to render them worthy of a full trial in connection with acute infantile diarrhœa, and in combination with the other eliminative measures which have been described.

Acute Ptomaine Poisoning.—When a child previously in good health is suddenly attacked with vomiting, accompanied by marked prostration, even collapse, with diarrhœa possibly but without abdominal pain, one must think of the possibility of ptomaine poisoning. If there is a history of a meal—not necessarily very recent—containing tinned meat or fish or paste, or shell fish, or even (?) fresh fish one may have a clue to the nature of the illness, and this is much strengthened if other members of the family have been similarly affected. It will often be found that the senior members of the family escape with a slight attack of vomiting or diarrhœa. The children, on the other hand, are often rapidly reduced to a state of complete prostration, with sunken eyes and shrunken face. The facial appearance will often suggest the disease at once to one who is familiar with it.

One must at once take steps to eliminate the poison from the alimentary canal and the system generally. The sooner this can be done after the poison has been taken the better is the prognosis. The stomach should be washed out with warm saline solution, even although vomiting may have been going on actively. Before removing the tube a dose of calomel (grs. ij or iij) along with sulphate of magnesia and sulphate of soda (of each one or two drachms) is to be introduced directly into the

stomach. Afterwards it may be necessary to continue the dose of saline by the mouth until free purgation is established.

The patient must be kept warm in bed, with a plentiful supply of hot-water bottles to combat the prostration. Feeding may be left out of account for four hours, but pieces of ice to suck, or sips of champagne, or hot water may be given to relieve the great thirst. Hot fomentations may be applied to the abdomen if pain is complained of in that region. One must not be tempted by pain or restlessness to give opium in this affection, as its effect in checking the action of the excretory organs may be fatal. Restlessness may be soothed by hot baths, and by rectal injections of chloral hydrate (grs. x) with potassium bromide (grs. xx). Stimulation may be urgently called for, and should take the form of subcutaneous injections of strychnine (gr. $\frac{1}{100}$ th to $\frac{1}{50}$ th every four hours) aided possibly by digitalin, adrenalin, and caffein. With the subsidence of the acute symptoms the immediate danger passes off, but the digestive organs may have been so seriously injured that they require careful dieting during a prolonged convalescence.

Lienteric Diarrhœa is a form of chronic intestinal irritability in which the food is apparently rushed through the bowel by abnormal peristaltic activity. The bowels act at frequent intervals, the motions are usually loose, and contain partially digested food. Frequently the taking of food induces an evacuation so that the patient cannot sit through a meal without seeking relief. Any extra exertion, or excitement, or a slight chilly feeling

will lead to an evacuation. Some local nervous disturbance is apparently the cause of this condition, which is usually very amenable to treatment. The diet must be regulated so that nothing in the food or feeding should tend to maintain any gastrointestinal irritation. At the same time it is not necessary to put the patient on a milk or "sloppy" diet. A plain wholesome dietary suitable to the age of the child should be ordered. Very definite therapeutic benefit is obtained from the use of arsenic, as in the following prescription—

R. Liq. Arsenic., ℥ jss; Potass. Bicarb., grs. iij; Inf.
Gent. co., ℥ xxv; Aq. Chlorof., ℥ j; Aq. ad ℥ ss.

Half an ounce of this may be given three times a day to a child of five years, and one ounce to a child of ten. The effect is usually seen in the form of marked improvement within a week and cessation of the trouble within a fortnight. In cases where arsenic fails, opium may be tried. Three minims of liquor opii sedativus may be given three times a day to a child of five years. Finally, if neither arsenic nor opium effects a cure one can try the combination of the two. After relief has been secured a tonic for the nervous system in the form of Easton's syrup (℥ x T.D.S.) may be ordered. Relapses are not common, but may be met by a similar course of treatment as at first.

Diarrhœa from an **overloaded bowel** is not uncommon in children. The condition can be diagnosed from an abdominal examination, when hard fæcal masses will be felt in some part of the large intestine or in the rectum. The treatment is

thorough evacuation of the bowel by means of castor oil by the mouth (3 j to 3 ij at night) and enemata of soap and water. (*See Constipation.*)

Mucous Colitis.—Various forms of colitis are met with in early life. The acute summer diarrhœa of infants is a form of infective ileocolitis. Colitis may be a complication of pneumonia, of diphtheria, or of chronic renal disease, and may be associated with tuberculous disease of the bowel. The special form which we are now to consider is mucous colitis. This affection may arise at any age after the first year of life. The leading symptoms are the passage of large quantities of mucus *per anum*, sometimes accompanied by blood, attacks of abdominal pain, and marked constipation. The mucus may take the form of casts, easily broken up on handling, or there may be actual membranous casts of the bowel wall. The pain is usually of a colicky character, and is situated in and above the left iliac region. The disease tends to run a chronic course with relapses which may be of an acute (pyrexial) or subacute type.

Certain leading characteristics must be kept in mind in considering the **treatment**. The subjects of this affection are usually of the neurotic temperament, and liable to other disturbances of the nervous system, such as migraine, nervous vomiting, etc. They are, as a rule, thin, excitable, and precocious, with active brains and a tendency to introspection. A habit on the part of the parents to dwell on the child's symptoms leads to a desire on the part of the child to exaggerate and dwell on them. Consequently the less notice taken of the symptoms and

the less discussion of them in the presence of the child the better will be the prospect of a cure. Fanciful ideas about diet must not be encouraged. Another important factor is the influence of cold in inducing an attack. The affection is much more common in the winter months than during a hot summer. The clothing of the child by day and by night must be regulated so that there is no chilling of the surface of the body or extremities. Cold baths should be forbidden, and a warm covering of flannel round the whole abdomen is essential. Not only is constipation usually present during an attack, but a history of preceding constipation for some time will usually be obtained. In predisposed subjects chronic constipation is undoubtedly an exciting factor. Consequently means must be taken by diet, gentle laxatives, and enemata to ensure that a regular and proper evacuation of the bowels is secured.

During an acute attack the patient should be confined to bed as long as pyrexia or pain persists. The diet should be of a light character, *i. e.* milk and farinaceous foods, and the quantity given at a time should be small. Water may be given freely. For the relief of the abdominal pain, which is due to irregular and excessive contraction of the colon, hot fomentations may be applied to the abdomen, with the addition of a drachm of tincture of belladonna sprinkled on each. For the constipation which will probably be present, a mixture containing liquid paraffin (℥ ss-j) and tincture of belladonna (℥ v-viij) may be given three times a day. In some cases a saline mixture containing

sulphate and phosphate of soda (of each grs. x) and citrate of potash (grs. x) will be found useful in regulating the bowels and clearing off the excess of mucus. If the constipation does not yield to mild laxatives, such as the above, it is better to avoid strong purgatives and to use rectal injections. An enema of olive oil (℥ j to ij) may be given at night to be retained, and followed in the morning by a soap-and-water injection. In some cases diarrhoea with colicky pains is present during the acute attack. In such cases a mixture containing carbonate of bismuth (grs. x-xv), bicarbonate of soda (grs. x), and liquor opii sedativus (℥ j-ij) may be given three times a day.

The treatment does not cease with the recovery from an acute attack, because relapses will almost certainly follow. It is not advisable to treat these children as delicate invalids whose digestion must be humoured with the lightest of foods. On the contrary, I believe that the digestive powers are as a rule good, and that a mixed diet is the best line of treatment. What is required is to build up the whole system as much as possible and thus check the tendency to nervous instability. Any idiosyncrasy in the matter of special articles of diet, *e. g.* eggs, must be considered, provided that it is well authenticated. Proteins and fats are the chief tissue-builders, and should be given freely. Beef, mutton, fish, fowl, eggs, cream, and cod-liver oil serve this purpose. On the other hand, foods which tend to ferment in the bowel, such as milk, potatoes, bread, puddings, and sweets, should be given in strict moderation for a time. As in the

case of so many other affections, if food is given in moderation, and if the patient is not coaxed to eat when there is no desire for food, it is usually possible in a short time to get these patients on to an ordinary mixed diet. When this has been accomplished, and when the patient is gaining weight steadily, it will usually be found that the attacks of mucous colitis tend to cease. The regulation of the bowels must be carried out by means of cascara or senna or liquid paraffin. The paraffin preparations, such as "chrismol confection" (Allen and Hanbury), seem to be particularly effective as laxatives in this affection, and probably cause less disturbance than any other aperient.

Constipation.—In order to secure the proper evacuation of the bowels a certain regular habit must be acquired. This ought to be established in the earliest months of life, and if it were so established, and if the infant were properly fed, there would not be much necessity for medical advice as to the treatment of constipation. As it is, however, constipation in infants and children is one of the commonest conditions we are called on to treat. An infant will not make any voluntary effort to empty the bowel unless the rectal reflex is very active, and, as it easily becomes dulled, the bowel soon becomes overloaded. It is easy for the mother to give a dose of medicine and empty the bowel, but the same course of events is quickly repeated. Thus a vicious habit is established which may seriously impair the healthy development of the bowel and intestinal functions generally.

In order to prevent the development of constipa-

tion in an infant, a habit of soliciting an action of the bowels should be begun at the age of one or two months. After the morning bath and thorough general friction the child should be placed on the chamber. At first there may be no result, as the bowels may have been acting, quite normally for the age, at irregular intervals three or four times a day. If there has not been an action for twelve hours, then a small piece of soap or the little finger dipped in glycerine may be introduced through the anus. This will probably start the rectal reflex and an action will follow: at the same time a mental impression is conveyed to the child, which simply requires repetition to become a habit. On no account should it be regarded as a healthy state of affairs for a young infant to pass one, two, or three days without an evacuation. Just as certainly as the response to the rectal reflex in the form of an action of the bowels becomes a habit, so the dulling of the rectal reflex will become chronic if the rectum is allowed to retain fæcal matter for a day or two. While a young infant will usually pass several motions a day, the fact that one motion only is passed must not be regarded as a sign of constipation. It is the bulk of the matter passed which is important. Several small motions a day may be passed without there being any thorough evacuation of the bowel, and a condition of constipation is being developed. On the other hand, one full motion in the day may represent a normal and healthy action of the bowel.

All babies do not start life with the same ease and regularity in emptying the bowels. For those who have any difficulty simple measures are often

sufficient to prevent the development of constipation. Care must be taken first of all as regards the food and the feeding. Errors in this respect are responsible for most of the cases of constipation in early life. In the case of breast-fed infants, the habits of the mother must be carefully regulated, and if she is herself healthy and feeds her child regularly, the tendency to constipation in the infant will not be great. This constipation of breast-fed children is seen much more amongst the poorer classes, and in them the quality of the milk, the state of the mother's health, and irregularity in the feeding are probably chiefly responsible for the condition of the baby. As regards bottle-fed children it is equally necessary that proper food at proper intervals should be given if constipation is to be avoided. (*See Feeding of Infants.*)

Some infants show a tendency to constipation from birth, which is not necessarily a pathological condition, for it can often be remedied by a slight alteration in the diet. Thus a few ounces of plain or barley water in the day, given between feeds, may suffice to maintain a regular action. Orange-juice or grape-juice may be given with benefit and safety to the youngest infant for the same purpose, $\frac{3}{4}$ ss—j diluted with water, and given between feeds. In other cases the milk may be so thoroughly digested and absorbed that little residue is left in the bowel. Without some residue to act on it is difficult for the bowel to exert its peristaltic action effectively. In such cases we may allow a small amount, three or four teaspoonfuls daily, of a starchy food, either unconverted or partially converted, which is sufficient

to act as a stimulus without acting as an irritant to the bowel. Again, a tendency to constipation may be induced by frequent doses of castor oil given in early infancy. It cannot be too strongly impressed on mothers that castor oil is not the drug to give for constipation. It finds its true use in connection with diarrhoea and intestinal irritation. The action of castor oil as a purgative is usually followed by a period in which constipation results, so that no permanent progress is made. The habit of drugging young infants with castor oil, as if it were an essential part of healthy babyhood, is one of those nursery customs which is responsible for much constipation.

Another factor which sometimes leads to constipation is the habit of depriving infants of facilities for the free exercise of their limbs. A healthy child is a very active person, but if the limb muscles are hampered by tight and heavy garments or by heavy bedclothes, those natural movements are much curtailed. It should be the daily practice to let an infant be on the bed or some warm protected place where it can indulge in its natural muscular movements with perfect freedom. At the same time the abdominal muscles will be strengthened, and their action has an important influence in securing natural evacuations. It is the custom amongst many primitive races for the mothers to carry their infants slung over the back or on the hip. The result is a considerable amount of shaking, which acts on the liver and induces a flow of bile, just as riding exercise does. Perhaps it is impossible to introduce such a custom amongst the advanced races here, but it is quite easy to give the baby some exercise in the nursery

which will serve the same purpose, such as jumping it up and down. If the period after the morning bath is utilized in this way it will often be found that an action of the bowels follows.

After an infant has cut some teeth the prolonged use of a soft, pappy diet and the custom of using predigested foods are apt to be followed by constipation. Intestinal peristalsis is weakened when there is no solid residue in the bowel to call it into action. Hence it will be found advisable to employ those foods which contain some irritating and non-digestible materials, such as porridge, whole-meal bread, figs, etc., and in the case of older children, salads, green vegetables, tomatoes, and raw apples. At the same time care must be taken that these substances are not given in excess of the age and requirements, as the result may be impairment of the digestive powers and diarrhoea. A sufficient amount of fatty material must also be part of the diet. Fats and oils have a lubricant effect on the bowel contents, and prevent the inspissation of the fæces which sometimes leads to constipation. In suet puddings, cod-liver oil or olive oil, cream and butter, one finds the necessary fatty elements. In the case of children of school age the same principles apply, and the best diet for the prevention of constipation is a mixed one, in which all the essential elements are represented, care being taken that a sufficient amount of water is drunk both at and apart from meals.

In cases of constipation an abdominal examination should always be carried out, and frequently a rectal examination is also called for. By the omission of

such measures one will be liable to overlook cases of serious abdominal disease and local conditions bearing directly on the cause of the constipation. Amongst the local causes there may be : (1) Atonic dilatation of the bowel; (2) overloading of the sigmoid flexure with fæces; (3) anal fissure or tenderness; and (4) a spasmodic contraction of the anus.

(1) The chief cause of **atonic dilatation of the bowel** in young children is rickets. At the same time a prolonged course of over-feeding or improper feeding is apt to be followed in young persons by atonic dilatation, quite irrespective of rickets. The abdomen is distended by the dilated bowel, which is incapable of driving on its contents properly. The first and most important part of the treatment is to put the patient on a spare and digestible diet, so as to restore the muscular tone of the bowel wall. For the same object massage of the abdominal wall may be carried out twice daily. The muscles of the abdominal wall should be well pounded, and pressure exerted from the right iliac region along the course of the colon to the sigmoid flexure. A firm flannel binder should be applied round the abdomen. During this period of toning-up the bowel wall it may be necessary to use regularly a mild aperient, such as the following—

R. Tincturæ Nucis Vomicæ, ℥ ij; Tincturæ Belladonnæ, ℥ iij; Tincturæ Aloes, ℥ iij; Glycerine, ℥ x; Aquam, ad ℥ j.—T.D.S.

(2) **An overloaded condition of the sigmoid** does not necessarily manifest itself by constipation. On inquiry one may be told that the bowels act daily,

but on examination it will be found that the motions are usually small and lumpy. There is never a complete evacuation of the bowel. Irregular attacks of abdominal pain, of vomiting, and of diarrhoea are common manifestations of this condition. The loaded bowel can be palpated easily in the left iliac region. Sometimes the accumulation is enormous and extends into the rectum, as well as throughout the whole of the colon, in the form of hard masses. In extreme cases the rectal accumulation is so hard that it must be mechanically broken down. In less severe cases it is advisable to give an enema of 2 or 3 ounces of olive oil at night, to be retained, and to follow this with a soap-and-water enema in the morning. This procedure should be repeated for three days or longer if the bowel has not been cleared. When the lower bowel has been emptied, a dose of 2 drachms of castor oil should be administered on consecutive nights, so as to empty thoroughly the parts of the colon beyond the reach of the enemata. One has then to give a course of mild aperients to prevent the recurrence of such a condition. This form of constipation is often the result of want of regularity in soliciting an action of the bowel on the part of the child. It may have been as the result of difficult and painful defæcation, or of neglect of the calls of nature that the rectal reflex has become blunted and then lost. In many schools, and not only those for the poorer classes, this is too often neglected, and much preventable constipation, both in boys and girls, is brought about. Full facilities should be provided at schools for the performance of these natural functions, and both meals and work should

be so arranged that no boy or girl can plead want of time.

(3) A small **anal fissure or abrasion** may be the result of hard and inspissated motions. The presence of blood in the fæces, even in the youngest infants, is quite common, and is due to the irritation of hard scybala in the rectum. Whenever a movement of the bowels becomes painful a child will instinctively try to avoid an action, and constipation follows. If small, a fissure will usually heal under the local use of boracic ointment; if at all deep, it must be divided freely. At the same time the action of the bowels should be rendered easy by the daily use of olive-oil enemata, \bar{z} iv-vj. The enema should be retained for five or ten minutes, and the action following will cause little pain.

(4) In some cases of constipation, on making a rectal examination one may find a **spasmodic contraction of the sphincter ani**, which resists the entrance of the finger. Such a condition of spasm in the sphincter is usually accompanied by imperfect emptying of the rectum. This spasm may exist quite apart from fissure or other local irritation, and is sometimes very difficult to cure. In such cases we may employ locally the injection of hot water for its sedative effect, and also try the effect of bromides and belladonna, given by the mouth, for their anti-spasmodic action.

In the case of children the treatment of constipation by means of **enemata and drugs** ought to occupy a very secondary place. Bad habits have not become fixed, and the errors of youth have not had time to impair the normal working of the bowel.

Nevertheless, a medical man will often be consulted after constipation has existed for some time, and until it is cured there must be an interval during which drugs or enemata must be employed to maintain a healthy state of the intestinal functions, and, through them, of the system generally. It is well to remember that strong aperient medicines should not be used in the treatment of constipation, but reserved for occasional use only. When mild aperients are used for constipation they are much more efficacious when given in divided doses, three times daily, rather than as one dose at night. As regards the dosage, children require much larger amounts of such drugs as senna and cascara than would be considered necessary from a comparison of their body-weight with that of adults. Some parents will stuff their children with porridge, prunes, bananas, apples, etc., in order to relieve constipation; but will object to a dose of senna or cascara because it is a medicine, and, in their opinion, weakening to the bowel. As a matter of fact, there is no such difference of nature or action, and a healthy tone of the bowel wall and healthy intestinal secretions can be secured much more quickly and effectively by cascara than by prunes.

Enemata are called for in those cases in which the motions are hard or there is a chronic difficulty in emptying the rectum—the condition to which Dr. Hertz has given the name *dyschezia*. The choice lies between plain water (which is not efficient unless given in considerable amount), soap-and-water, olive or other simple oil, and glycerine. Glycerine suppositories are so slow and uncertain in their action

that plain glycerine is to be preferred : one drachm of glycerine is sufficient to produce a speedy action. If any pain follows it may be avoided in future by giving equal parts of glycerine and water. When the rectal wall seems to require a gentle stimulus to provoke the dulled reflex, plain water up to $\frac{3}{4}$ pint may be employed. When the rectum is overloaded with fæces soap-and-water may be used, with or without a preliminary injection of olive oil. When the motions have been hard and the evacuations incomplete an enema of from 4 to 6 oz. of olive oil will procure an easy evacuation. In giving enemata only soft rubber should be used for introduction into the bowel, as any hard substance is apt to cause abrasions about the anus.

Amongst the mild aperients cascara and senna are specially suitable for children. Cascara may be given in the form of a fluid extract or "cascara evacuant," the latter being more palatable and equally effective. An ordinary dose for a child of five years is from 5 to 15 drops three times daily. The best preparation of senna is a fresh infusion of the pods, made by pouring \mathfrak{z} iij of boiling water over four or six pods, and standing for twelve hours. Of this \mathfrak{z} j can be given three times a day. A fresh infusion of the pods may be prescribed, to be made of the strength of one in six, flavoured and preserved with chloroform, and of this \mathfrak{z} ss may be given thrice daily. This preparation should be made fresh twice a week. Senna is also the active ingredient in syrup of figs (\mathfrak{z} ss thrice daily), and of "laxative fruit pastilles" (one thrice daily). In prescribing senna or cascara it will often be found useful to meet

certain indications by the addition of other substances. Thus, if the hepatic action seems to be defective we add tincture of rhubarb (℥ v to ℥ x), if spasm of the bowel and colic are present we add tincture of belladonna (℥ v to ℥ x), and when the muscular tone of the bowel is weak we add tincture of nux vomica (℥ ij to ℥ iv). Liquid paraffin is a useful aperient, which may safely be employed for the youngest of infants. Its use is chiefly indicated in those cases in which the stools are hard or lumpy, as its action is that of a lubricant and it prevents the hardening of the fæces. In breast-fed babies a condition of inspissation of the fæces is not uncommon and may be prevented by the administration of liquid paraffin. There are various preparations on the market, such as petroleum emulsion, chrismol, etc., which act well, or the liquid paraffin can be given in milk in doses of from 15 to 60 drops three times a day. The use of an aperient may have to be continued for from one to six weeks, according to the length of time the constipation has lasted. The plan is to begin with doses sufficiently large to produce complete evacuation of the bowels, without looseness, and gradually to diminish the amount of the dose as the normal action of the intestine becomes re-established.

Abdominal Tuberculosis.—There are three chief forms in which abdominal tuberculosis is manifested in early life. First, there may be tuberculous enteritis, an ulcerative form of inflammation affecting chiefly the lower part of the small intestine, the cæcum, and the colon. Secondly, there may be tuberculous mesenteric glands, a condition which

is known clinically as *tabes mesenterica*. Thirdly, there may be tuberculous peritonitis. It is possible that any one of these types may occur alone, but as an isolated condition, tuberculous enteritis or *tabes mesenterica* is distinctly rare in childhood. The commonest form met with clinically is tuberculous peritonitis. At the same time, while tuberculous peritonitis overshadows the others by its frequency and by the prominence of its symptoms, it is to be viewed as a result of tuberculous infection of the bowel. In some cases it may be that infection comes from the thoracic glands along the lymphatic channels, or from other tuberculous deposits *viâ* the blood stream, but such are not examples of abdominal tuberculosis pure and simple.

Abdominal tuberculosis as a primary disease is not often met with during the first two years of life. *Tabes mesenterica* is not a common disease of infancy. "Consumption of the bowels," which is such a popular diagnosis, is most frequently a misnomer for chronic intestinal indigestion and diarrhœa, the results of improper food or over-feeding. At the same time, from the age of six months one may meet with typical and severe cases of abdominal tuberculosis. The majority of the cases occur after the age of two years.

The symptoms of tuberculous enteritis may be very slight, or there may be severe and persistent diarrhœa, with the passage of blood and mucus, and with a considerable degree of irregular pyrexia. The symptoms of *tabes mesenterica* may be wasting only, and unless one can make out definitely a mass of enlarged glands about the mesentery, the diagnosis

must remain uncertain. Tuberculous peritonitis, on the other hand, is usually a well-marked affection, and as it is usually accompanied by the other two conditions, we shall in the following remarks discuss abdominal tuberculosis under the name of tuberculous peritonitis.

The **preventive treatment of tuberculous peritonitis** consists in the use of wholesome fresh food as the diet, and the maintenance of a healthy condition in the alimentary canal. The dread of tubercle-laden cows' milk has affected the profession and the public for some years, and elaborate methods of sterilization were introduced to destroy not only every tubercle bacillus, but also every spore. This was probably effected, but at the same time the nutritive value of the milk was destroyed. For practical purposes it has been found that boiling the milk for one or two minutes will destroy the bacilli, which as a rule are not abundant in cows' milk unless the cow's udder is the seat of active disease. As a matter of clinical experience, I have found that tuberculous peritonitis may occur later in children who have been fed entirely at the breast for nine or ten months. While it is most important that children should have tubercle-free food as far as possible, there is no evidence to show that the subjects of tuberculous peritonitis have been swallowing more tubercle bacilli than their neighbours who have escaped. It may be assumed that in town life and in crowded areas every child consumes in the food a considerable number of tubercle bacilli, both living and dead. *The real risk lies in an unhealthy condition of the alimentary canal, which*

may allow of the penetration of the bacilli. Consequently the troubles of infancy and childhood—flatulence, diarrhoea, chronic intestinal catarrh, and other disturbances of the gastro-intestinal tract, in so far as they weaken the self-protecting and resisting power of the bowel, may predispose to abdominal tuberculosis. With a history of a stormy period from the above disturbances in early life, and also a family predisposition to tuberculosis, one has to regard the danger to the child of tuberculous peritonitis as a real one. So far as the preventive treatment of tuberculous peritonitis is concerned, we shall probably do more by the regulation of the diet, so as to avoid gastro-intestinal disturbance, than by the attempt to destroy tubercle bacilli in the milk. If the mucous membrane of the stomach and bowel is in a healthy condition, it will be able to protect itself from the invasion and penetration of any tubercle bacilli. A distinct history of injury to the abdomen is often present, which strongly suggests that a local injury may have weakened the resisting power of the bowel.

The **treatment** of the disease will depend on the nature of the attack. In some cases the onset is sudden, with high temperature, prostration, abdominal swelling, and possibly abdominal pain and diarrhoea. This type of the disease may easily be mistaken for typhoid fever. In other cases the onset is slow and marked by few symptoms, namely, slight abdominal pain, progressive abdominal distention, lassitude, and wasting. In a third class the child may simply appear to be “out of sorts,” and no abdominal affection is suspected until the signs

are detected by the physician on examination. An acute attack may run a course of from two to six weeks, without any marked improvement or alteration in the general condition of the temperature chart. In every case there is probably a period of active local tuberculosis, although the symptoms may not be severe enough to bring the patient under medical care. It is very doubtful whether during this stage any treatment will check this active process, although it may be the means of preventing serious complications. At the same time the recognition of this active period, and the fact that it may run into weeks without doing the patient any permanent harm, may enable physicians to wait patiently and not adopt more severe measures of treatment which are of doubtful value.

In all acute cases, and in all cases with pyrexia, absolute rest in bed should be ordered. The patient should occupy a large room with windows constantly open, and there should be one room for the day and another for the night. If circumstances allow, the rest should be carried out in the open air as much as possible both by day and by night. In short, the more the "open air" treatment can be employed, the better; and if this is not available at home it may be obtained at a sanatorium, or at the seaside. The body warmth of the patient must be maintained by clothing and blankets and hot bottles, but these must be regulated so as not to induce sweating from excess of warmth.

The natural tendency is to put such cases on a "sloppy" diet—milk, bread and milk, and pudding. Experience has shown that this is the worst possible

form of treatment. The abdominal swelling which is present is largely due to the intestinal catarrh or ulceration, with consequent flatulent distention and atony of the bowel. These conditions are increased on a diet of farinaceous foods and milk, which ferment in the bowel. The first part of the treatment is to clear out the bowel thoroughly, and the next is to put the patient on a non-fermentable diet. A drachm of castor oil may be given twice daily until four doses have been taken; or some other simple evacuant may be used. The diet selected should be one which will allay intestinal catarrh, which will not decompose readily in the bowel, which will be easily digested and absorbed, and which will supply the system with the important constituents calculated to combat the affection. These conditions are best fulfilled by a proteid diet. At the outset, if pyrexia and loss of appetite are present, one can order a diet of mutton, beef, veal, or chicken soup. Small quantities of these should be given at frequent intervals during the day. For children, these soups should never be made strong, as concentrated soups are apt to produce indigestion. They may, however, be made more nourishing by the addition of raw meat-juice, one or two ounces daily in divided doses, or plasmon powder, or somatose. As soon as possible, that is to say, when the patient will take it, more solid food is to be ordered in the form of pounded fish, or chicken, or mutton, with some bread-crumbs and white of egg to make it more savoury and appetizing. This is to be given quite irrespective of the condition of the temperature chart, provided the patient's appetite is good. In some cases one

will find that during the morning apyrexial stage the patient is ready for this more solid food, while during the evening pyrexia he is feeling ill and is disinclined for anything but fluids. Advantage should be taken of the fluctuations of the temperature chart to feed accordingly. Often one will find that although pyrexia continues, the patient's tongue is clean and the appetite is rapidly improving. Advantage is taken of this to put him on to a meat diet, which he can chew thoroughly. It must be recognized that in children over three years of age a diet of plainly cooked food is more digestible and more nourishing than any forms of invalid cookery. The following dietary therefore may be ordered as suitable both for the later stages of an acute case, and for those chronic cases in which the temperature has never risen above 100° F.

Breakfast.—Fresh fish; tongue, freshly boiled or tinned; white of egg, raw or lightly boiled; two small pieces of crisp toast; one teacup of weak cocoa, with one ounce of milk.

Dinner and Supper.—Fish, chicken, sweetbread, tripe; hot or cold, boiled or roast, mutton and beef; chops and steaks. These must be plainly cooked, and served without any fat and without any sauce or gravy. A small quantity of breakfast or dinner biscuits (one tablespoonful), or two plasmon biscuits. Half a glass of claret.

If the appetite is good, as it usually is, three meals a day are better than frequent small meals. If, on the other hand, the patient is not inclined for a good meal, then the same materials should be given more frequently in smaller quantity. The amount

of carbohydrate material is to be strictly limited, but a small quantity is probably not injurious and is much appreciated. Only a small amount of fluid is to be allowed at meals, as a dry diet is more digestible, but water may be given freely between meals. Claret acts as a tonic, and as an astringent when diarrhœa is present.

The benefit derived from one or other form of this proteid diet is usually striking. The patients take it with relish and without discomfort. The abdominal distention usually subsides markedly within a week or ten days. The motions become more healthy in character, and if diarrhœa has been present it usually passes off. If there is no improvement under this treatment, one is led to suspect that there may be some grave lesion present, such as extensive ulceration of the bowel, or a mass of caseous and suppurating glands, or a rupture of some intestinal ulcer, with leakage and abscess formation in the surrounding tissues. It is plain one cannot expect improvement from dietetic treatment under such conditions.

The above diet, while it is strengthening and tends to maintain the vital powers of the patient, is not fattening. As soon as possible, one goes on to add some fatty food in the form of cream or cod-liver oil to increase the nutrition. This is a much more severe test of the digestive powers, and the fatty food must be commenced tentatively and in small quantities at first. I have frequently found digestive disturbances follow at once, so that one had to fall back on the proteid diet. One drachm of cream or the same amount of cod-liver oil and malt may be ordered three times a day. Some

children will take by preference a sardine with some of the accompanying oil, and this, or the yolk of an egg, may be substituted. The amount may be gradually increased, and some beef or mutton fat may also be allowed as the convalescent stage is reached. At this period also one may allow a return to milk and farinaceous foods, care being taken that the quantity given is small at first.

I do not say that a proteid diet is a cure for tuberculous peritonitis, but I believe that it places the patient in a better position to resist and conquer the attack of the tubercle bacilli. Just as a catarrhal condition of the bronchial tubes predisposes to pulmonary tuberculosis, so a catarrhal condition of the intestine predisposes to tuberculous peritonitis. As fresh air tends to check pulmonary catarrh, and thus allows of pure air entering the pulmonary blood-vessels, so a proteid diet tends to check intestinal catarrh and allows the pure products of digestion to enter the blood stream. These are all the advantages that are claimed for it, but if the disease is not too advanced, the result is usually satisfactory.

As regards the **medicinal treatment**, reference has already been made to the evacuation of the bowel at the commencement. If the motions are offensive and flatulence is persistent, a mixture containing creosote (℥ ss) and salol (grs. v) may be given three times a day. Guaiacol carbonate is a useful intestinal antiseptic. Burney Yeo claims good results in tuberculous peritonitis from iodoform, given in pill form, but my own experience has been that its action is solely that of an intestinal antiseptic. It must be remembered that no medicinal

antiseptics will counterbalance the effects of a diet which tends to produce intestinal sepsis. If diarrhoea is persistent and weakening, the following prescription may be ordered—

R. Bism. Subnitr., grs. x; Tr. Opii, ℥ ij; Sod. Sulpho-carb., grs. v; Muc. Trag., q.s.; Aq. Cinnam. ad $\frac{3}{4}$ ss.
—T.D.S.

In the convalescent stage, tonics such as cod-liver oil with hypophosphites, nux vomica, strychnine, and port wine are to be given, but drugs such as arsenic and iron, which tend to upset the digestion, are better avoided.

As regards the **local treatment**, a flannel binder ought to be worn both for warmth and support. Abdominal pain is not usually great, especially when the patient is kept at rest, and can usually be relieved by hot fomentations, with or without a drachm of tincture of belladonna. In ascitic cases, *i. e.* when there is free effusion of fluid, a mercurial ointment may be spread over the abdomen. Half an ounce of unguentum hydrargyri compositum, or two drachms of unguentum hydrargyri, may be rubbed into the skin of the abdomen every second or third day for ten days or a fortnight. This will often be followed by absorption of the fluid. In ascitic cases the abdomen should be firmly supported and the parts kept as far as possible at rest by means of a flannel bandage. In the adhesive forms and those with tumour formation, local treatment is of little use and is better avoided.

The **surgical treatment** of tuberculous peritonitis is a vexed question. Some years ago, in a discussion on this subject, Sir Watson Cheyne said

that the attitude of the profession had changed curiously during the last thirty years. At first, physicians had held that tuberculous peritonitis was an incurable and fatal affection. Then they found that surgeons could cure it, and had called in surgical treatment largely. Now they held that the disease was curable by medical measures. This description is correct, and so I believe is the final conclusion of the physicians. Laparotomy has been tried in every form of tuberculous peritonitis, but now surgeons claim that they get the best results in the ascitic form, and many say that simple laparotomy is of no use in other forms. The ascitic type is usually one of the mildest, and physicians get their best results in that form also. If a case with ascitis is very persistent, and the fluid does not disappear under medical treatment, then it may expedite matters to tap and drain the abdomen with a Southey's or other trocar, or, if preferred, to have laparotomy performed. But of recent years I have had no experience of surgical treatment in tuberculous peritonitis, as I have had no occasion to employ it. As regards the results of laparotomy in ordinary uncomplicated cases, I have seen no changes follow which cannot be seen under medical treatment, save perhaps the formation of a tuberculous sinus. In certain complications, on the other hand, such as intestinal obstruction from bands or adhesions, or in localized abscesses, surgical treatment is the only one which offers any prospect of relief, and should be called in early.

The **prognosis** in uncomplicated tuberculous peritonitis is good, and even when tuberculous

pleurisy is present, as frequently happens, it is still favourable. On the other hand, the occurrence of continuous pyrexia, of persistent diarrhoea, of a rapid pulse, or of recurrent acute exacerbations suggests the presence of some grave complication which renders the prognosis less favourable. These complications may be of a local nature, such as extensive ulceration of the bowel, with or without perforation, extensive caseation of the mesenteric lymph nodes or tuberculous masses, or localized suppuration. In other cases the complications may be of a general nature, namely pulmonary tuberculosis or tuberculous meningitis or general miliary tuberculosis.

Worms.—The worms most commonly met with in children are the threadworm (*Oxyuris vermicularis*) and the roundworm (*Ascaris lumbricoides*). The number of subjective symptoms referred to their presence is legion, but the diagnosis is usually made by the discovery of one or more worms in the stools. One may be led to suspect their presence from an excess of mucus in the stools, from anal irritation at night, and from general restlessness and irritability by day without obvious cause. The infection is probably carried in some form of uncooked food, such as fruit or vegetables, or it may be that the ova are picked up on the fingers from handling some source of infection, and are then conveyed directly to the mouth. These worms are comparatively rarely met with in the children of well-to-do parents, whose food is supplied under cleanly conditions. Even if the ova do enter the bowel they are not likely to remain there unless the

alimentary canal is in an unhealthy condition. The prevention of intestinal catarrh is an important part of the preventive treatment of worms in the bowel. Wherever there is a possibility of fruit and vegetables having been infected, they should not be given in a raw condition to children.

In a case of **threadworms** a powder containing three grains of calomel and one of jalapin may be ordered for a child of five years. When this is given in the evening, there is often some vomiting during the night, the result of the calomel, but this does not affect its activity. Several motions will probably be passed next day containing threadworms. An injection of salt (℥ ss.) and warm water (1 pint) should be given next morning, administered slowly with a long tube, so as to clear out any worms remaining about the rectum. At night an ointment composed of hydrargyrum ammoniatum (grs. v) and vaseline (℥ j) should be smeared around the anus, and a small quantity of it passed into the bowel with the little finger. The powder should be repeated at the end of three days, while the other treatment may be continued as long as any worms appear in the motions. An infusion of quassia or garlic is often employed for washing out the bowel, and while effective as regards those worms which may be on the rectum, it requires to be supplemented by other treatment for those higher up. The diet should be simple and spare, and a mixture may be ordered to limit the mucous catarrh, such as the following—

R. Potass. Citrat., grs. x; Sodii Sulphat., grs. xv;
Tr. Rhei., ℥ x; Tr. Zingib., ℥ ii℥; Aq. ad ℥ ij.—
T.D.S.

These measures will probably serve to relieve the patient of threadworms.

The diagnosis of **roundworms** is usually made by the presentation to the physician of a bottle containing the worm. It does not by any means follow that more are present, but it is always advisable to determine the point. A powder containing three grains of calomel and half a grain of santonin is to be given at night. This will usually bring away any worms which remain, but if any doubt still lingers, a second powder may be given three nights later.

The Liver.—The liver may be the seat of many disturbances in early life, but the special diseases are few in number. As in adult life, the leading symptom is jaundice, which is usually accompanied by less general disturbance in young subjects. We shall only refer to those affections of the liver in which treatment may be of benefit, even although the pathology is not always clear.

Jaundice.—This may occur in new-born infants, and may be of a simple character, passing off in a few days or a week, so that no treatment is called for. In other cases it is more persistent, and may be associated with congenital obliteration of the bile ducts. Here no treatment is of any avail. A third variety is associated with **syphilitic hepatitis**. The jaundice may be present very soon after birth, or may not appear for some weeks later. The liver will be enlarged, bile may be deficient in the stools, and will be in excess in the urine, as shown by the staining on the diaper. It is important that

syphilitic jaundice should be diagnosed early, because the treatment will probably be much more successful if early begun. The importance of the presence of jaundice is that it directs attention to the liver, whereas in the absence of this symptom an early stage of syphilitic cirrhosis may be entirely overlooked, and the opportunity for successful treatment may be lost. The prognosis in early syphilitic cirrhosis when treatment is thorough is in many cases good, but if it is delayed until fibrous tissue is fully formed, the prognosis is very different. Confirmatory evidence of syphilitic jaundice may usually be obtained from the presence of other signs of syphilis in the infant or from the family history, or from both. The treatment should be full doses of mercury, one grain of grey powder three times a day, which may be supplemented if necessary by mercurial inunction (*vide* Syphilis). Even under this treatment the jaundice may persist for weeks, but the infant will probably be improved in its general condition, and the treatment must be persevered with.

After infancy **catarrhal jaundice** is not infrequently met with. An attack is usually shorter and milder than in later life. Apart from the jaundice, loss of appetite and slight malaise may be the only symptoms complained of. The immediate occasion of an attack is often difficult to determine, but there has probably been some gastrointestinal catarrh or a chill leading up to it. Recurrent attacks at intervals are not uncommon. The preventive treatment consists in a simple dietary and the avoidance of over-feeding and

exposure to cold. The immediate treatment consists in rest in bed and low diet. Fifteen ounces of milk and ten ounces of weak mutton soup *per diem* may be ordered during the acute stage. The milk may be diluted with equal parts of lime-water. Medicinally, the patient may have at first a mild aperient, preferably two drachms of castor oil, and this may be followed up by a grain of grey powder every night. A gastro-intestinal sedative mixture should also be ordered as follows—

R. Tr. Rhei, ℥ v; Potass. Bicarb., grs. v; Sp. Chlorof.,
℥ ij; Aq. ad ℥ j.—T.D.S.

In ordinary cases there will be marked improvement within a week, and disappearance of the jaundice within a fortnight. With the first signs of an increase of bile in the stools the diet may be gradually increased by the addition of boiled bread-and-milk and simple pudding, but a return to full diet must not be adopted too hurriedly.

“**Bilious Attacks.**”—One is frequently consulted about children who are subject to “bilious attacks,” according to the home diagnosis. This is sometimes regarded as a special development on the part of the child, and sometimes it is traced to the fact that the father suffered similarly when he was a boy. The attack is described as follows:—The patient, after being rather seedy for a day or two, is seized with vomiting, his appetite is lost entirely, his face becomes pale and sallow, and a considerable degree of prostration ensues. After a day or two all the symptoms subside, and recovery is rapid. There are different causes for such attacks,

such as chronic gastro-intestinal catarrh, or a loaded bowel, etc., which have been already described. But in other cases there is reason to believe that the liver is the organ chiefly affected, that it has temporarily gone on strike after a period of overwork, or from acute toxic disturbance.

The **prevention** of such attacks consists in seeing that the normal action of the liver is not interfered with by chronic over-feeding or bad feeding, and that indulgences outside the ordinary diet are permitted in strict moderation.

The **treatment** of an attack consists in the abstention from food until rest has restored the gastric and hepatic functions. As all appetite is usually lost, this abstinence is not objected to. Water or barley-water may be given freely to drink, but not in large quantities at a time. The medicinal treatment should consist of small doses of calomel, half a grain three times a day, with ten grains of bicarbonate of soda. With the return of appetite, weak mutton soup may be given alternately with milk and lime-water, and for the calomel powders may be substituted a gentian-and-soda mixture.

In all cases in which a diagnosis of "bilious attacks" has been made in the family circle, it is advisable to make a careful abdominal examination, which not infrequently reveals some entirely different cause for the vomiting than the supposed hepatic disturbances. The possibility of "cyclic vomiting" as the cause of these attacks must also be kept in mind.

Congenital Pyloric Stenosis.—This is an affec-

tion of early infancy to which much attention has been directed during the past few years. Cases are still being constantly overlooked, the proper treatment is not carried out, and the babies die. We shall refer first of all to the clinical symptoms, which are as a rule clearly defined, and allow of an early diagnosis if the possibility of pyloric stenosis be kept in mind.

The history is usually as follows: An infant, healthy at birth, seems to progress satisfactorily for two, three, or five weeks, and then vomiting comes on. It does not matter what the food is, breast or artificial feeding, the vomiting persists. Frequently it is suggested in such a case to try another food, and the baby is started on a career of different diets. A most misleading fact in this connection is that a change of diet has often a temporary effect in checking the vomiting. It may be only for a day, or a week, but the cessation of vomiting suggests that the disturbance is due to the food, that the appropriate food has not yet been found, and so the hunt continues. The result is always the same—failure of the treatment and death of the child. The vomiting is really a regurgitation of the food, without any of the signs of nausea, gastric catarrh, or acute disease. At the beginning it is moderate in amount, not specially violent, and only occasional. As time goes on—and time is measured by days in this affection—the amount of vomited material becomes larger, representing two or three feeds, and the violence of the vomiting is much greater, so that the food is shot out through the mouth and nose for some distance. The vomit-

ing consists of the food, partly digested, and while sometimes only the last meal is rejected, at other times it is evident that the vomit consists of several meals. The amount vomited may be considerably greater than a normal stomach could contain at this age, showing that dilatation has taken place.

The vomited material may also contain a considerable amount of mucus, and sometimes from prolonged retention may be fermenting and foul smelling. The frequency of the vomiting varies, sometimes occurring only once a day, and at other times more frequently. The act of vomiting does not distress the patient, in fact it often brings relief, and the child is at once ready for another feed. It is almost characteristic of these cases that the infants are always ready for a feed, being in a chronic state of hunger. The infant wastes rather rapidly at first, and then more slowly, but steadily. The bowels are usually so confined that enemata or suppositories have to be used daily, and the motions are extremely scanty. The diagnosis is to be finally settled by an examination of the abdomen. If one has the infant lying quietly, soon after a feed, with the abdomen exposed, one can see, especially on tapping the abdomen, a succession of peristaltic waves passing from the ribs on the left side across the abdomen above the umbilicus to be lost in the right hypochondriac or lumbar region. On palpation of these waves, which are usually about the size of a large walnut, one can feel that they are due to firm muscular contractions of the stomach wall. Some writers lay stress on palpation of the pylorus as an important diagnostic aid, but this can only

be done in certain cases and is not really necessary. The underlying lesion in these cases is a hypertrophy, probably congenital, of all the muscular layers of the pylorus.

All are agreed as to the clinical symptoms, but a good deal of difference of opinion exists as to the pathology. A hypertrophic condition of the muscular tissues of the pylorus is always found at operations or on post-mortem examination in typical cases, although occasionally in practice one meets with atypical cases in which probably spasm is present without hypertrophy. The latter are much more amenable to medical treatment. The hypertrophy is believed by some to be due to a congenital hyperplasia of the pyloric muscle (Cautley), and by others to be the result of persistent spasm. From the therapeutic point of view it is important to note that the pyloric spasm is the chief factor, as owing to the spasm the food is unable to pass the pylorus. A condition of hyperplasia or hypertrophy should not, and probably does not, of itself prevent the pylorus from relaxing, but it may tend to render spasm more easily induced and more persistent than under normal conditions. There is clinical evidence in favour of the view that such spasm is caused by the irritation of food in the stomach. However carefully an infant may be fed, some gastric disturbance or indigestion must happen at times, and this may be the starting-point of a pyloric spasm which tends to persist. Hence we find that although the lesion is probably congenital, the symptoms may not appear for two, three, or even six weeks. The sequence of events would

appear to be : first, gastric irritation ; secondly, pyloric spasm ; and thirdly, hypertrophy and dilatation of the stomach from its efforts to drive the food through the pylorus. The vomiting is induced by the irritation of the stagnant gastric contents, and sometimes by the large quantity of food which accumulates in the stomach. Willcox and Miller have found after test meals that there is a large retention of food in the stomach, that the ferment activity (estimated as rennin) is much increased, that the total acidity is lessened, and that there is excess of mucus. These evidences of gastritis are in all probability secondary to the retention and irritation of fermenting food in the stomach.

The question of the best method of treatment for such cases is still unsettled, and must remain so until further experience has been gained. At first it was thought that the only possible means of cure was by operation, and many distinguished physicians and surgeons still hold that opinion. On the other hand some physicians have been able by medical measures to secure relief from all the symptoms and eventual recovery. In the light of our present knowledge the course to be recommended is, first, treatment on medical lines, and if that fails, operative interference, care being taken that the infant is not too weak before the surgeon is called in.

The important medical measures are, first, suitable feeding, and secondly, washing out the stomach (lavage). The food requires to be such that it can be completely digested in the stomach, so as to leave no solid residue to induce pyloric spasm. The difficulty, therefore, lies in the casein and the fat of

milk. No food is better than breast-milk provided it is of normal quality and contains no excess of fat. This should be determined by chemical examination, and if necessary the mother's diet can be altered so as to bring her milk to the proper standard. In any case the breast-milk should not be discarded until a strong effort has been made to use it successfully. Fresh cows' milk, as commonly used in infancy, is not as a rule well tolerated in this affection, at least for some time, and one has usually to commence with some substitute in which the casein is more digestible and the amount of fat is kept small. Peptogenized milk or whey may be used. In such cases also life can be maintained by the use of certain foods which are of themselves incomplete, but which are capable of being digested in the stomach, such as lactalbumin (*e. g.* Albulactin), Allenbury's food (No. I), Mellin's food, Glaxo, or malted milk. Whatever the diet is, the food must be given well diluted at first, and gradually increased in strength as toleration is established. A method which will be found useful is to alternate weak whey or peptogenized milk with one of the foods mentioned above. Sugar in the form of malt extract may be given in excess of the normal requirements, as it is very digestible. A little orange or grape-juice may be given in water. To ensure complete digestion in the stomach of the food taken, the quantity given at a time must be small and the frequency of the meals must be increased. From two to three ounces is usually as much as should be given at a time, and less may be called for if vomiting persists. The feeding will often require to be carried out every two

hours during the day and night, and sometimes one will obtain better results by feeding every hour during the day, giving an ounce at a time. Both the quantity and the frequency of the feeds must be regulated according to the results of experience in individual cases. Every attempt to increase the fatty element in the diet is often followed by gastric disturbance and increased pyloric spasm. There is no affection of infancy in which more difficulties are met with in the course of dietetic treatment than in pyloric stenosis.

The signs of successful feeding in these cases are as follows. The vomiting ceases. The bowels come to act naturally. This is in marked contrast to what happens in untreated cases, where marked constipation is the rule, artificial aids *per rectum* being very often required, and the motions contain little faecal matter. The stomach peristalsis becomes less marked, and gradually passes off. This is due to the absence of irritating food material which the stomach had previously been trying to drive through the pylorus. The discomfort, pain, apathy, and constant whining of the infant cease. This is owing to the appetite being satisfied by the entrance of food into the system. The nutrition of the infant is improved, as shown by the healthier colour, the increased activity of the limbs, and a slow gain in weight. It is very important to remember that these infants cannot be fattened rapidly, that any attempt to secure this will probably end in disaster, and that the less weighing there is the better, especially if there are anxious relatives about. The most suitable foods are not fattening ones, and any excess of food

is apt to produce disturbance in the stomach and bowel. On the other hand, the vital powers of the infant can be very much improved, and the disordered functions restored to healthy action, by a simple diet, and the fattening materials can be reserved to a later period. The increase in weight of the infant is somewhat fluctuating at first, and tends to become steady as time goes on, but is always slow.

A common **complication** in the course of treatment is diarrhœa. In cases of pyloric stenosis the bowel has been out of use for some time, and is consequently unprepared for the food material which now passes through the pylorus. Hence arises what is probably a form of irritative diarrhœa, which is always serious and may prove fatal. In such cases it is advisable to reduce the amount of food by one-half, and to give sips of hot water frequently. After an attack of vomiting no food should be given for at least two hours, so as to rest the stomach. Intestinal flatulence is to be treated, like diarrhœa, by a temporary reduction in the amount of food.

Gastric lavage is useful in two ways—first, in removing all irritating remnants of food and excess of mucus from the stomach; and secondly, in showing the physician how to regulate successfully the food and feeding. For the latter reason it must be carried out under the supervision of the physician, and not left to a nurse. The method and apparatus have already been described (p. 151). The stomach should be washed out once a day, and in severe cases this proceeding may be required twice daily for a time. It should be done when under normal conditions the stomach is empty, *i.e.* two or two and a

half hours after a meal as the case may be. The wash-out should show a small amount of soft, flocculent matter, which tends to get less in successful cases as time goes on. If, on the other hand, a large amount of matter is washed out, or undigested curds, it is clear that the food is not likely to pass through the pylorus. The food materials must be changed, or at any rate that food which is not being properly digested, and it may be that the quantity of food and the frequency of feeding will have to be altered. Dr. Cautley has pointed out that in many cases the mere washing out of the stomach systematically will check the vomiting, and that this may prove misleading. This is true, and enforces the importance of examining carefully the nature of the stomach contents in order to judge whether they are likely to pass the pylorus. If the residue be small and of the soft flocculent nature described above, one may reasonably expect that it will not tend to maintain pyloric spasm by irritation. Sometimes the diet employed may lead of itself to a cessation of all vomiting, but this is no reason for not adopting lavage as part of the treatment. It will be found in many cases that there are distinct evidences of gastritis as shown by excess of mucus and fermenting material in the stomach on washing it out. Such a condition will inevitably lead to failure to improve the nutrition of the infant by diet alone. There is an additional therapeutic effect in lavage in such cases in the relief of the gastritis which follows. In ordinary cases the treatment by lavage will probably have to be carried on for some months, even in favourable cases, although one is

able gradually to increase the strength of the food and to diminish the frequency of the wash-outs.

Thirst is often present in these patients, and when small quantities of food are being given, say ten ounces in the twenty-four hours, there is a distinct call for more fluid, as shown by the shrivelling up of the tissues. In cases with active vomiting it is impossible to say how much fluid really does enter the system. It is advisable in all cases to give some plain water by the mouth, between feeds, so as to ensure that from twenty to twenty-five ounces of fluid (including food) are taken in the day. Half an ounce of water may be given half an hour before each feed or second feed. In urgent cases this may be supplemented by the use of subcutaneous salines up to half a pint in the day. Marsh and Hutchison recommend that the saline injections be given *per rectum*, either in small quantities or continuously. In my experience neither of these methods is of much value in the case of young infants. When the infant is much reduced or has a subnormal temperature one or two drachms of brandy daily will be found useful as a general tonic. The use of small doses of opium has been recommended as a means of reducing the pyloric spasm. In my experience neither opium nor bromide of potassium has had any effect. Alkalies, belladonna, and many other drugs have been recommended, but the symptoms against which they are directed are much more effectively relieved by diet and lavage. Hutchison endorses the German plan of applying continuous poultices to the epigastrium.

From what has been said as to the medical treat-

ment it will be plain that it cannot be carried out amongst the poorer classes, save in hospital practice. Even in hospital practice it must be admitted that cases do not do so well as one is accustomed to see them do in good private practice. There are several reasons for this; in some cases the whole system has been so weakened by starvation that recuperative power is lost; in others the bowel would appear to have become so atrophied as to be functionless and incapable of absorbing food; while in others a sudden fatal collapse occurs or diarrhoea sets in which cannot be checked. Even those patients who are admitted to hospital at an early stage of the affection do not tolerate well the prolonged stay in a hospital which is necessary for successful treatment.

The question of **surgical interference** in connection with pyloric stenosis in infants is not now so much to the front as it was a few years ago. Probably no one now would think of operating in a case in which medical treatment was begun at an early stage and in which satisfactory progress was being made. The question only arises in connection with cases seen at an advanced stage or in which the child's nutrition had not been improved by medical measures. The mortality after operative treatment is high, and will probably continue so, for the operation is a severe one, especially considering the age of the patient; it calls for much surgical knowledge and experience, and it by no means puts an end to the feeding difficulties. The operations which have been employed are—(1) pylorotomy, (2) gastrojejunostomy, (3) pyloroplasty, and (4) pylorodiosis or Loretta's operation. The surgical procedure will rest with the

surgeon, but at present gastrojejunostomy and pyloroplasty appear to be the most popular. After operation the sudden entrance of food into the bowel, which has been more or less inactive for weeks, may induce severe and fatal diarrhœa, a risk which has been already referred to in connection with relief of the pyloric spasm by medical measures. Again, the shock of a somewhat severe abdominal operation is often so great as to prove fatal within a short time. One cannot but feel that the responsibility of advising operation in this affection is great. At the same time if medical treatment cannot be skilfully carried out for a prolonged period, or if it fails to check the downward progress of the infant, one may be thoroughly justified in recommending it.

Pyloric Spasm in Infancy.—This is a condition sometimes met with in infants; although much less frequently than hypertrophy of the pylorus. While as a temporary cause of vomiting from improper feeding pyloric spasm may be regarded as a valuable safeguard on the part of nature, the above term is rather applied to cases in which there would appear to be an unusual degree of pyloric irritability or sensitiveness leading to spasm. Clinically the condition is recognized by frequent vomiting, often of a forcible character, pain and screaming after a feed, constipation, and a certain amount of wasting. Visible peristalsis of the stomach is not present to the same degree as in pyloric hypertrophy, but at times the stomach may be seen to stand out as a prominent swelling. Post-mortem evidence of the underlying condition seems still to be wanting, but Willcox and Miller on examining the stomach

contents during life found that there was an increase of the total acidity, with a diminution in the ferment activity. The symptoms may develop at any time during the first six months of life.

As a rule such cases are very amenable to treatment by means of a carefully regulated diet. The chief trouble is the persistent nature of the affection, so that the dietary precautions have to be carried out for months. The gain in weight is slow and any dietetic disturbance is apt to be accompanied by a temporary loss in weight. Milk suitably diluted and given at regular intervals, and in amount suited to the age of the child (see Chap. I), is usually well tolerated. For persistent vomiting, gastric lavage may be employed with great benefit. Dr. Reginald Miller terms this affection acid dyspepsia, and for the relief of the excessive amount of acid present in the stomach he recommends that bicarbonate of soda (grs. ij-v) should be given in the milk feeds, and medicinally small doses of grey powder.

CHAPTER VII

DISEASES OF THE RESPIRATORY SYSTEM

Rhinitis—Foreign Bodies in the Nose—Epistaxis—Post-nasal Growths—Enlarged Tonsils—Congenital Laryngeal Stridor—Laryngitis Stridulosa—Foreign Bodies in the Larynx, Trachea, and Bronchi—Bronchitis—Asthma—Lobar Pneumonia—Broncho-pneumonia—Chronic Fibroid Phthisis—Pleurisy—Empyema.

THE preservation of the respiratory passages in a sound condition during the early years of life is a matter of the greatest importance for the proper development and health of a child. Local disease in those passages is common, and may produce a weak spot at which an acute infection gains entrance to the system. Disease is apt to lead to obstructed breathing, which means imperfect ventilation of the lungs, incomplete aeration of the blood, and stunted growth generally. While considering the diseases of the respiratory passages as involving separate local areas, we must bear in mind that several of these areas are frequently involved by direct extension at the same time. Thus a simple cold starting as rhinitis may soon extend to the pharynx, larynx, and bronchi.

Rhinitis.—(1) **Simple Rhinitis.**—During the first few weeks of life it is very common to find that

an infant's nostrils have become blocked as the result of a simple catarrh. Nature has been very economical of space in the nostrils, has lined the passages with a delicate and sensitive membrane, and has provided the possessor with limited powers of keeping those passages clear. Consequently a very slight obstruction, *e.g.* some inspissated mucus, starts a catarrh which, if not attended to, quickly becomes chronic, and may seriously interfere with the infant's feeding, sleeping, and normal development. It has, unfortunately, come to be regarded by many mothers as the normal condition of affairs that an infant's nostrils should be blocked or discharging, and "the snuffles" in the majority of cases is not the result of syphilis, but of the neglect which has followed from this foolish belief. It will therefore secure much immediate comfort to the infant, and prevent to a great extent the risk of future trouble, if it is made part of the daily toilet to clear out the nostrils with some non-irritating lotion. This may be efficiently done by inserting a fine camel's-hair brush dipped in a watery solution of common salt ($2\frac{1}{2}$ grs. to the ounce), or bicarbonate of soda (5 grs. to the ounce), the solution having first been warmed. A thin brush can easily be passed along the floor of the nose to the post-nasal space, and if sneezing is provoked it will only ensure more thorough clearing of the nostrils. After the washing out a little dilute ointment (zinc or boracic) may be introduced into the anterior part of the nostrils in a similar manner, and the nasal toilet is then complete for the day. This process may be kept up with advantage during the first two

years of life, and until the child has learned to blow its nose and thus clear the passages.

An attack of **Acute Rhinitis** may be apparently excited by a chill, but it is more likely that exposure and chilling of the surface of the body only predispose the system to the invasion of some specific organism. A "cold in the head" is a form of specific fever, for which the system may have been prepared by any lowering influence such as chill, over-feeding, stuffy rooms, etc.

In early life the important **preventive measures** are plenty of fresh air, warm clothing suited to the season of the year, and a proper diet. It will often be found that the subjects of these "colds"—for the attacks tend to be recurrent—have been regarded as delicate infants. Consequently they have been burdened with extra clothes by day, have been buried in blankets by night, and have been kept in overheated and stuffy rooms, with the result that exposure out of doors at once brings on a chill. Recurrent colds are often an indication of obstruction in the nasopharynx from adenoid hypertrophy and enlarged tonsils, and will not be successfully prevented until any such obstruction is removed.

When one is called to a child suffering from a cold in the head or simple rhinitis, the **general treatment** adopted should be such as to ensure not only relief from the immediate attack, but also the prevention of future attacks. In cases with pyrexia the child should be kept in bed until all fever has subsided. The body clothing should be warm, loose, and light, so as not to burden the infant or child. The sleeping and day rooms should

be cool, well ventilated, and free from draughts. The effect of an overheated and stuffy atmosphere is to increase the discomfort of breathing in all catarrhal affections of the respiratory passages. A temperature of 62° F. in the room is quite high enough in all cases, whether pyrexial or not. The cot should stand clear of the walls, without curtains or closed sides, so as to allow of the play of fresh air all around. The mattress should not be too soft, and the pillow should be a firm hair one into which the head cannot sink. The diet will call for careful supervision. The food ought to be simple and non-stimulating, and administered at regular intervals. In the case of infants under nine months nothing but breast-milk, or cows' milk and barley-water, is required. For older children, milk, porridge, puddings, bread, fish, and mutton are the standard foods. Beef-tea and meat-essences are often given by anxious parents in the most reckless manner, and to an extent which frequently aggravates the complaint. Head colds and attacks of acute gastric catarrh are frequently combined in young children, and both may be traced in many cases to over-feeding and errors of diet. A constitutional tendency to such nasopharyngeal catarrhs must also be recognized in many families of the gouty or rheumatic diathesis. This tendency will be aggravated in the case of children who live in towns during the wet and thick atmosphere of winter, or who live on a damp soil elsewhere. A prolonged residence in a bright and bracing inland place will often be beneficial in such cases.

The local treatment must be attended to. The

nostrils should be painted, or irrigated, or sprayed with a simple lotion such as the following—

R. Sod. Bicarb., Sod. Biborat., Sod. Chloridi, āā grs. xij; Glycerini, ℥ xx; Aq. ad ℥ j. Sig.—One tablespoonful to be mixed with two tablespoonfuls of warm water.

This may be used two or three times a day according to the amount of discharge, the number of hardened crusts present, and the extent of the obstruction. A little hazeline cream, or weak boracic ointment, may be introduced into and around the nostrils at night. As the purpose of the treatment is sedative, it is important that the opposite result, namely, disturbance, be not induced by struggling on the part of the child. Violent spluttering and coughing may have the effect of driving the fluid up the Eustachian tubes, with consequent middle-ear disease, but gentleness and care ought to obviate this danger. If the child cannot be taught to allow irrigation to go on quietly, with the fluid passing up one nostril and down the other, under a low pressure of water, easy respiration being carried on all the time, it is better to use the spray or brush.

The irrigation or spraying may be repeated as often as is necessary to secure the patency of the nostril, after the acute stage has subsided. The child should also be taught at as early an age as possible to blow the nose, not with those violent blasts which some like to indulge in, but with sufficient force to drive out all accumulated secretions and to keep the passages clear.

Medicinal Treatment.—During the acute stage

a powder such as the following may be given at night for the relief of the stomach and liver—

R. Pulv. Rhei, grs. iij; Hydr. c. Cretâ, grs. jss;
Magnes. Carbon., grs. jss;

and at a later stage a mixture may be ordered as follows—

R. Sodii Salicyl., grs. v; Tr. Rhei, ℥ x; Tr. Zingib,
℥ iij; Aq. ad 3 j.—T.D.S.

These instructions may seem somewhat elaborate for the treatment of “a cold in the head,” as a nasopharyngeal catarrh is termed in ordinary language. But it must be remembered that such a cold if not attended to will quickly extend down the respiratory passages. Further, if a chronic rhinitis is established, and is kept up by the habits of life, the child tends to become a mouth-breather, and the path is made easy for the development of adenoid hypertrophy in the nasopharynx, of chronic tonsillitis, of pharyngitis, of tracheitis, and of bronchitis. It is but too often the case that medical advice is not sought until some or all of these developments have taken place, but it is none the less advisable to be ready to take measures to prevent these when an opportunity presents itself.

(2) **Syphilitic Rhinitis** is a special form which has been referred to (*vide Syphilis*).

(3) **Membranous or Fibrinous Rhinitis**.—The symptoms in this affection are very like those of a severe nasal catarrh. Nasal discharge, purulent or sanguineous, epistaxis, and nasal obstruction are present without any other local or general disturbances. On examination of the nostrils one finds

that the mucous lining, in whole or in part, is covered with a yellowish-white exudate, which is not merely inspissated muco-pus but is membranous in character, and leaves a raw bleeding surface when detached. One or both of the nostrils may be affected with this membranous exudate, which has a tendency to re-form quickly after removal. The importance of this condition lies in the fact that it is really a form of localized diphtheria, and that virulent Klebs-Löffler bacilli swarm in the membrane and the discharge. The infection may spread either along the nostrils to the nasopharynx and larynx, or it may be conveyed to other persons by contact. At the same time it must be stated that as a matter of clinical experience the disease usually remains confined to the nostrils, without signs of general infection.

I have been accustomed to look on membranous rhinitis, even when proved to be diphtheritic, as very slightly contagious, and undoubtedly many cases occur in which no spread of the infection takes place. More recently, however, I have met with an outbreak in a hospital in which sixteen cases of membranous rhinitis occurred, and were clearly due to the conveyance of the infection from one patient to another. All of these showed the presence of the Klebs-Löffler bacillus, and in only two of them did the affection extend beyond the anterior nares.

The affection tends to run a very chronic course, and may persist for several months if untreated. As regards the treatment it is certainly advisable to keep the patient apart from other children as long as the rhinitis continues. When all discharge has

ceased, one should examine the nose for diphtheritic bacilli, and when they have been absent for a week the patient may be declared free from infection. As a matter of clinical experience it is often very difficult to free the nose from bacilli even after most thorough local treatment. When constitutional symptoms are present the full treatment for diphtheria by means of antitoxin should be carried out (*see* Diphtheria). As a rule, however, the disease is a purely local one, and calls for local measures only. To clear the nostril or nostrils it may be necessary to remove the membrane with forceps. The nostrils should be painted several times a day with a weak antiseptic lotion, such as listerine (3 j to 3 iv), or carbolic acid (1 in 200), or corrosive sublimate (1 in 4000), applied with a camel's-hair brush or cotton wool. As the discharge is irritating and leads to excoriation of the upper lip, an ointment of weak ammoniated mercury or boracic acid should be applied to that region. Under careful local treatment the discharge will usually cease in from a week to ten days in recent cases.

Foreign Bodies in the Nose.—The presence of a chronic discharge from *one* nostril should always lead to a careful local examination. Children are very apt to pass all sorts of curious things up the nostrils, *e. g.* buttons, pieces of paper, peas, etc. The result is the development of a nasal discharge which usually becomes purulent, and may be very offensive, irritating, and hæmorrhagic. The foreign body may not be visible until the surrounding exudation has been irrigated away. It is usually

easily removed by means of a bent probe or a pair of fine forceps. In the case of a frightened or very young child, cocaine solution or chloroform may be necessary. After removal, irrigation for a few days with an alkaline lotion will complete the cure.

Epistaxis may occur as the result of the hæmorrhagic tendency in many blood diseases, in heart disease, and in the acute specific fevers. It may be so profuse as to call for treatment by the local application of adrenalin solution (1-1000) or even by plugging. The more common form is that which occurs in healthy young subjects of from nine to fourteen years of age. Anxiety may have been aroused by repeated attacks of epistaxis and advice is sought. If a careful examination fails to reveal the presence of any disease, the best treatment is to do nothing locally. The occurrence of epistaxis at this period of life is so common that it may be regarded as physiological. Instructions should be given that the child is not to pick the nose or to use his handkerchief too powerfully, that the bowels are to be kept well opened, and that moderation in the amount of food is to be observed. In some cases an examination of the nares will show a bleeding point on the nasal mucous membrane, with a small zone of ulceration around it. This will usually be cured by touching it lightly with the electric cautery or solid nitrate of silver (after applying cocaine).

Post-nasal Growths : "Adenoids."—By far the most common and the most important form of obstruction in the nasopharynx is hypertrophy of the adenoid tissue. Probably in no form of

obstructed breathing are the effects so numerous and so widespread as from post-nasal growths. The immediate symptoms for which patients are brought are very numerous. The chief complaint may be deafness, or cough, or snoring, or broken sleep, or a chronic cold in the head, or recurrent attacks of bronchitis, or general listlessness and debility. As a rule when not complicated with ear trouble this form of obstruction does not cause any actual pain, nor does it manifest itself to the patient by difficulty in breathing, owing to the slow development of the condition. During the day an amount of air sufficient for comfort is admitted by the mouth, even although the nasopharynx may be completely obstructed. But at night these little sufferers, unconsciously trying to breathe through the nose, and failing to get a sufficient amount of air into the lungs by this channel, are affected by partial asphyxia. The result is seen in the restless sleep, the talking at night, the night terrors, and in what they sometimes describe as "suffocating dreams," in which they experience a choking sensation about the throat. Such a history ought always to arouse suspicion as to the presence of adenoid growths.

The preventive treatment of adenoid hypertrophy in the nasopharynx is directly associated with the etiology, a subject on which various opinions have been expressed. I have already suggested that many influences are at work in maintaining a condition of chronic rhinitis in infants, which is frequently the precursor of adenoids in children. If the cleansing of the nose in early life were attended to, and the dietary, the exercise, and the surroundings

in the matter of fresh cool air were in accordance with physiological requirements, I believe that in the vast majority of cases adenoids could be prevented. Dr. Harry Campbell has laid stress on the unnecessary prolongation of "pap-feeding" as a cause of this trouble, the normal development of the bones being checked by the non-use of the masticatory muscles. This possible factor should certainly be kept in mind, for nature has made the nasopharyngeal chamber of an infant so small that every effort should be made to expand it. Undoubtedly the use of the muscles of mastication will tend to develop the bones of the upper and lower jaws and of the base of the skull, and by so doing will enlarge the nasopharynx and nostrils. Amongst associated and predisposing diseases must be mentioned rickets and rheumatism. Both of these lower the resistance of the tissues generally, and both are characterized by a tendency to inflammation of the adenoid tissues. Damp, cold weather, such as is common in this country, plays an important part in inducing attacks of rhinitis, and therefore the prevention of adenoids in some cases may only be secured by residence during the winter in a warm, dry climate. The remarks made already on the preventive treatment of rhinitis apply also to adenoids.

The treatment of obstruction from adenoid hypertrophy may be non-operative or operative, the former in early and moderate cases, the latter in more advanced or severe cases. Different views would probably be expressed by a physician and a throat specialist. The following remarks are from a physician's standpoint. In early cases the

measures about to be described will often be found sufficient to bring about a cure, provided that they are carried out systematically, persistently, and intelligently. One must exclude those cases in which there has already followed from the obstruction definite chest deformity, or deafness, or ear discharge, in which cases immediate relief of the obstruction by operation is called for. In mild cases the diet should be full, digestible, and non-stimulating, but no stuffing with food and meat extracts should be allowed. The child should have as much fresh air as possible night and day, and plenty of out-of-door life. Breathing exercises should be employed so as to develop the nasal passages and the chest as fully as possible. Lying flat on his back, with his mouth shut, the child should inspire and expire deeply and slowly through the nose for a few minutes at a time. The ordinary exercises for developing the chest and the muscles of the back are also to be employed. The application of a firm abdominal bandage for an hour at a time while the patient is taking exercise will bring into play the costal muscles and relieve the over-action of the diaphragm, which is common in such cases. The body clothing should be loose and light, and any constriction of the chest walls, or interference with their free movement, must be carefully avoided. If there is evidence of crusts or muco-pus in the nasopharynx a simple alkaline lotion should be syringed gently through the nostrils twice daily. The use of the pocket-handkerchief should be taught and practised regularly. Any accompanying constitutional disease such as rickets or rheumatism must

be appropriately treated. These measures if persevered with for a couple of months will usually lead to the disappearance of all symptoms, but it is difficult in private cases to get them efficiently carried out, unless a trained nurse is available. If the symptoms are not relieved at the end of two months it is advisable to adopt operative measures.

The operation of the removal of adenoid growths is theoretically perfect, but as a matter of practical experience it must be admitted that a considerable proportion of the patients operated on are not cured. Whether the anterior nares had been affected with chronic thickening of the mucous membrane, or whether they had been imperfectly developed, or whether the removal of the adenoid growths had not been completely effected, it is often impossible to say, but the advisability of giving a guarded prognosis as to a complete cure has been impressed on me. In the case of young children, from one to four years of age, a recurrence of the growths after operation, with obstructive symptoms, is very common, so that it is better not to operate at that age unless the symptoms call urgently for such treatment. After operation the employment of chest-expanding exercises, and also instruction in what has become the lost art of breathing through the nose, will much increase the benefit obtained.

While the removal of any source of obstructed respiration in a child's nose is of the first importance, one must not trace every infantile and juvenile ailment to a small excess of adenoid tissue in the nasopharynx. Epilepsy, asthma, incontinence of urine, congenital laryngeal stridor, stammering,

laryngismus, and a host of other evils have been ascribed to the presence of adenoid tissue which could be felt, *but which had produced no evidence of obstruction by day or by night*. Many unnecessary operations have been performed on the view that the adenoid tissue was the source of all the mischief. For a time the removal of adenoids took the place of the removal of the foreskin as a cure-all operation. This surgical epidemic is now subsiding, and the opinion is getting firmly established that where there is no blocking of the nasopharynx, no interference with the opening of the Eustachian tube, and no real obstruction to respiration, the adenoid tissue cannot be regarded as the source of remote disturbances. On the other hand in cases of epilepsy, incontinence, etc., if there is nasal obstruction, from adenoid overgrowth, this condition must be treated as it would be apart from these ailments, and in some cases marked benefit will follow, probably from the improvement in the general health thus secured.

Chronic Tonsillitis is often associated with adenoid hypertrophy of the nasopharynx, and so far as it is productive of symptoms is to be considered as one of the conditions leading to obstructed breathing. There is a further danger in that the tonsils are more liable, when chronically inflamed, to become a focus for the entrance of infective disease, *e. g.* diphtheria, rheumatism, tuberculosis. In cases of slight enlargement, and more especially when the tonsillar tissue is soft, benefit may follow from painting with astringents. Equal parts of glycerine, of tannic acid and liquor ferri perchloridi

may be used twice daily after meals. If this fails to reduce the size, a solution of nitrate of silver (grs. xx to the ounce) may be tried, applied every few days, or the tonsils may be touched lightly with silver caustic. Along with these measures the general health must be built up by means of plain nourishing food, cod-liver oil, and hypophosphites. As a rule local measures, except in very slight cases, are of little permanent benefit.

The more radical treatment by means of excision is usually called for. This can be safely and easily carried out by means of the tonsil guillotine. As excision does not imply removal of the whole tonsil, recurrence is not uncommon, and operation is again called for. When the tonsils have become chronically enlarged or deeply infected by chronic inflammation the more thorough operation of enucleation is to be preferred to tonsillotomy. The common association of adenoids and large tonsils has rendered the operation of removal of both at the same time very frequent, and the results quite justify the adoption of this treatment.

Congenital Laryngeal Stridor.—This is an affection peculiar to infants, its presence being manifested within a few hours or days of birth by a curious inspiratory stridor. The sound is often compared to that made by a hen or a chicken, or to the purring of a cat. Frequently it is of a nondescript character. Various theories have been put forward as to the exact cause of the stridor, and it is important, from the therapeutic point of view, to adopt one which does not lend itself to active treatment, lest harm should be done. The

stridor is evidently of an obstructive character, and Dr. Lambert Lack has been able to demonstrate during life a peculiar infolding of the epiglottis, an exaggerated condition of the infantile shape of the epiglottis, which, along with a loose state of the ary-epiglottic folds, allows of these parts being thrown into vibration during inspiration. In the great majority of cases the infant suffers no inconvenience from the condition, and the only distress exhibited is by the anxious mother, who brings her infant for advice. There is usually a slight amount of subcostal retraction during inspiration, but no other evidence of obstruction outside the larynx. In the great majority of cases no active treatment is called for. The stridor will usually persist for from six to nine months, and then gradually pass off. It is rare to find any trace of it after two years of age. In certain exceptional cases a history of attacks of cyanosis will be given. These require to be supervised more carefully because an element of danger comes in, but it is one which diminishes with each month of life. If a persistent condition of cyanosis comes on, as happens very rarely, then it is advisable to perform tracheotomy, or to have the infant in surroundings where tracheotomy can be performed at once if necessary. In all cases the infant should be carefully protected from chills and other causes of catarrh in the respiratory passages.

Laryngitis.—Inflammation of the larynx is not uncommon in early life, and may occur in connection with a common cold, by extension from the nose or throat, or as part of an acute infective

illness, such as measles, influenza, or pneumonia. It is especially necessary to remember that during the invasion stage of measles, before the rash has appeared, an acute laryngitis, with loss of voice, cough and marked signs of obstruction, may be present, and tracheotomy may appear to be called for. With the appearance of the exanthem, these acute symptoms usually disappear rapidly. Laryngitis may also be associated with diphtheria, with syphilis, and more rarely with tuberculosis. The form which falls to be discussed here is laryngitis stridulosa, which may be considered as a type of acute laryngitis.

Laryngitis Stridulosa is a form of disease which is met with from three to five years of age. There is a real inflammation of the larynx with super-added spasm of the cords. The condition is sometimes called spasmodic croup, and must be carefully distinguished from real croup (laryngeal diphtheria), and from laryngismus stridulus (a rachitic manifestation). The preliminary symptoms may have been slight, but usually there are some indications of catarrh about the respiratory passages, slight cough, huskiness, and pyrexia. The special condition which gives the disease its importance is the sudden onset, usually during the night when the child is asleep, of spasm of the larynx. Crowing breathing comes on, with dyspnoea, retraction of the chest, a croupy cough, and all the signs of acute respiratory distress. The attack may soon subside, but is apt to recur on the same or the following nights, with varying degrees of severity. The subjects of this affection are popularly described as suffering from "attacks

of croup." Whether the preceding condition is one of rickets or not it is impossible to say, but the spasmodic element has a distinctly nervous basis, and the sufferers require to have their nervous system strengthened in every way.

During an **acute attack** the patient should be kept in bed, in a warm, well-ventilated room. The food should be light, non-stimulating, and given in small quantities at a time. Chicken or veal tea, milk and barley-water, and whey are a sufficient dietary. A steam kettle, with the vapour impregnated with carbolic acid, or creosote, or cresoline, may be allowed to play about the bed for fifteen minutes at a time. It is not advisable to shut the child up in a steam tent, or to keep the steam playing about the bed continuously, as the heavy, hot, damp atmosphere thus induced becomes most trying. The intermittent use of steam as above described gives great relief and does not depress. Fomentations may also be applied round the neck and the front of the chest, and after one or two hours' continuous application they should be intermitted. They may be reapplied at intervals, but if continuously employed they seem to lose their beneficial effect, and increase the discomfort of the patient. At the onset it is very important to give a smart purge of calomel and jalapin, two grains of each. The spasm is often induced by gastro-intestinal irritation, and the inflammation will be relieved by a thorough evacuation of the bowels. If there are any indications of stomach disturbance, such as flatulent distention or the history of a heavy meal having been taken shortly before the attack, an

emetic of ipecac or sulphate of copper should be given. If the attack is very severe, and the obstructive symptoms alarming, a few whiffs of chloroform may be given to check the spasm.

In less severe cases, or after using chloroform, one can give opium and bromide to maintain a sedative action, as in the following prescription—

R. Liq. Opii Sedat., ℥ j-℥ss; Ammon. Brom., grs. v;
Ol. Ricini, ℥ xx; Muc. Trag., q.s.; Extr. Glycyrrh.
Liq., ℥ x; Aq. ad 3 ij.

This dose may be given every four hours to a child of five years. When the acute symptoms have subsided, as they usually do during the following day, the frequency can be reduced to every six hours. When a day has passed without trouble the medicine can be reserved for night use. As in these days some young children will not take medicine by the mouth unless they approve of the proceeding, an alternative plan is to give bromide and chloral by the bowel. Ten grains of ammonium bromide and five of chloral may be injected *per rectum*, and repeated every four hours if necessary. The child should also be encouraged to drink hot fluids freely, such as barley-water, thin linseed tea, etc., which can be flavoured with barley-sugar, or saxon, or malt extract.

In the convalescent stage the child should be kept in the one room for some days after all pyrexia and stridor have ceased, as the larynx continues in a sensitive and irritable condition for some time. Tonics such as quinine (gr. j) and liquor strychninæ (℥ j) are useful, to be followed later, when the digestion is good, by compound syrup of the

hypophosphites, or cod-liver oil with hypophosphites. The dietary to be followed is one containing plenty of fat, with carbohydrates and proteids in sufficient quantity, but without any overtaxing of the digestive powers. Any weakness in the adjoining tissues, such as adenoid hypertrophy, enlarged tonsils, or chronic bronchitis, must be attended to. The great restorative, in addition to a proper diet, is plenty of fresh air out of doors and indoors, and this in many cases will be best secured by a stay in some hilly district.

Foreign Bodies in the Larynx, Trachea, and Bronchi.—Children are very apt to put playthings into their mouths, such as peas, beads, buttons, etc., and when laughing or running these objects easily slip into the air-passages. Choking may also follow from the impaction of an unchewed mass of bread or meat in the larynx. A child aged nine months was brought to hospital quite dead. At the autopsy there was found an enlarged thymus pressing backward on the trachea, and a piece of sausage in the oesophagus pressing forward on the trachea, which was thus doubly constricted. When sudden choking takes place at a meal, the first thing to be done is to explore the pharynx with the finger, and if possible to remove any food which is blocking the entrance of the larynx. Other foreign substances may be impacted suddenly at the glottis and may be capable of removal by the finger. If a foreign body has entered the larynx or trachea there will probably follow violent coughing and cyanosis. If the coughing does not lead to its expulsion, it must be removed through the mouth with laryngeal forceps, or after tracheotomy.

The great advance in the successful treatment of foreign bodies in the bronchi is due to the invention of the bronchoscope. All other methods previously employed were uncertain in their action, and successful only in very few cases. Inversion of the patient and the induction of violent coughing may be tried with a view to the forcible expulsion of the foreign body. Usually the irritation of a foreign substance is of itself sufficient to induce violent attacks of coughing. Many foreign bodies swell from the absorption of moisture in a bronchus, and thus become more severely impacted, so it is not until surrounding ulceration has occurred that they become sufficiently loose to be expelled by coughing. Tracheotomy and exploration of the bronchi through the wound may lead to the discovery and removal of a foreign body by forceps, but usually end in failure to find the substance. Radiography may help in the localization of some foreign bodies. On the other hand, by means of the bronchoscope a foreign body, even in the subdivisions of a bronchus, may be exactly located and removed with ease. The instrument calls for a considerable amount of practice and skill in its use. In the case of children a general anæsthetic will be necessary. The results when immediate treatment has been carried out are very good, but in cases of some standing the removal of the foreign body may require to be followed up by treatment of the pulmonary inflammation which has arisen secondarily.

Bronchitis : Preventive Treatment. — Bronchitis is very common in infancy and childhood. Possibly the climate of this country and also town air

in winter are factors of considerable importance in this matter, but still a very great deal can be done in the way of prevention, even in British surroundings. If instead of merely treating an attack of bronchitis we always tried to find out the cause and remove that, it is probable that we should be able to prevent further attacks. During the first two years of life one will find, in London practice at least, that some 70 per cent. of cases of bronchitis are associated with and dependent on rickets. The treatment of this underlying condition is therefore of the first importance (*vide* Rickets). Again, we have already referred to the importance of obstruction in the upper respiratory passages, nose, nasopharynx, and pharynx as a predisposing factor in bronchitis. It is therefore most necessary in all cases of bronchitis to examine for chronic rhinitis, adenoid growths, and enlarged tonsils, because until the mouth-breathing which accompanies these disorders has been cured, it is futile to hope to secure permanent relief from bronchitis. Another factor which calls for notice in this connection is adiposity. While all rachitic subjects are specially liable to bronchitis, it is more commonly found in fat, flabby children. In all cases of excessive stoutness the same tendency will be present, and is probably due to the obstruction in the circulation produced by the fatty tissue. This leads to a state of chronic venous congestion in the lungs, which induces catarrh of the bronchial tubes. The home surroundings are also often of such a character as to directly predispose to bronchitis. In the homes of the poor the children frequently breathe

a close, hot atmosphere, all ventilation being cut off, and the whole family breathing again and again the same air, contaminated by themselves, by offensive matter lying about the room, and by the cooking of the food. In the homes of the well-to-do the same result is produced by different conditions. Children are kept in overheated, stuffy day-rooms and bedrooms, and are often overloaded with clothes so as to protect them from cold, with the result that their bodies are rendered very sensitive. When they are taken out a chill soon follows. Another factor is excessive feeding. The blood is surcharged with food materials, the pulmonary circulation is overtaxed in trying to get rid of these, and venous congestion and bronchial catarrh follow. Much can be done in the way of preventing bronchitis if the home surroundings, and the presence of local or constitutional disease, are always inquired into and corrected when necessary.

The **treatment** of an **acute attack** will vary in some respects according to the season of the year. In the cold season artificial warmth and confinement to one room are necessary. In hot weather, on the other hand, it is not desirable that the child should be shut up in one room. In winter the air of the room should be kept fresh, and should not be overheated, a temperature of 62° F. being quite high enough. The breathing is impeded under any conditions, and the difficulty is increased if the air is impure, or stagnant, or overheated. With the same end in view, one should secure the largest room available for the invalid, and should have the bed placed away from the walls and without

curtains, so that the air can play freely about it. The sick-room should not be filled with anxious friends, who simply use up the atmosphere. Babies suffering from bronchitis or any other pulmonary affection should not be carried about or bathed in the ordinary way, but should be kept in bed, so as to save their breathing power as much as possible. The rest secured to the body enables respiration to be carried on more easily, and the usual washing can be done in bed.

The diet during the acute pyrexial stage should be fluid and small in quantity. Milk and barley-water, whey, gruel, chicken or veal soup are sufficient. Warm drinks, such as hot barley-water or linseed tea, may be given freely, as they are the best diuretics and expectorants, and are therefore very useful. The use of the steam-kettle was formerly considered indispensable, but has now largely fallen into disuse, and deservedly so, as a routine proceeding. Its continuous use, as in former days, was most enervating and exhausting to the patient, and produced an atmosphere exactly the opposite of what was desirable. Nevertheless, it has its use under certain conditions. If the patient, as often happens in the early stages, is suffering from a dry, irritating cough, and if examination of the chest shows the presence of many dry sounds, then the induction of bronchial secretion by the inhalation of steam may give great relief. If, on the other hand, secretion is free or over-abundant, then the use of steam is contra-indicated. Under no conditions should the steaming be continuous, or the bed be enveloped in close curtains. The full benefit will

be obtained by allowing the steamer to play over the bed from the far end for fifteen minutes at a time, to be repeated every hour or two as long as the conditions persist. Compound tincture of benzoin may be added in the strength of one drachm to the pint of water, in order to increase the antispasmodic effect of the steam. Poulticing has also largely fallen into disuse as a routine measure. It is not advisable to apply any heavy poultices or any tight bandages to the chest of a child suffering from bronchitis, as the result will inevitably be to increase the difficulty of breathing. There are, however, special indications which call for the use of hot applications to the chest, which will preferably take the form of fomentations, as these are much more easily prepared and are much more likely to be applied hot. Fomentations will probably give relief in the condition for which inhalation has been recommended, namely, the dry stage, in which secretion is deficient. In bronchitis there is frequently present a considerable amount of dyspnoea, with loud expiratory wheeze, which is probably due to spasm of the bronchial tubes, as indicated by its paroxysmal character. When these attacks of dyspnoea from spasm occur, the application of hot fomentations to the back and front of the chest will often give relief. A drachm of turpentine may be added to the fomentation, and this can be repeated later if necessary. If plain fomentations are used, they may be applied continuously for an hour, and then intermitted. Continuous fomenting or poulticing of the chest is never advisable, but if the practice is carried out intermittently according to the indica-

tions, much relief may follow. Encasing the chest in any adhesive substance, medicated or otherwise, is not advisable in the case of children, as it limits the freedom of movement during respiration, and prevents a proper examination being made as to the condition of the lungs. In many mild cases of bronchitis the attack will not call for any of the above measures, and the routine treatment is to apply some stimulating liniment to the chest twice a day, such as the following—

R. Linim. Terebin. Acet., ℥ ii½; Linim. Belladon., ℥ j;
Olei Dulcis, ℥ ij.

During winter a layer of cotton wool is to be applied to the back and front of the chest, under the flannel vest, but in summer a flannel vest is sufficient. Care must be taken that there is nothing tight about the chest or the abdomen which would interfere with the breathing. The body temperature must be maintained by hot bottles.

At the onset of the attack the bowels should be freely opened. Three grains of rhubarb powder and two grains each of grey powder and carbonate of magnesia may be given at night, and followed by a drachm of sulphate of soda or magnesia in the morning. This will help to improve the condition of the alimentary tract, which is often affected with catarrh, and to relieve the bronchial congestion. Half doses of the above may be repeated every second or third night. A simple febrifuge mixture such as the following may be ordered—

R. Liq. Ammon. Acet., ℥ xv; Potass. Citrat., grs. v;
Tr. Aurant., ℥ v; Aq. Camphor. ad ℥ j.—T.D.S.

Cough Mixtures.—The above medicines will often prove sufficient throughout the illness. The treatment of bronchitis and of other pulmonary affections has in the past been largely one of expectorant or cough mixtures. Prescriptions are common in which one finds drugs to increase expectoration, or to diminish expectoration, or to do both at the same time. Regarding many of the drugs recommended and employed, our knowledge is infinitesimal, and we have no certainty that they act as they are supposed to. In the case of children, the one thing certain is that most cough medicines tend to upset the digestion. It is better therefore to limit our therapeutical zeal to conditions in the lungs which we can determine, and to drugs which we know will affect those conditions. In the early stage, when secretion is defective, and a harsh irritating cough may be associated with dry catarrh of the tubes, iodide of potash (grs. ij) and carbonate of ammonia (gr. ss-j) may be added to the above mixture, or given separately as long as necessary. When secretion is free, this is not required, and it is only when secretion is over-abundant that we may require to interfere in order to diminish it. This may be effected by the following—

R. Tr. Belladon., ℥ iv; Ac. Nitrohydroch. Dil., ℥ ii½;
Glycerini, ℥ x; Inf. Gent. co., ad 3 j. Sig.—3 j
every four or six hours.

When the patient is troubled with a persistent cough, one should examine the nasopharynx and throat for signs of irritation, which may be relieved by a nasal lotion or simple throat lozenge. In other cases, and especially if the night's rest is disturbed

by coughing, five to ten drops of paregoric may be given occasionally for its relief. Again, if special sedatives seem called for, a convenient form of administration to children is in the form of pastilles, which may contain one-fiftieth of a grain of morphia or codeia. It must be remembered that a certain amount of coughing and expectoration is a necessary accompaniment of bronchitis, and medicinal sedatives are only called for when these are excessive.

By attention to the warmth and rest of the patient, by hot applications to the chest and moist inhalations when necessary, and by dieting simply, one will usually carry the patient comfortably through the illness. The disease is seldom fatal save in the case of children of very weak physique or debilitated by previous illness. In rachitic patients there is often a serious complication in the softened parietes of the thorax and the muscular atony which makes ordinary respiration laboured, and greatly interferes with the increased respiratory action called for in bronchitis. Alcoholic stimulants are not to be recommended in the treatment of bronchitis, as they tend to increase the congestion of the bronchi. In cases accompanied by cardiac weakness, it may be necessary to use alcohol as a stimulant of the circulation. The indications for the treatment of heart failure will be discussed in connection with lobar pneumonia.

In the **convalescent stage** one must see that the patient has a sufficient amount of animal fat. The chief forms of fat are butter, cream, beef and mutton fat, yolk of eggs, and cod-liver oil. We have already referred to the tendency to bronchitis

which fat babies have, but in this case the adipose tissue is usually the result of excessive feeding with carbohydrates. The combination of cod-liver oil and hypophosphites, as in the emulsio hypophosphitum (*Pharmacopœia*, p. 398), gives better results than any other drugs in restoring a healthy condition of the bronchial tubes. If anæmia is present, raw meat-juice, green vegetables, and iron in small doses may be given. Children of a bronchitic tendency should not live in large towns during the winter months. They should be in the country, in an upland district, where the soil is dry. Sea air is not suitable for such cases. In more severe cases it may be necessary to winter abroad in the South of France or in Italy or Egypt.

Asthma in childhood presents the same peculiar aspects that it does in adult life. It comes and goes in different localities and at different times in the most puzzling way. An important part of the treatment is to build up the patient's health, and to correct any dietetic errors or local disease which may be present.

The nervous constitution which underlies the affection should not be overtaxed by lessons or excitements, or mental strain of any kind. The diet should be of a simple non-stimulating variety, the fats and carbohydrates preponderating, and the proteins, especially the meat proteins, being kept in moderation. As an attack is frequently induced by overloading of the stomach, the meals must be moderate in amount. It is often advisable in these cases to give small meals at frequent intervals, so as to prevent the gastric disturbance which

brings on an attack. Indigestible substances such as pickles, cheese, strawberries, shell-fish, etc., must be strictly forbidden. It is often noticed that a certain article of diet, harmless to other children, may induce an attack of asthma in susceptible subjects, and this food must be interdicted. A change of residence will often lead to a cessation of attacks, which shows that the atmospheric surroundings must always be taken into account.

The tendency to bronchitis, which is so often present, must be properly treated. This includes attention to the upper respiratory passages—the nose and nasopharynx. While the cure of asthma is not to be expected from the removal of adenoids any more than from circumcision, great improvement will often follow the restoration of nasal breathing. One often finds after this relief that the frequency of the attacks is lessened, while the patient begins to improve in his general health. This improvement in the general health is usually progressive, and the tendency is for the asthma to get less and less marked as time goes on. One can usually give a good prognosis in cases of asthma in childhood, provided that the patient is in reasonably good surroundings, and that the instructions given are intelligently carried out.

The **medicinal indications** are: (1) to maintain the regular evacuation of the bowels; (2) to allay and prevent the bronchial spasm; and (3) to lessen the tendency to bronchial catarrh.

The bowels may be regulated by a dose at bedtime of cascara or senna pods. An acute attack of asthma is best treated by iodide of potash (grs. v)

and carbonate of ammonium (grs. ij), thrice daily. As the attacks of dyspnœa become less frequent the dose may be reduced one-half and continued for one or two weeks. Other drugs, such as lobelia, arsenic, belladonna, antipyrin, salicylate of soda, bromide of soda, etc., have not proved of much service in my hands, but one cannot tell beforehand what drugs of this nature may or may not suit an individual case. A nasal spray containing adrenalin solution and cocaine will often cut short an attack, but the repetition of this treatment is apt in time to affect injuriously the mucous membrane of the nose. An injection of adrenalin (℥ v-x of the 1-1000 solution) has proved serviceable in the case of adults, but I have never used it in the case of children. In some cases of chronic asthma, benefit may follow from the use of full doses of chloral hydrate, thirty to forty grains daily. The patient should be kept in bed and the drug pushed until he is under the influence of it. Chloral probably acts by checking the disordered action or "bad habit" of certain nervous centres. For long-standing cases La Fetra recommends the following—

R. Potassii Iodidi, grs. xx; Morphini Sulphatis, gr. $\frac{1}{3}$; Tincturæ Belladonnæ, ℥ xx; Spiritus Etheris Compositi, ℥ iij; Aquam ad ℥ ij. Sig.—℥ j every three or four hours.

The use of fumes of stramonium or asthma cigarettes is not to be recommended, as there is nothing curative about their action, and they are distinctly injurious to the bronchi, inducing a persistent catarrh. The best tonic for the bronchi is the emulsion of cod-liver oil with hypophosphites, and

this should be continued for months in all cases of chronic asthma.

Lobar Pneumonia.—Lobar or croupous pneumonia is a common affection in infancy and childhood. It may occur as a primary disease, or may be associated with influenza and other systemic infections. The pure type is that associated with the presence of the pneumococcus only. Although it is still usually described as a pulmonary affection, from many points of view it is better to regard it as a systemic infection with, as a rule, definite pulmonary lesions. In some cases, however, and this seems to occur with special frequency in early life, the systemic affection may produce local lesions, not in the lungs, but in the pleura, or peritoneum, or joints, or subcutaneous tissues. The pulmonary signs of lobar pneumonia and of catarrhal pneumonia may sometimes be so intermixed that the distinction is difficult in the early stages. The course of the two diseases is, as a rule, so different, that one is usually able to make an exact diagnosis as time goes on. In the case of a child previously healthy who is suffering from uncomplicated lobar pneumonia, the prognosis is always good. A fatal issue can almost always be traced to impaired health or poor nutrition in the child, or to the presence of some complication.

Treatment.—In an ordinary case and in the majority of cases, if the patient is put under favourable conditions as regards rest in bed, fresh air, and suitable diet, the disease will run its course to a favourable termination without any necessity for active interference. No treatment of pneumonia

has yet been devised which will shorten or influence the natural course of the disease, and many forms of treatment have fallen into well-merited discredit. It is advisable therefore that any treatment adopted should at least not be harmful to the patient. Nevertheless it is necessary that every case should be carefully watched by the physician for two reasons: first, to relieve troublesome and weakening symptoms; and, secondly, to treat complications if they arise.

We shall suppose that, the diagnosis having been made, the patient is put in bed, clothed in a flannel nightdress, with or without some extra flannel or cotton-wool round the chest; that any chilling of the extremities is guarded against by the use of hot bottles; that the bed is not placed in a corner or close to the fire or covered with a tent, but in an open part of the largest available room, where fresh air can play freely about it (without draught), so that the lungs may have a plentiful supply of cool fresh air; that a diet of milk and barley-water, with some mutton or chicken soup, has been ordered, and that a febrifuge mixture containing citrate of potash and acetate of ammonia has been prescribed. In many cases the above treatment, with the help of good nursing, and the treatment common to all acute specific fevers, will carry the patient safely through the illness. As a rule in lobar pneumonia there is no special call for the "open air" or "balcony" treatment, and the nursing difficulties are increased. But in severe cases, and where the nursing can be efficiently carried out, it will be found that open air is one of the best stimulants and tonics

at the disposal of the physician, while at the same time it promotes sleep and appetite.

Certain symptoms may call for treatment.

(1) **Pain about the Chest.**—If the pleuritic pain is manifestly causing the child suffering, a local application in the shape of a turpentine fomentation or linseed poultice may be applied over the painful area for half an hour, or until the skin is thoroughly reddened. This may be repeated some hours later if necessary. These local measures will usually serve to relieve the patient, except in that very painful variety associated with diaphragmatic pleurisy. In this condition the application of a few leeches (two or three) over the affected area, combined with strapping of the affected side, may secure relief and rest. But if they fail to do so then opium or morphia must be given. Opium is distinctly contra-indicated in pneumonia because of its toxic effect on the respiratory centre, and as that centre is always affected to a greater or less extent in pneumonia, it is as well to refrain from giving it for any symptom save very severe pain. We have to consider whether the patient will not be more weakened by the pain and restlessness than by the opium, and decide accordingly.

(2) **Coughing** may at times disturb the patient. The amount of coughing probably depends on the extent of lung involved. If there is a whole lobe involved, there will probably be a good deal of coughing from the irritation of the exudation. If only a small focus is involved, the irritation will be slight and the coughing trifling. It may be either of the short, hacking pneumonic type, or bronchial

from the presence of catarrh. In both of these the interrupted use of hot local applications will be beneficial. The position of the patient in bed must also be attended to, as frequently the coughing only occurs in certain positions, and is relieved by a change. The use of steam inhalations may also check an irritable condition of the bronchi. For the relief of persistent coughing, with or without much secretion, belladonna in doses of \mathfrak{M} v-x of the tincture, or \mathfrak{M} $\frac{1}{4}$ -j of the liquor atropinæ will be found advantageous. It is especially indicated in pneumonia because of its (1) checking secretion, (2) dulling the sensory branches of the vagus throughout the lungs, and (3) stimulating the respiratory centre. One can also safely and beneficially give \mathfrak{M} v-x of paregoric occasionally for a hacking cough.

(3) **Pyrexia.**—The ordinary temperature of pneumonia, averaging from 103° to 104.5° F., requires no treatment. In children the height of the temperature is not an indication of the gravity of the disease, and the rapid recovery after the crisis shows that the pyrexia is not *per se* a source of weakness or danger. Prolonged continuous pyrexia, say after the seventh day, is probably weakening, but should not be interfered with by drastic measures, as the pyrexia may directly bring the crisis nearer. The medical profession is quite unanimous in deprecating the use of antipyretic drugs in pneumonia. In some cases the temperature rises to 105° F. or 106° F. without the patient showing any signs of distress. Here, again, no treatment is called for. But if great restlessness supervenes,

with sleeplessness, symptoms which we trace to the presence of hyperpyrexia, then some interference is called for. In the case of infants, the employment of a hot bath, which is rapidly cooled to 85° F., will frequently be followed by a fall of temperature of from 1° to 2° F., and the restlessness will disappear. In older children, sponging in bed with hot or tepid water is the corresponding treatment, and if extreme nervous disturbance is present the temporary application of cold-water cloths to the head. It will often be found also that the application of a hot fomentation to the chest, combined with drachm doses of liquor ammoniæ acetatis, has a distinctly antipyretic effect. An ice-bag to the chest has its advocates, but my own experience has led me to avoid extremely cold applications in childhood and infancy. When confronted with a rise of temperature amounting to hyperpyrexia, one must not assume at once that this is due to the pneumonia. Disturbances of an entirely different kind may be present in other parts of the system, and may be sufficient to raise the temperature by a few degrees. Such a disturbance will frequently be found in the gastrointestinal tract, and consequently, in the absence of other definite cause, it is advisable to order a couple of grains of calomel or grey powder in cases of hyperpyrexia with restlessness. Another possible source of hyperpyrexia is acute otitis media, which should always be examined for.

(4) **Sleeplessness.**—Pursuing the plan of securing rest to the patient, it is necessary to take action if sleeplessness occurs. Probably there is nothing

more exhausting to the child's whole system than want of sleep. Delirious sleep is very common in pneumonia, and is probably not injurious. On the other hand, sleeplessness is often accompanied by active delirium, and marked prostration follows. I have already referred to the presence of middle-ear inflammation, and this condition should always be looked for, and if necessary treated, when delirium and sleeplessness are present. Cold water to the head or hot applications to the chest may produce relief of these symptoms, but constant fussing about the patient with local applications is apt to increase the condition. Probably the free use of bromide of ammonium, in ten-grain doses, or bromidia in fifteen-minim doses, is at once the most effective and the least harmful treatment. Sulphonal or veronal may be used, but not opium. A dose of brandy, 3 ij to 3 ss in hot water, will often act like a charm. As a matter of clinical experience I believe there has been far less delirium and sleeplessness in pneumonia since we gave up the active "treatment" of the disease, and simply kept the patient quiet and comfortable in bed.

(5) **Symptoms preceding the Crisis.**—The symptoms of pneumonia are as a rule most pronounced and most threatening for the twenty-four or forty-eight hours preceding the crisis, and possibly for a short time after it. This is very strikingly shown in hospital practice, where so many pneumonia patients are admitted shortly before the crisis. The explanation would seem to be that the condition of the child in mild cases of lobar pneumonia does not appear to the lay mind to be very serious

until this pre-critical stage has been reached. The breathing and coughing may then have been observed to get worse, the restlessness greater, or the lethargy and prostration more profound. Sometimes an increase in the nervous symptoms may have excited alarm, sometimes blueness of the face or a tendency to faint may have been noticed. These or other signs have led the parents to seek medical advice for the first time. The same conditions are often present in cases which have been carefully treated from the first, and therefore it is important to be on the watch for the symptoms of the pre-critical or second stage of pneumonia. The longer the crisis is delayed, the more severe will the symptoms of the pre-critical stage become. This is the stage at which the active treatment of pneumonia should commence, as contrasted with our previous treatment for the relief of symptoms. Not that even at this stage do we actually treat the disease, but only certain results of it which are of vital importance.

Signs of **cardiac weakness** are to be carefully watched for, and we have to note whether the failure is primarily in the left or in the right ventricle. There are many elaborate methods described for determining these points, but clinically the simplest method is best. If dilatation of the left ventricle is taking place, as the result of cardiac failure, we shall find the apex beat extending outwards to the left, the first sound at the apex becoming weaker, the pulse tension falling and the rate increasing, and a tendency to faintness and pallor appearing. At the onset of these signs the

use of brandy, strychnia, and ether is indicated, in doses increasing in amount until we get a definite improvement. If the condition is more serious or is rapidly advancing, the hypodermic injection of strychnia is as serviceable in children as in adults. The injection causes little discomfort to the patient, and the only remark I have to make about the dose is that enough is not usually given. For an infant one year old in the pre-critical stage of pneumonia, liquor strychninæ in one-minim doses by the mouth and half-minim doses hypodermically, every four hours, will produce good results. The reaction of the system to strychnia is much less easily induced in the profound toxæmia of pneumonia than under normal conditions. Consequently the drug should be pushed until we get the desired improvement, or until some symptoms of the physiological action, such as twitching, have been produced. If dilatation of the right ventricle is present, with cyanosis, dyspnœa, and overaction of the right side of the heart, then some depletion of blood is called for. A very useful test as to the presence of this condition is the gradual enlargement of the liver, and clinically the increase in size of the liver will be found to be a very exact guide as to the degree of embarrassment of the right side of the heart. This may be accompanied by signs of œdema in the affected lung or the sound lung. The application of three or four leeches over the hepatic region, followed by a hot fomentation to encourage further bleeding, will usually be found to produce marked relief. Two to four ounces of blood may be removed in this way. This treatment

is further aided by a dose of calomel (two to three grains) followed by a saline, and by the use of alcohol and strychnine as cardiac tonics. Instead of the leeching we may employ dry cupping over the bases of the lungs posteriorly, especially when pulmonary engorgement is present. It is also when cyanosis and right-sided enlargement of the heart occur that the use of oxygen inhalations, or better of a hyper-oxygenated atmosphere about the patient, may be of distinct service. In the treatment of pneumonia generally I have not been able to convince myself of the benefit of oxygen inhalations, and the patient does not appear to be suffering from a defective supply of oxygen; but in cyanotic conditions oxygen certainly gives relief in some cases and presumably benefits the patient.

We shall sometimes find that there is an increasing amount of respiratory distress, with dyspnœa and rapid breathing, which does not appear to depend directly on the pulmonary or the cardiac condition. We have here probably to deal with a failure of the respiratory centre from toxæmia. In such cases atropine, as a direct respiratory stimulant, may be combined with the strychnia, in doses of $\frac{1}{160}$ grain hypodermically every four hours, for a child of five years.

Certain **complications** may arise during or after the acute stage of the disease. Some are local, and may be traced to a spread of the disease by direct continuity. Amongst these the chief are empyema, otitis media, and pericarditis. **Empyema** should always be suspected when the temperature continues irregular after the crisis and

when the signs of fluid are present in the chest (*vide* Empyema). **Otitis media** is a complication which is very common in children, but which is often overlooked owing to the absence of localizing symptoms. Pain in the ear may be complained of, but is more frequently absent. On the other hand hyperpyrexia, delirium at night, restlessness, and even the series of symptoms comprised in the term "cerebral pneumonia," may be directly due to acute inflammation of the middle ear. In the presence of one or more of these conditions it is advisable to examine the membranes, and if any bulging is present to have a free opening made by incision. Irrigation of the ear by means of warm boracic lotion should then be practised. In the case of young infants the examination of the ear is somewhat difficult, and incision of the membrane is even more so. Those who are not sufficiently skilled in these matters may in the absence of expert assistance apply a leech behind each ear when otitis is suspected. If fluid is accumulating the membrane will probably soon rupture spontaneously. **Pericarditis** is a most serious complication and one that is easily overlooked. Like other inflammations of serous membranes in this affection it tends to be suppurative. Although we have classed this as a local complication it is quite as likely to complicate a pneumonia of the right upper lobe as one of the left lower. The infection may be spread by the blood stream. Unless the heart is being regularly examined, and the area of cardiac dulness is being watched daily, the condition will probably be overlooked, as there is seldom

any complaint of præcordial pain. If the condition is diagnosed and the presence of pus is shown by exploration, the only satisfactory treatment is to open and drain the pericardium.

The **systemic infection** of pneumonia is shown by the occasional occurrence of arthritis, peritonitis, subcutaneous abscesses, meningitis, and nephritis. An **arthritis** may be manifested by inflammation and effusion in one or more joints. The effusion is usually purulent. If pus is found by the exploring needle, the proper treatment is to open the joint freely and drain it. **Peritonitis** is not a common complication, and is manifested by the usual signs of that disease. Laparotomy and drainage are to be employed, as pus is usually present. **Subcutaneous abscesses** may form after the acute stage is over, and may be single and large, or numerous and small. In one case I met with there were hundreds of small subcutaneous abscesses in an infant, which were pneumococcal in origin. Surgical treatment is also called for in these cases. **Gastro-enteritis** may develop acutely in the course of lobar pneumonia, so that one is forced to conclude there is a special infective inflammation of the alimentary canal. The symptoms of typhoid fever may be closely simulated, and as the pulmonary signs may be easily overlooked, an erroneous diagnosis may be made. The diet calls for special care and should be directed to the prevention of flatulence. An atonic condition of the bowel is apt to develop with meteorismus which seriously interferes with the action of the heart and lungs. In the presence of pneumonic consolidation the

embarrassment of the lungs and heart thus induced may be of grave import. Weak albumin water, whey, chicken and veal soup should be given in small quantities at frequent intervals. The following powder will allay irritation and check fermentation—

R. Pulv. Hydr. c. Cretâ, gr. $\frac{1}{2}$; Pulv. Ipecac. co., gr. ss;
Salol, grs. ij; Pulv. Cretæ Arom., grs. v.—T.D.S.

Hot fomentations or a turpentine stupe may be applied to the abdomen at intervals. **Acute nephritis**, accompanied by hæmaturia, tube casts, and œdema may be present during the acute stage of pneumonia. As a rule it subsides rapidly after the crisis, and calls for no special treatment.

Broncho-pneumonia.—This affection is known under several different names, such as lobular pneumonia, capillary bronchitis, catarrhal pneumonia, etc. It is a disease of very great frequency and importance in early life. The individuals most likely to be attacked are those whose general strength has been weakened by illness, or whose lungs have been injured by previous catarrh. The greatest incidence of the disease is during the first year of life, and at that age also the prognosis is most serious. The mortality is distinctly less during the second year, and diminishes steadily with every year of life, until after five years it is comparatively slight. While lobar pneumonia is to be looked on as a primary disease, broncho-pneumonia is usually secondary. A large proportion of the cases accompany or follow on the specific fevers, *e. g.* measles, whooping-cough, diphtheria, influenza, etc. Acute summer diarrhœa

is responsible for another series of cases. The lungs of children suffering from rickets are specially liable to attacks of broncho-pneumonia. If we exclude all the cases referable to the above causes, and to other preceding acute illnesses, very few will be left to be accounted for. A point of some importance is that a child suffering from broncho-pneumonia secondary to one of the infective fevers must be regarded as infectious, both as regards the specific fever and the pneumonia. It is therefore advisable to have such patients isolated during the whole course of the illness, in a manner which is not considered necessary as regards lobar pneumonia.

We know a good deal about broncho-pneumonia from the frequency of the disease and the many opportunities of studying the lesions in the post-mortem room, but we know little about the treatment. If one considers the disease to be, as it probably is, an infective inflammation of the pulmonary tubes and tissues due to various organisms (streptococci, pneumococci, etc.), which have often acquired a special virulence either owing to the debilitated state of the patient or the coexistence of some other disease (measles, hooping-cough, etc.), the difficulties in the way of a direct curative treatment are obvious. Cures are of course reported and are traced by the enthusiastic writer to some special means adopted, drugs, or baths, or poultices, etc., but no one of these has stood the test of experience. The difficulties in the way of identifying the particular organism, or organisms, causing the disease render any vaccine therapy a purely haphazard proceeding. If by puncture of a solid part of lung a definite

pathogenic organism can be obtained, a vaccine may be prepared and tried. In broncho-pneumonia, as in many other diseases, our treatment must be general and symptomatic, and we must be content to treat results until our knowledge of the cause is more complete.

A very great deal can be done in connection with the **preventive treatment of broncho-pneumonia**, if we bear in mind the great liability there is to this affection in all cases of infective fevers. For instance, the great mortality from measles in this country is due to broncho-pneumonia, and it is not going too far to say that this mortality could easily be reduced one half if proper precautions were taken. Whenever a child has a fever the tendency has been to shut up the patient in a hot stuffy room, cover him with blankets until his skin is rendered unduly sensitive from overheating and perspiration, and to let him out into cold draughty passages as soon as the temperature is normal. The result but too often is a chill which ends in broncho-pneumonia. If, on the other hand, in all cases of infective fevers we insist on plenty of fresh air about the patient, and keep the body warm but not overheated, the risk of broncho-pneumonia will be greatly diminished. A very interesting result has been obtained in this connection by Dr. Claude Ker, who treated a series of cases of hooping-cough by the open-air method throughout the whole illness, and found a marked diminution in the proportion of cases complicated with broncho-pneumonia as compared with those treated in the wards of the hospital under the ordinary atmospheric conditions.

Another point to be remembered is that the domestic belief that the patient is well as soon as the temperature is normal is not justified in connection with the specific fevers, and that a considerable period must be allowed to elapse before the system is sufficiently free from the poison to allow of any precautions being omitted. Any pulmonary affection complicating an infective fever in childhood must be treated most carefully and thoroughly lest bronchopneumonia develop. During the winter and spring months in this country the period of enforced seclusion may be long, and may be the cause of much protest in the domestic circle, but a strong position must be taken up by the medical adviser, and he must insist on the careful observance of his preventive measures.

The **general treatment** of the disease proceeds on the same lines as in other feverish illnesses in children. Rest in bed, the use of sufficiently warm body and bed clothing, and the maintenance of a steady temperature (62° F.) in the room, are essential. At the same time an abundance of fresh air must be supplied, as in this affection the patient has need of all the fresh air he can get, and hot stuffy rooms form the worst possible environment. When one large bedroom is not available a couple of smaller rooms can be used, one for day and the other for night use. The room which is not in use can be thoroughly ventilated, and a healthy atmosphere can thus be obtained for the patient at all times. No one but the nurse should be in regular attendance, as the presence of other people in the room does no good and may do much harm in using up the

available oxygen. It is probable that in the future we shall come to treat all cases of broncho-pneumonia in the open air, at least in the warm months. From my own experience of the "balcony treatment" in hospital cases I can state that no harm has ever resulted, and that several cases seemed to benefit immensely. The chief difficulty in private practice is that the open-air method outrages all the domestic canons of treatment in this affection, the poultice and steam-kettle still holding sway, and that skilled nursing is absolutely essential.

During the acute stage the food should be fluid, easily digested, and given in small quantities every two or three hours. Gastric and intestinal complications are common and must be carefully guarded against by dietetic measures. If appetite is lost it is much better to give very weak fluid food than to produce gastric trouble by feeding up. Albumen water, whey, peptonized milk, and veal soup may be given at first, and if the appetite is good, plain milk and barley-water, bread-and-milk, Benger's or Mellin's food and milk, and thin milk puddings may be allowed. Diarrhoea is often present, and is not necessarily to be checked, as it may be a means of relieving the blood of some of its toxic contents. If the diarrhoea is such as to weaken the patient, then it should be treated by careful dieting, lime-water, and small doses of castor oil. Water or barley-water can be given freely, and the more one can act on the skin and kidneys by the use of plain fluids, the better is the prospect of clearing the poison out of the system. As regards the fever it is not often that a very high tempera-

ture, say above 104–105° F., is prolonged, and as the fever is usually of an irregular type, no active interference is called for in the way of antipyretic treatment. When a high temperature is associated with marked restlessness a hot bath or hot pack will often remove both conditions. Hot sponging and hot packs are soothing and stimulating, and are of very great value in this affection. They should be given with as little disturbance of the child as possible. In the case of those young patients it should be remembered that their energies are fully occupied in carrying on respiration, and that therefore their strength should not be taxed in other ways. Carrying babies about, prolonged bathing operations, and fussing about with poultices constantly will tend to exhaust the patient, who should be resting quietly in bed.

Coughing is often troublesome, and in its treatment it is important to determine first the seat and nature of the irritation. If bronchial irritation without much secretion is present, as often happens in the early stage, steam inhalations for ten or fifteen minutes, hot fomentations to the chest for an hour, and hot drinks are indicated. At this stage one may expect benefit from such drugs as citrate of potash, carbonate of ammonia, and solution of acetate of ammonia. If bronchial secretion is free, with loose bubbling râles all over the lungs, we follow another line of treatment. The emptying of the blocked tubes may be aided by partially inverting the child, by resting it with the head depressed, or by giving an emetic, such as one grain of sulphate of copper in a drachm of water. Emetics

must not be used if the child is very weak or at a late period of the disease, as they are too exhausting. Excessive bronchial secretion may be checked by the use of tincture of belladonna in ten-drop doses, or of solution of atropine in one-drop doses. If, on the other hand, the nature of the cough and the signs in the lungs suggest that irritation of nerve filaments is the source of trouble, then paregoric in five to ten drop doses, or solution of morphia in one-drop doses, may be given. In the case of broncho-pneumonia we may rest assured that sooner or later the heart will suffer from the general toxæmia, the pulmonary obstruction, and the prolonged fever. With the view of toning up the heart I have used digitalis at an early stage, but have not been able to convince myself that it is of any real value in this acute affection. The right side of the heart suffers most from the pulmonary obstruction, and when it is dilating, as shown by cyanosis and increasing dyspnœa, depletion is called for. The application of three or four leeches over the hepatic region, followed by a hot fomentation to encourage further bleeding, will usually be found to produce marked relief. Free cupping over the bases of the lungs posteriorly is indicated when the congestion and consolidation are marked in those regions. In urgent cases with cyanosis it is advisable to bleed the patient from the arm, removing from two to six ounces of blood, so as to relieve the blocked cardio-pulmonary circulation. Stimulation must be pushed boldly in this disease. Strychnine and brandy stimulate both pulmonary and cardiac action, probably through the nervous system, and

are invaluable in tiding a patient through an attack of broncho-pneumonia. Strychnine may be used in doses of from a half to one drop of the liquor strychninæ every four hours, at first by the mouth and later by hypodermic injection if improvement has not followed. Brandy may be given in doses of ten to sixty drops every three hours according to the age and condition of the child. Its sedative action on the restless patient is often very marked. Oxygen bubbled through alcohol or hot water is of value in certain cases of pronounced cyanosis, but it is impossible to say beforehand whether it will improve the colour and breathing of the patient, which is the test of its efficacy. If there is much pulmonary catarrh present it has sometimes seemed to have the effect of increasing the pulmonary secretion. We sometimes find that there is an increasing amount of respiratory distress, with dyspnœa and rapid breathing, which does not appear to depend directly on the state of the lungs or heart. We have here probably to deal with a failure of the respiratory centres from toxæmia. In such cases atropine, as a direct respiratory stimulant, may be combined with the strychnine in doses of $\frac{1}{100}$ grain hypodermically every four hours for a child of three years.

There is one form of treatment which is not to be recommended, but which is sometimes carried out when a case of severe catarrhal pneumonia is suddenly sprung upon the young practitioner. He sees a child cyanosed, gasping for breath, with the lower ribs sinking in at every inspiration, and with all the indications for tracheotomy save one, namely stridor. Sometimes when one is hurried this

negative sign is overlooked and tracheotomy is performed, without of course affording any relief, as there is no obstruction to the entrance of air above the trachea.

The convalescent stage is usually prolonged, and rest in bed should be maintained until the lungs have thoroughly cleared up. Tonics such as cod-liver oil and hypophosphites, iron, etc., will be called for, in addition to as nourishing a diet as the patient can digest.

Chronic Fibroid Phthisis (*Interstitial Pneumonia; Fibroid Induration of the Lung*).—A condition of fibrosis in one lung, coming on as the result of chronic bronchitis or pneumonia or pleurisy and lasting for many years, is not infrequent in children. The physical signs are at first sight rather puzzling, and from the dull flat note on the affected side (thickened pleura), and the shrinking of the costal wall, pleural effusion is often suspected. A careful examination will usually enable one to exclude the possibility of effusion, for the accompanying displacement of intrathoracic organs is towards the affected side, and not away from it, as in the case of pleural effusion. Sometimes, however, the exploring needle is used to settle the point, and this may be attended by very serious consequences. It would appear from recently recorded cases that a very real risk of sudden death from hæmorrhage attends the apparently trivial operation of exploring a fibroid lung. In doubtful cases, therefore, it is advisable to delay the use of the exploring needle, and repeated examination will enable one to make a diagnosis without it. The subjects of this affec-

tion are as a rule stunted, anæmic, languid, and delicate children. Their respiratory capacity is much diminished and the whole organism suffers.

The **general treatment** is to be directed to placing them in the best possible surroundings as regards home, fresh air, and good nourishing food, and to the avoidance of chills, over-exertion, and contaminated air of any kind. The clothing should be warm and light, the whole body being protected by flannel, and the feet more especially being kept warm and dry. The diet should be a good nourishing one, in which the fatty element, as in cream, eggs, butter, etc., is well represented. By these means one endeavours to check the progress of the fibrosis by increasing the resisting powers of the patient, for any direct method of attacking the pulmonary lesion is not yet known. The best medicinal remedies are cod-liver oil and hypophosphites, which should be given regularly throughout the colder months of the year. The symptoms of pulmonary trouble of which the patient complains are often slight. Coughing may be absent, or slight, or very troublesome. In cases associated with cavity formation (bronchiectasis), there may be much coughing and the expectoration of large quantities of pus at times. The use of dry inhalations may serve to check the secretion of pus and to diminish the foetor which often accompanies it. A pad of cotton wool is to be sewn up in muslin or gauze. Five drops of terebene and creosote are dropped on one side of this pad, and the other side is applied over the patient's mouth and nose and fastened in position by tapes round the neck. This

is to be used as a respirator three times a day for ten or fifteen minutes at a time. Terebene in five-minim doses may also be administered internally three times a day. Garlic is a vegetable highly recommended for its beneficial action in such conditions. The emptying of the pulmonary cavities, which is often accompanied by prolonged and harassing coughing, may be aided by inverting the patient or hanging the head well over the side of the bed, so as to allow the action of gravity to come in. Pleuritic pains are not uncommon and may be relieved by a few small blisters, or iodine pigment. The chief complication is catarrhal pneumonia, or bronchitis, and it is for recurring attacks of one or other of these that medical advice is frequently sought. Hence the importance of the hygienic precautions to which reference has been made. Whenever possible patients with active fibroid disease should winter in the south of England (Falmouth, Bournemouth) or in the south of France.

This condition of chronic pulmonary fibrosis is often diagnosed as chronic pulmonary tuberculosis, but in the great majority of cases tubercle bacilli are not present in the sputum, and the course of the disease is not that of tuberculosis. Even if tubercle bacilli are present in the sputum they are not necessarily the offending organisms. As a rule examination of the sputum will show a mixed infection, containing staphylococci, streptococci, pneumococci, the influenza bacillus, etc., and as regards the employment of vaccine therapy the first step in determining the causal organisms is by no means easy. I have in some cases employed

vaccines made from one or more organisms present, but cannot claim to have seen any results which had not been observed in other cases not so treated when the patients were under favourable conditions as regards their hygienic surroundings, diet, and careful supervision. My chief aim was to prevent the recurrence of congestive attacks, the lighting up of the old infection, to which these patients are subject, for it cannot be expected that any vaccine will alter the permanent changes in the shape of thickened pleura, fibrosed lung, dilated bronchi, etc..

Pleurisy and Empyema.—Simple pleurisy, with or without effusion, is not a common affection in childhood. On the other hand, empyema is frequently met with, most commonly as the result of pneumonia. The two chief etiological factors in the production of pleurisy are rheumatic fever and tuberculosis. During an attack of rheumatic fever pleurisy and pericarditis are very often combined. The general treatment directed to the rheumatic fever is, of course, to be continued, while special local measures may be called for as regards the pleurisy. Tuberculous pleurisy is the commonest form in childhood. It may be apparently primary, in the sense that there is no manifest tuberculosis in the lungs or elsewhere, but one usually assumes that infection has come through some tuberculous gland in the thorax. In other cases it is associated with definite tuberculous disease of the lungs, acute or chronic. In all tuberculous cases it is specially important to carry out the full treatment for tuberculous disease, including rest when required, fresh air, and a full nourishing diet.

An attack of **acute pleurisy** is to be recognized by the same signs as in adult life and is to be similarly treated. Rest in bed during the acute stage, fluid diet, and a simple febrifuge mixture represent the general treatment. Locally counter-irritation is to be applied by the painting of the affected side with equal parts of the tincture and liniment of iodine, and the chest is to be fixed by a firm, broad flannel binder. If the pain is severe, a couple of leeches applied to the painful area will usually give relief, or a turpentine fomentation may be applied in less acute cases. The most severe type is diaphragmatic pleurisy, in which the pain of respiration may be agonizing, and the distress of the patient painful to witness. In such cases opium is called for and may be given freely until relief is obtained. For a child five years old five minims of liquor opii sedativus by the mouth, or two minims of the liquor morphinæ hypodermically, may be given, and repeated in two hours if necessary.

If **effusion** occurs there is no urgent call for tapping, as the fluid usually subsides in the course of ten days under rest and iodine to the chest. The absorption of fluid may be aided by the administration of liquor hydrargyri perchloridi (℞ x-xv) and potassii iodidum (grs. ij-ijj) thrice daily. If the fluid persists beyond a fortnight without diminution, or if signs of fluid pressure appear, such as dyspnœa, fainting, failing pulse, etc., then the fluid should be removed at once.

Latent pleurisy may be met with, in which there have occurred no signs of acute illness, but the signs of pleural effusion are found on examination. Here

also there is no urgency about the removal of the fluid until a trial has been given to rest and counter irritation. Tuberculous pleural effusion is very apt to be discovered in this accidental way.

The two steps in the treatment of pleural effusion which must next be considered are first the determining of the nature of the fluid by the exploring needle, and secondly its removal. The dangers of needling the chest have already been referred to (*vide* Chronic Fibroid Phthisis). It is not advisable to use the exploring needle in all cases of dulness over the lung. Such a line of procedure shows a lack of diagnostic power and of consideration for patients. A careful examination will usually enable one to determine whether the signs of fluid are sufficient to justify an exploratory puncture. If they are not, then there is no harm in waiting until they are. The spot to be selected for the puncture should be in the middle of the area of greatest dulness, whether that be in the back, or the axilla, or anteriorly. If the whole of one side is dull, the mid-axilla, above the fifth rib, or immediately below the angle of the scapula, will be found suitable for puncture. The patient can either be sitting up or lying down, preferably the latter, and should be so placed that the operator can conveniently pass the needle straight into the chest, at right angles to the plane of the surface selected. If not so placed one will find that the needle has a knack of wandering about amongst the soft tissues of the chest wall or impinging against a rib. The patient's arm should be elevated above the head.

The skin around the part to be explored should

be thoroughly cleansed and disinfected. The apparatus to be used consists of a carefully sterilized exploring needle and syringe. The needle should always have a very sharp point, and a bore large enough to admit the passage of pus. It should be boiled for five minutes immediately before use. In the case of very timid children chloroform, or chloride of ethyl (locally), may be used, but only in exceptional cases, and never in the case of infants. With a sharp needle the amount of pain is trifling. Having sterilized his hands, the operator finds the upper border of a rib at the part selected, and passes the needle firmly through skin and subcutaneous tissues. In children the distance of the surface from the pleura is short, and one must not make a plunge into the deep tissues. The tendency often is to plunge the needle so deeply that it passes through the fluid into the lung. Having punctured the skin and subcutaneous tissues, one pushes on slowly and firmly until a sense of diminished resistance is felt. The needle is now probably in the pleural cavity, and one draws back the piston of the syringe. If no fluid is obtained one should handle the needle like a probe and push it gently onwards. By moving the point of the needle about, one can usually feel whether it is in a cavity or not. If it is not free, then the depth of the puncture may be gradually increased, so long as the lung has not been entered. If the lung is punctured, there will be an up and down respiratory movement communicated to the needle, provided that the lung is not bound down by adhesions. If this movement is detected the needle should be at once withdrawn. If fluid has

been obtained, it is advisable to fill the syringe so as to make a complete examination of the contents later. Even if no fluid appears in the syringe, on withdrawing the needle, the syringe should be emptied of air over a glass slide. This will drive out any matter which may be blocking the needle, such as pus or coagulated lymph, and which may suffice to show the nature of the pleural contents. If nothing is found, it is advisable to puncture the chest again an inch or two from the place previously selected and in a similar manner. It occurs to all to fail at times to find fluid on one or more punctures. One may have struck coagulated lymph, or thick pus, or an adhesion, or gone too deeply, or not deeply enough. Repeated puncture will usually enable one to discover fluid when present. After the needle has been withdrawn, the puncture wound should be closed with a pledget of sterilized cotton wool or gauze and collodion. If fluid has been obtained, the treatment will vary according as the fluid is simple or purulent.

(1) **Simple Pleural Effusion.**—It must be noted that the fluid is not necessarily clear, for there may be a cloudiness about it from an excess of cells. This, however, is quite different from the yellow cloudiness of pus, and is different also in that it can be absorbed by the pleura, a result which is not likely to happen in the case of pus. If non-purulent fluid is obtained we have to determine, on the lines mentioned above, whether time should be allowed for natural absorption, or whether complete removal is at once called for. Very often the removal of even a syringe-ful of fluid seems to act as the starting-

point of absorption, and the process will go on, without further interference, to complete resolution. If, on the other hand, immediate removal is desirable, we have the choice of syphonage or aspiration. Syphonage has the advantage over the use of the aspirator in that it allows of a more steady and gradual suction, and requires no complicated apparatus. All that is required is a sharp trocar with three or four feet of rubber tubing. These are to be sterilized before use. The rubber tubing is fitted on to the end of the trocar, the whole is filled with boiled water, and the free end of the tubing is then clipped and placed in a basin on the floor at the side of the bed. The trocar is then passed into the pleura, in the same way as in the exploratory puncture, and, when the clip is removed, the head of water in the tubing will start a continuous flow into the basin. This will continue until the greater part of the fluid in the pleura has been removed. During the process the patient should be lying down, and if there has been any cardiac weakness beforehand, it is as well to give two or three drachms of brandy before the operation. The slow action of the syphon allows of a slow expansion of the lung, a point of some importance. Rapid withdrawal of the fluid and rapid expansion of the collapsed lung tend to induce coughing, faintness, pleural hæmorrhage, and sometimes œdema of the lung. If coughing comes on during the withdrawal of the fluid it is advisable to clip the tubing for a time, and if the coughing is severe and persistent, the trocar should be withdrawn, and a dose of liquor morphinæ (℥ ii-v) given to the patient.

The aspirator, in experienced hands, is quite a safe instrument, but it requires careful regulation, and has no advantage over the syphon. One of the Dieulafoy type should be used, with an exhaust bottle attached. The receiving bottle should *not* be exhausted of air so as to produce a vacuum, as this leads to a rapid rush of fluid when the tap is opened, to rapid emptying of the pleura, and often to a flow of blood with the fluid. At the outset there should be only a partial exhaustion of the receiving bottle, and this should be repeated at intervals, so as to regulate the flow in a manner comparable to that secured by syphonage.

(2) **Purulent Fluid Effusion.**—The only satisfactory method of treatment in empyema is one which is thorough, and is suited to all cases. Tested by these standards, aspiration or syphonage is not to be recommended. While aspiration may be successful in rare cases one can never tell beforehand what the result will be, and in the majority of cases the fluid will reaccumulate, necessitating a more radical operation. Thick masses of pus may be present, even in recent cases, and they cannot be removed by aspiration. The only thorough treatment is to make a free opening into the pleura, after removing a portion of rib, and to drain the abscess cavity. In those cases, however, in which a large quantity of pus is present it is advisable first to syphon off as much fluid as possible, and to open the chest on the following day. This will avoid the risk of shock or sudden death at the operation, from the too rapid evacuation of fluid which accompanies a free opening. It may also be necessary in

certain cases to temporize, *e. g.* from the extreme weakness of the patient, or because the surroundings are not suitable for operation. In such cases the treatment by aspiration may be employed, and repeated until favourable conditions for operation arise.

The exact surgical details of opening the chest vary to a certain extent with the individual operator, but the following measures, as carried out by my surgical colleagues, have appeared to be thorough and successful. The exact part of the chest selected for operation is usually that where pus has been obtained by puncture. If the whole side of the chest appears to be occupied by fluid, then a point below and external to the angle of the scapula will be found suitable. An incision is made along the rib, about two inches of rib are removed, and the pleura is then laid freely open. Some surgeons consider that resection of a rib is unnecessary and that an opening through an intercostal space gives sufficient room for the evacuation of the purulent matter. This is not my experience, and in many cases it will prove most inefficient and will delay recovery. When the pleura is opened the fluid is allowed to escape slowly. The cavity is then explored with the finger, masses of coagulated lymph are detached and broken up, and the lung is freed from any soft adhesions which may be tying it down. Free irrigation of the cavity with boiled saline solution is then employed, care being taken to avoid any intrapleural pressure by maintaining a free outlet. The irrigation is continued until all pus, fluid or inspissated, has been removed. A

large-sized drainage tube, long enough to reach the pleura, is then introduced, and stitched in position, the wound round it is closed, and dressings are applied. The drainage tube is retained until the discharge is slight and serous, and in pneumococcal cases can usually be dispensed with in from three to five days. In streptococcal or tuberculous cases more prolonged drainage is often necessary.

Special precautions must be taken as regards the administration of an anæsthetic at this operation. Chloroform is to be used unless the cardiac weakness is great, when ether may be substituted. The anæsthetic must on no account be pushed, and after the pleura has been opened very little more is to be given. It is advisable before the wound is closed to test the expansile power of the lung by making the patient cry or cough, and this cannot be done during full anæsthesia. As the danger from the anæsthetic is very real in an operation for empyema, the rule should be to give as little as possible, and to discontinue it as soon as possible.

The after treatment of simple and purulent pleural effusions consists in restoring the functional activity of the lung on the affected side as rapidly as possible. The patient should be allowed to walk about and indulge in such chest-expanding exercises as he is capable of. Massage to the affected side of the chest and passive chest-expanding exercises may also be employed. A full nourishing diet should be given, and the patient should be sent for a holiday to some bracing climate.

CHAPTER VIII

DISEASES OF THE CARDIO-VASCULAR SYSTEM

Congenital Heart Disease—Chronic Heart Disease—Cardiac Disorders and Disturbances—Purpura: Henoch's Purpura—Anæmia—Splenic Anæmia.

Congenital Heart Disease.—This may occur as the sole manifestation of disease, or it may be accompanied by other congenital defects, as in cases of the Mongolian type of imbecility. There is no form of treatment which will directly tend to remove the cardiac lesion. In some cases it is slight and is apparently due to delayed development. These may ultimately lose all symptoms, and the signs of a cardiac lesion may disappear. As a rule the condition is a permanent one, and the patients are from birth more or less crippled. The body development generally tends to be poor, and the patient is prone to attacks of intercurrent disease.

The treatment to be adopted is a protective one. The child should be carefully guarded against chills, and the body clothing should be warm, especially about the extremities. Cold hands and cold feet must be avoided by the use of warm gloves, warm stockings, and hot bottles if necessary. The diet should be nourishing and plain, and any disturbance of the digestive organs should be carefully guarded against. Pulmonary troubles, *e.g.* bronchitis, are

common and are apt to increase the signs of cardiac embarrassment. They must always be very carefully treated. If the breathing is obstructed by adenoid growths or large tonsils they must be removed under an anæsthetic, and incidentally it may be remarked that the subjects of congenital cardiac disease seem to suffer no inconvenience from the administration of chloroform. Tepid or warm baths are to be used in preference to cold. As attacks of dyspnœa and increased blueness are apt to come under any excitement or exertion a placid life should be cultivated as far as possible. School life, children's parties, and athletic games are not suitable. Sudden attacks of cardiac distress are to be treated with brandy and strychnia, while the onset of cardiac failure calls for the systematic use of digitalis. The prospects of life in an infant born with congenital cardiac disease are bad, as statistics show that hardly one-third of such cases survive to the age of two years.

Chronic Morbus Cordis.—The treatment of the acute and recent forms of heart disease will be found in the section on rheumatic fever, and that of acute heart failure in pyrexial conditions is described in connection with lobar pneumonia (*q. v.*). Notwithstanding the great frequency of rheumatism and acute valvular disease in childhood, it is only in a certain proportion of cases that one has to treat the child later for chronic cardiac disease. Many will have no further symptoms, and in others the results of the valvular lesion will not be such as to call for treatment until later in life. This is because the functional activity of the heart is not interfered with,

so that what Mackenzie calls the "rest force" and the "work force" of the heart are still perfectly effective. On the other hand in cases of severe valvulitis or myocarditis or pericarditis it is probable that cardiac symptoms will persist. In cases also of recurrent attacks of rheumatism in a patient already affected with heart disease there will probably be progressive cardiac disease calling for treatment. But in the majority of cases it will not be until after childhood has passed that the effects of a simple valvular lesion will bring the patient for medical advice. Consequently it cannot be too strongly impressed on the student that the discovery of an organic cardiac murmur or dilatation of the heart in a child is not an indication for the administration of digitalis, strophanthus, and other cardiac tonics. Nothing but harm will follow from such a procedure.

The forms of chronic heart disease are similar in childhood to those of adult life but are more limited in their range. Certain conditions such as "auricular fibrillation," heart block, and angina pectoris are seldom or never found in childhood, while all the forms of senile heart are naturally non-existent. In connection with the treatment it is extremely important to distinguish between those symptoms which are associated with organic heart disease and those of functional disturbance merely, usually of nervous origin. The chronic organic lesions are the result of an acute or subacute affection (usually rheumatic) which has affected the myocardium or pericardium or valves. The valvular affection is usually the least important as regards the production of symptoms. When the myocardium is damaged

or the pericardium has become adherent the tendency is for dilatation and hypertrophy to take place. This, however, must be recognized as an effort on the part of Nature to maintain the circulation efficiently, and if Nature is not successful then it is extremely unlikely that any medical treatment will be. At the same time much can be done in the way of aiding the natural powers in maintaining an efficient circulation, and this implies a careful regulation of the child's whole life, exercise, rest, sleep, diet, etc. One must be on the outlook for signs of failure of compensation, but must withhold direct treatment until they have appeared. Failure of compensation is indicated by certain signs and symptoms. Amongst the signs one may find weakening or rapidity of the pulse, dilatation of the left or right ventricle, weakening of the first sound of the heart, engorgement of the liver, pulmonary catarrh or congestion, cyanosis or pallor, oliguria or œdema of the extremities. The tendency to œdema of the extremities is not nearly so common in children as in adults, and would seem to be replaced by engorgement of the liver. Amongst the symptoms there may be breathlessness, palpitation, faintness, or headache. One or more of these will indicate that the time for direct treatment has come. The objects now to be aimed at are, (1) to make the work of the heart as easy as possible, and (2) to strengthen the cardiac muscle.

1. Complete rest is the chief means of **lightening the heart's work**, and it must be maintained for some time after the evidences of failure of compensation have been removed. At first the rest should

be in bed, the patient either lying down or sitting up, as is found most comfortable for breathing purposes. Later on the rest can be continued on a couch during the day, either in or out of doors. What must be insisted on is a sufficiently prolonged period of rest, possibly for some months, as the damaged myocardium will improve under any conditions but slowly, and the less work it has to do the more progress it will make. The temperature chart may show a slight degree of pyrexia at night, and this will probably be due, in the absence of other definite cause, to a fresh rheumatic outbreak and calls for treatment by salicylate of soda. The child's nervous system should not be excited in any way by visitors, or tragic stories, or the presence of other children. As much sleep as possible should be obtained both during the day and the night, and in cases of sleeplessness bromide of ammonium should be given in ten-grain doses, night and morning.

The state of the organs below the diaphragm must be attended to, as flatulent distention of the stomach and bowels, or constipation, or an engorged liver may seriously interfere with the cardiac action. Flatulence will often be best avoided by a diet which is solid rather than sloppy, and which contains fish, fowl, mutton, eggs, and toast as the chief ingredients. The meals should be small in amount, and given more frequently than under normal conditions, every three hours by day, with some Benger's food and milk during the night. If the appetite is not such as to make chewing a pleasure, the food may be pounded or very finely minced, but it must be eaten slowly. Fluids should be given between rather than

with meals, and the amount should be limited to one pint daily. In the presence of gastro-intestinal disturbance one must carefully avoid a diet of soups, strong meat-essences, and much milk with the food, all of which tend to induce flatulence. A fatal termination may be brought about in cases of cardiac failure by overloading the stomach and thus producing dilatation of the stomach and upward pressure. Digestion being at a standstill or much diminished the food remains in the stomach and ferments there. Later the gradual distention of the stomach by food and gas presses the diaphragm upwards, and induces fatal syncope by mechanically obstructing the cardiac action. The important point to remember is that the period of cardiac failure is not the time to try to strengthen the patient with much food. Enlargement of the liver, which is a valuable and common sign of cardiac failure, is to be relieved by mercury and salines. Two grains of grey powder or one grain of calomel may be given at bedtime for a week, and followed each morning by one or two drachms of sulphate of soda. For congestion of the liver or lungs the value of leeching must not be forgotten. Two or three leeches may be applied over the part affected, and after they drop off further bleeding may be encouraged if necessary by the application of a fomentation. The bleeding from a leech-bite, which used at times to be difficult to stop, can usually be checked quickly by applying adrenalin chloride solution (1-1000). If leeches are not at hand, dry cupping may be used, and in some cases with marked cyanosis it may be advisable to bleed directly from the arm, up to four

or five ounces. Constipation must be relieved by cascara or senna pods or liquorice. When marked restlessness or cardiac distress is present the condition is best combated by small doses of opium given in the form of liquor opii sedativus (five-minim doses) or Dover's powder (one to two grains) or liquor morphinæ (two-minim doses).

As already stated, the treatment by rest must be continued for some time after the active signs of cardiac breakdown have disappeared. As the want of exercise tends to lower the general health, massage may be usefully employed during the convalescent stage. When the patient can rest on a balcony or in a garden, the tonic effect of open air will probably be marked. Anything which tends to excite the child, and so increase the rate of the heart, should be avoided. With returning appetite and digestive powers a more full dietary may be permitted. When the patient is allowed to be up, the amount of exercise must at first be small and carefully regulated so as to prevent the onset of breathlessness, or tiredness, or palpitation. The cardiac rate will at first be increased by exercise, but this quickly subsides when the patient is at rest. If exercise induces a persistent increase in the pulse-rate, then it has probably been too prolonged, and less exertion is called for. The recovery of muscular power and tone in the heart is best tested after a breakdown by the response to graduated exercises, such as walking, stair climbing, etc.

2. In addition to relieving the work of the heart one seeks to stimulate and strengthen the cardiac muscular tissues. Stimulating treat-

ment is called for in cases of distress or cyanosis, or dyspnœa associated with cardiac failure and calling for immediate relief. The most prompt effect is produced by brandy or whisky and strychnine. Brandy, even if not a direct stimulant of the heart as many maintain, does good by calming the nervous system and dilating the peripheral arteries. Its use certainly is often accompanied by relief of urgent symptoms. One can use from one to three ounces daily, in divided doses, for a child of five years. It is not to be continued at one time for more than two or three days. In the hot months of summer the effect of brandy is greater than in cold weather, and consequently a smaller dose is required. Strychnine is another prompt cardiac stimulant which should be given hypodermically in emergencies or severe cases of heart failure. One-minim doses hypodermically, or two-minim doses by the mouth, of the liquor strychninæ may be given every four or six hours to a child of five years. Perhaps the best results are obtained by giving brandy and strychnine alternately. In cases marked by cyanosis or cardiac dyspnœa oxygen is often useful. There is one great advantage about the use of oxygen, namely, that one can tell very quickly whether it is acting beneficially. If it is found to relieve the cyanosis, to calm the breathing, or to soothe the patient, then it should be persevered with. The oxygen may be administered for from ten to twenty minutes every few hours, according to the state of the patient. It is very difficult to say beforehand what cases will be benefited by oxygen, and often in apparently suit-

able cases, *e. g.* those with marked cyanosis, the results are disappointing. Nitro-glycerine and the nitrites are not in common use amongst children in whom vascular spasm and thickening of arteries do not occur as in adult life. In some cases, however, characterized by pallor, cold extremities, and a thready pulse, the inhalation of nitrite of amyl or nitro-glycerine by the mouth (gr. $\frac{1}{400}$ — $\frac{1}{200}$) will prove beneficial. All of these remedies are for temporary use only, in stimulating the heart, and tiding the patient over a period with urgent cardiac symptoms.

When we come to the direct cardiac tonics we find that the digitalis group—including digitalis, strophanthus, and squills—is by far the most efficient. Within recent years, and largely through the work of Dr. James Mackenzie, the real value, and at the same time the limitations, of digitalis, have been much more clearly established. In adult life the most striking results, according to Mackenzie, are obtained in connection with “auricular fibrillation,” and this condition does not occur in childhood. Although the range of the applicability of digitalis in children is probably more limited than in adults, there are certain indications for its use in cases of chronic heart disease. The chief action of digitalis is in slowing and strengthening the left ventricle. The main clinical indications for the use of digitalis are: (1) dilatation of the left ventricle, (2) rapid cardiac action (100 to 130), (3) œdema of the extremities, (4) diminution in the amount of urine, and (5) breathlessness on exertion. If the left ventricle is not dilated, and if the cardiac rate is

about normal, it is not likely that digitalis will do any good.

The action of digitalis, as ordinarily administered, is not manifested for some days, and it is not therefore of any use in emergencies, where more rapid stimulants are called for. Perhaps the most reliable and effective preparation is the fresh fluid infusion, which may be given in doses of one-half to one drachm every four or six hours for a child of five years, or a reliable tincture of digitalis may be used in five-minim doses. When one is using digitalis a record should be kept of the pulse-rate, the amount of urine, and the presence or absence of vomiting. When the pulse begins to be steadily lowered, or when the amount of urine is increasing, the dose of digitalis may be reduced one-half, as the effect of the drug is cumulative, and it should not be pushed too far. Vomiting arising during the administration of digitalis is also an indication for intermitting or diminishing the dose. It is very important, however, to push the drug until some evidence of its action has been obtained, and individuals vary greatly as to their susceptibility to digitalis. If one employs two or three minims of the tincture thrice daily it may be weeks before any effect is produced, and the practitioner may discard the drug as useless for his patient, whereas he has only been using too small doses. In the cases associated with a weak, irregular and rapid pulse, we must have the pulse rendered stronger, slower and more regular. In cases of heart disease associated with dropsy we trust to digitalis as the most valuable diuretic. It is usually combined with citrate and acetate of

potash, but there is no doubt that the action of digitalis on the heart is the important factor in producing diuresis. I have seen some very striking effects produced in cardiac dropsy by the combined action of digitalis and theocine-sodium-acetate (grs. iv to viij) thrice daily. The cases were usually those of dilated left ventricle with renal congestion, and the good results could only be maintained by a combination of theocine and digitalis, and not by either of them alone. Viewing digitalis as a cardiac tonic one must not discontinue the drug as soon as marked symptoms have been relieved, but must continue it for some weeks, in diminished doses, and more especially until the cardiac condition has been tested by the patient's state when out of bed and taking exercise. In some cases of chronic cardiac disease in children the continuous or intermittent use of the drug may be absolutely necessary in order to prevent signs of cardiac incompetence developing. If digitalis is not well tolerated by the patient, as shown by vomiting and diarrhoea, strophanthus or squills may be employed instead. Nativelle's granules of digitalin are also a serviceable digitalis preparation for children's use, in doses of $\frac{1}{80}$ of a grain.

Cardiac Disorders and Disturbances.—In addition to organic heart disease, children are subject to various disorders and disturbances which are not infrequently ascribed to the heart without any justification. Relatives are particularly apt to diagnose heart disease in the presence of such symptoms as faintness, sudden attacks of pallor, breath-

lessness, or palpitation. In other cases the doctor discovers accidentally an irregularity of the cardiac action, or a certain degree of persistent tachycardia, or a reduplication of the sounds, and although there are no symptoms of heart disease, he may feel inclined to lay too much stress on the irregularity discovered. Systolic murmurs are also very commonly found during childhood over the præcordia, and more especially over the pulmonary area of the heart, without there being any evidence of heart disease or any associated symptoms.

While it is very important that organic heart disease should not be overlooked, it is equally important that the symptoms and signs referred to above should not be regarded as evidences of heart disease requiring prolonged treatment. Cardiac murmurs and cardiac dilatation are so commonly present in childhood that taken by themselves they may be considered as physiological signs, *i. e.* of a healthy heart performing such duties as may be required of it. There are, of course, certain clinical distinctions between murmurs and dilatation which are physiological, and those which are the result of organic heart disease. As regards the symptoms referred to above, they are often to be traced to some local or general disturbance quite apart from the heart.

An irregularity in the pulse or heart rate is very common in childhood, sometimes very persistent in character, and sometimes intermittent. I have seen several members of the same family with this peculiarity. Taken by itself it is a sign of no importance. The presence of a few regular beats

followed by a long pause, of a missed beat occasionally, or of varying force in the pulse is not to be regarded as evidence of heart disease. The rate of the heart is also markedly affected by the state of the respiration, and the quickening of the pulse during inspiration and slowing during expiration is much more marked in childhood than in adult life. Hence there are many types of arrhythmia, "sinus arrhythmias," as Dr. James Mackenzie calls them, which are met with in children, which are probably dependent on the incomplete development and control of the vagal centres in the medulla, but which are not to be regarded as indicative of heart trouble when unassociated with other definite signs and symptoms of cardiac disease.

In a child symptoms such as faintness, sudden attacks of pallor, and palpitation are much more suggestive of some extracardiac than intracardiac condition. The indications for treatment are usually obtained when the source of disturbance is discovered. The child may have been weakened by some severe or prolonged illness, and requires more rest and toning up of the whole system. A condition of anæmia, either primary or secondary, may be present, which requires treatment. Gastro-intestinal disorders or any form of disturbance below the diaphragm may cause these cardiac symptoms, either by mechanical pressure upwards or by reflex action. Flatulent distention and a loaded large bowel are common causes of these disturbances. Pulmonary or pleural lesions of a chronic character must be examined for. In my experience these cardiac symptoms are very commonly associated

with other signs of a disturbed and excitable nervous system, which I have described in another section under the heading of Neurasthenia. The term is no doubt often open to criticism, and I find that Dr. Mackenzie has grouped together the same series of symptoms under the title of the X-disease in order to declare and not to cloak our ignorance of the subject. From the age of seven or eight years onward through puberty I have found that the symptoms of palpitation, faintness or fainting, sudden attacks of pallor or flushing, and pain in the præcordial region, with or without a rapid or a slow cardiac action, are far more commonly associated with a depressed state of the nervous system than with organic heart disease. The vaso-motor system seems to be specially disturbed and does not accommodate itself readily to altered conditions. Thus one will often find that faintness occurs when the patient rises in the morning, and this is evidently due to the change of posture. The immediate cause is anæmia of the brain, and this is probably dependent on a tendency for the blood to accumulate in the abdominal cavity, as Dr. James Mackenzie has suggested. The treatment of this condition is not to be directed to the heart, but to regulating the life in such a manner as to build up a strong nervous system (*see* Neurasthenia).

Attacks of **Pericarditis** are not infrequently met with in the subjects of chronic cardiac disease. The symptom which directs attention to this condition is pain in the præcordial region. Hot fomentations applied over the præcordia afford great relief to the patient. For the relief of both pain

and inflammation Dr. Lees recommends the continuous application of an ice-bag to the præcordial region. As children frequently react badly to extreme cold the effect must be carefully watched. The application of two or three leeches will often quickly relieve the pain.

In more severe cases opium or morphia should be given in full doses, not only for the relief of pain but also to remove the restlessness and sleeplessness which tend to exhaust the patient. As an attack of pericarditis is often an indication of active rheumatic trouble it is advisable to give a course of salicylate treatment, as in rheumatic fever, and to combine with the salicylate small doses (grs. ij-iiij) of iodide of potassium. This treatment will also be found useful in cases of pericarditis with serous effusion, the amount of which is usually moderate.

Purpura.—In children, as in adults, purpura may be a symptom of some grave underlying disease, such as the malignant type of specific fevers, Bright's disease, extreme cachexia, scurvy, etc., and as such does not call for any special notice. There are, further, in children certain conditions in which purpura, simple or hæmorrhagic, may be the leading symptom and indication for treatment. Amongst these the so-called "Henoch's Purpura" is of considerable importance.

Henoch's Purpura is by some considered to be a variety of erythema exsudativum multiforme, and by others is classed amongst the angio-neurotic œdemas. The affection runs a prolonged course, of many months in some cases, but commences

suddenly without obvious cause or antecedent illness. It is characterized by recurrent attacks of hæmorrhage in the skin, the stomach, the intestines, and the kidneys; by severe colicky pains; by vomiting and diarrhœa; and sometimes by pains in the back, limbs, and joints. It terminates usually in recovery, rarely in death. The symptoms affecting the alimentary tract are always of a marked character. The abdominal pain is severe and griping, and is referred to the umbilical, the epigastric, or the right inguinal region. Sickness soon follows, and frequently the vomited material is blood-stained, or consists of pure blood. At first constipation is marked, but in a few days diarrhœa sets in, the motions are offensive and blood-stained, and soon pure blood is passed by the bowel. Such an attack may last for a few hours or a few days, and is followed by a gradual remission of the symptoms until the next attack. The importance of this affection lies in the fact that from the predominance and acuteness of the abdominal symptoms, various surgical diseases calling for immediate operation have been diagnosed, and laparotomy has been performed. Amongst these erroneous diagnoses may be mentioned intussusception, appendicitis, perforated gastric ulcer, peritonitis, and acute intestinal obstruction. The mistake is pardonable from the nature and acuteness of the symptoms, but it is none the less desirable to avoid it. This may usually be done if the possibility of Henoch's purpura be kept in mind, if the extent of the visceral hæmorrhage and the other abdominal conditions be duly considered, and if the skin be carefully examined

for purpuric spots. These spots appear most frequently and copiously on the extensor surfaces of the elbows, knees and hips, but may be found on any part of the body.

The symptoms in Henoch's purpura pointing to some toxic condition of unknown origin, the **treatment** must be palliative. The patient should be kept in bed and fed on a light and restricted diet of milk and barley-water, Benger's food and simple soups. During the acute stage, when vomiting is severe and all appetite is lost, the less food given the better. The local treatment should consist of an ice-bag or cold compresses to the abdomen. Hot applications are not to be used, as they may induce further bleeding in the bowel or the abdominal wall. The medicinal treatment consists in clearing out the intestinal tract by small doses of castor oil or sulphate of magnesia, and by relieving the abdominal pain with opium (liquor opii sedativus, ℥ v, every four hours until relief is obtained). In the more severe cases of colic, morphia (gr. $\frac{1}{24}$ — $\frac{1}{12}$) should be administered hypodermically. The attacks are apt to recur, and nephritis may be a complication which calls for prolonged treatment.

Another form of Purpura is sometimes met with in poorly nourished, badly fed and neglected children. The patient is usually distinctly anæmic, languid and disinclined for exertion. Purpuric spots will be found scattered over the skin, and there may be a history of epistaxis or bleeding from the mouth or bowel. Physical examination may not reveal any definite visceral or other disease. Although one may not obtain any characteristic

signs of scurvy in such cases, the affection would appear to be of that nature. In some cases one learns that the patient has been disinclined to eat fruit and vegetables all his life. The diagnosis of a scorbutic tendency is often justified by the results of treatment. The patient should be kept in bed until convalescence is fully established, as the risk of sudden cardiac failure is always present in these cases. A simple diet should be ordered consisting of meat, vegetables and puddings, and the juice of one or two oranges should be given daily. In the later stage the tincture of the perchloride of iron may be given in full doses (℥ x-xv, T.D.S.) to improve the anæmic condition which is apt to be persistent.

For certain **Idiopathic forms of Purpura** one can trust only to empirical treatment. Amongst the drugs which may be tried are calcium chloride or lactate (grs. v-x), adrenalin solution (℥ v-x) and ergot. In cases of purpura hæmorrhagica Dr. Eustace Smith strongly recommends oil of turpentine, two drachms along with an equal quantity of castor oil, for a child of five or six years. The effect of such a dose of turpentine is aperient and the kidneys are not likely to be injuriously affected. As turpentine is also antiseptic, it may act in checking some unrecognized source of sepsis in the alimentary tract.

Anæmia in infancy and childhood is usually a symptom of some local or general disease. It is advisable, therefore, not to commence the treatment with some preparation of iron, but to examine care-

fully as to the cause of the anæmia. In infants a peculiar lemon-yellow colour of the skin is frequently seen in empyema, while a waxy pallor, with a yellowish tinge, is characteristic of splenic anæmia. Anæmia is also a striking symptom in many cases of hereditary syphilis, tuberculosis, rheumatism and cardiac disease. The treatment in such cases must be directed to the underlying disease. The subjects of chronic gastro-intestinal catarrh are apt to be anæmic, and too often the anæmia is treated by giving more food and iron in the belief that the child is suffering from debility. The treatment should be to restore the proper functions of the alimentary tract by a spare and simple diet, by aperients, and by a course of alkalies and nux vomica. When the digestion is improved the blood condition will soon right itself. In other cases some affection of the blood, such as leukæmia, may be the cause of anæmia.

In the absence of any definite underlying disease special treatment may have to be directed to the anæmia. An anæmic child is a languid and tired child, and the best results will often be secured by keeping the patient at absolute rest in bed for a fortnight or longer. There should be as much fresh air and sunshine about the patient as possible, and, whenever possible, the open-air treatment should be carried out. During the resting period massage to the trunk and extremities should be employed, for half an hour twice a day, so as to maintain the digestion and nutrition. A simple diet should be ordered in which raw meat-juice, under-done beef

and mutton, oatmeal porridge, eggs, fruit-juices, and green vegetables play an important part. Green vegetables contain a considerable amount of iron in an assimilable form. As regards the quantity of food the appetite must be consulted, and nothing but harm will follow from coaxing or forcing the child to eat more than he is inclined to. An ounce of port, or two ounces of claret, may be given daily in divided doses along with meals. Constipation must be corrected by the use of enemata, salines, cascara, or senna. It is surprising how many cases of anæmia in children are due entirely to constipation, and are cured by free evacuation of the bowels. In extreme cases one can detect by palpation fæcal masses in the whole course of the colon. If there is any evidence of the presence of round- or thread-worms, calomel or santolin may be used.

The chief drugs in common use continue to be iron and arsenic, and as both of them are apt to disturb the digestion, it is desirable to hold them in reserve until the digestive organs are in a thoroughly healthy condition. For this reason also all syrupy preparations of iron ought to be avoided. In the case of rheumatic children the employment of iron is very apt to induce fresh pains. In the case of anæmia due to loss of blood from any cause iron is always beneficial. In the course of his practice every doctor settles down to use certain preparations of iron as the result of experience. For ordinary purposes in the treatment of anæmia an acid iron mixture, an alkaline iron mixture, and an aperient iron mixture will be found sufficient.

MISTURA FERRI ACIDA.

R.	Liquoris Ferri Perchloridi	.	.	.	.	℥	v
	Acidi Hydrochlorici diluti	.	.	.	.	℥	jss
	Glycerini	.	.	.	.	℥	x
	Infusum Calumbæ ad	.	.	.	.	℥	j
	Sig. 3 j.—T.D.S.						

MISTURA FERRI ALKALINA.

R.	Ferri et Ammonii Citratis	.	.	.	.	grs.	ii℥
	Sodii Bicarbonatis	.	.	.	.	grs.	v
	Glycerini	.	.	.	.	℥	x
	Aquam ad	.	.	.	.	℥	j
	Sig. 3 j.—T.D.S.						

MISTURA FERRI APERIENS.

R.	Ferri Sulphatis	.	.	.	.	grs.	j—j
	Magnesii Sulphatis	.	.	.	.	grs.	x
	Acidi Sulphurici diluti	.	.	.	.	℥	ss
	Glycerini	.	.	.	.	℥	x
	Aquam ad	.	.	.	.	℥	j
	Sig. 3 j.—T.D.S.						

The above are suitable for a child of five years. To these may be added reduced iron which Dr. John Thomson finds a convenient form for administration in doses of gr. ss—j, thrice daily after food. "Hæmaboloids," a proprietary preparation, has appeared to me to be sometimes useful in cases of anæmia, and especially those associated with cardiac disease. The preparations of hæmoglobin and of bone marrow have not in my hands proved efficacious. In the secondary anæmias of infancy Dr. Lovett Morse recommends the use of an aqueous solution of citrate of iron, administered subcutaneously. The average dose is gr. $\frac{3}{4}$ every second day. He states that the injection is non-irritating, but may be followed by pain. A glass syringe should be used with a platinum needle. The special indications are severe secondary anæmia,

with disturbance of digestion, and anæmia of the chlorotic type. Dr. Hutchison has found the combination of iron and oil in the form of "Ferroleum" very useful. Arsenic should be administered in small doses, well diluted, and immediately after meals. In doses of one to two drops of Fowler's solution it will often improve the appetite, but in larger doses gastric disturbance is apt to follow. A quinine-and-iron mixture is an old institution, but it is doubtful whether quinine is of any special value in the anæmia of childhood.

Splenic Anæmia is a special affection of infancy. It is characterized by progressive anæmia, enlargement of the spleen, certain changes in the blood and wasting. The condition may occur in syphilitic or rachitic infants, but does not appear to be directly associated with either of these affections as judged by the results of treatment. It is believed by many to be due to some chronic infection from the bowels. There is no direct curative treatment, but if the infant's health can be maintained through the prolonged course of the illness, and intercurrent disease avoided, the prognosis is good, as many cases ultimately recover. The dietetic and hygienic surroundings should be carefully regulated. Often a complete temporary change of diet will be serviceable, *e. g.* from milk and puddings to meat and vegetable soups, chicken soup, and plasmon. Special attention should be directed to maintaining a healthy condition of the alimentary tract. The infant should have as much fresh air and sunshine as possible. Iron in small doses may be given, in the form of the *Mistura Ferri Alkalina* or the *Mistura Ferri Aperiens*.

Splenic anæmia of older children is the same disease as in adult life, and is characterized by progressive and profound anæmia of the chlorotic type, with leucopenia. Severe hæmatemesis is not uncommon. While a full course of medicinal treatment by means of arsenic and iron should always be employed, the disease tends to progress, and the only curative treatment is excision of the spleen. This should be carried out before the anæmia is too advanced, and before a purpuric condition has developed.

CHAPTER IX

DISEASES OF THE NERVOUS SYSTEM

Functional Nervous Disorders; Neuroses—Neurasthenia—Convulsions—Epilepsy—Night Terrors—Organic Diseases; Meningitis—Hydrocephalus—Cerebral Palsies—Acute Anterior Poliomyelitis—Mental Backwardness and Cretinism.

Functional Nervous Disorders.—There is a class of young patients frequently met with in whom the nervous equilibrium is not temporarily and occasionally disturbed, but seems to be chronically upset. Children of this type are described by their parents as nervous. They are emotional, excitable, active, precocious, with restless bodies by day and restless brains by night, capricious in their likes and dislikes, passionate at one time, affectionate at another, and at all times the chief regulators of the domestic peace and comfort. They seem to be constantly hovering on the borderland between health and disease, never being decidedly in the former territory, but passing very frequently and very easily into the latter. When attacked by acute disease they present manifestations which are not in the regular order of things, and they respond to drugs in a way which puzzles the practitioner. This nervous diathesis is manifested in various ways, and amongst others by local disturbances of function, which are known as neuroses or hysterical manifestations.

These **Neuroses** may take many different forms. There may be functional aphonia, or functional tremor, or a spastic contraction of one limb, or functional paraplegia, or functional dysphagia, or functional spinal or hip disease. The attack may come on after some definite illness, or after an injury, or after a fright or shock of some kind. In other cases there is no apparent exciting cause.

The factors predisposing to such functional disturbances are both hereditary and acquired. There will often be found a history of nervous disease, of gout, or of rheumatism, in one or both parents. The acquired tendencies depend on the special diathesis of the child, influenced by its diet, its upbringing, and its home surroundings generally. Although some forms arise in very early life, such neuroses most frequently occur during later childhood, from the age of nine up to fourteen years.

The most important part of the **treatment**, and the most difficult to carry out, is the removal of the child from its parents and home surroundings. The home treatment usually consists in effusive sympathy, overfeeding, and a constant giving in to the whims of the child. Consequently it is extremely difficult to carry out a firm line of treatment at home. The next best thing to isolation away from the parents is to put the child under the charge of a trained nurse, and to give her strict injunctions as to the treatment to be pursued. The child is to be encouraged to use his mind and body, talking about ailments and complaints about pains are to be discouraged, and the mind is to be kept engaged on pleasanter and more profitable topics.

When the system is run down and the muscular power weakened massage is to be employed, especially after cold bathing or cold sponging. In all cases of general debility electricity in the form of faradism is beneficial. It is to be employed at first mildly as a general tonic, but a stronger current is often required locally so as to add the stimulus of pain to that of muscular action. In all the measures employed care must be taken not to frighten the child and possibly increase the nervous disturbance already existing. But firmness, gentleness, and patience will enable one to carry out strong measures without injury. Attention should be paid to the strengthening of the nervous system by a simple non-stimulating diet in abundance and plenty of open-air life. Lessons should not be made a burden, and competitive work should be forbidden. Nervine tonics, such as nux vomica, strychnine, and cod-liver oil with hypophosphites, are also useful.

Life at a boarding school has the advantage of removing the patient from the home surroundings, but has the disadvantage of being rather trying to a child with such a nervous temperament. A private school with a limited number of pupils where each child can receive the special care and attention necessary is better suited for such cases. At the same time fond parents must be warned against regarding and treating the child as delicate, and are to be advised as to the advantage of teaching the child a virtue which they often do not possess themselves, namely, self-control. Relapses are so common amongst children of this type, or the

development of some other neurosis, that careful attention must be devoted to the child's general treatment, and not merely to the curing of an attack.

The **local treatment** of the various local manifestations is important. Functional aphonia will usually be rapidly cured by faradism, one pole being placed on the back of the neck and the other over the larynx. The strength of the current is gradually increased until the patient cries out, and then he can usually be induced to say some words in a clear voice. He is to be encouraged to do so, and if the voice fails again, the battery has to be again used. In paralytic lesions of the extremities massage and electricity are of great value. In the case of lower extremities it will often be found that the patient can perform powerful movements with the limbs when in bed, but all muscular power vanishes as soon as he tries to stand or walk. But with encouragement and support the use of the limbs in the erect posture can be steadily improved. Functional tremor is usually confined to one limb and is present only when the patient is under observation. The local application of faradism to a painful extent is usually curative. In the case of all these local lesions it is very important to exclude the possibility of organic disease, and this can usually be done by a careful examination conducted under an anæsthetic if necessary.

A condition corresponding very closely to the **Neurasthenia** of adult life is of common occurrence in children between the ages of nine and fourteen years. There is also in such cases a history usually of nervous disturbance in the parents. Frequently

what may be called the more active symptoms of neurasthenia are developed by the strain of school life. These children are the subjects of mental over-strain, and the result is a nervous breakdown. They deserve all our sympathy and careful treatment, for the disorder is a very real and a very trying one. Cappelletti says that one very important element is the state of mental doubt which colours all the actions of the neurasthenic. The mental attitude is one of the most important helps in the differential diagnosis of the malady in question. The child complains of tiredness, becomes dull and apathetic, cannot keep his attention fixed at school, cannot remember his lessons, and becomes upset in consequence. Crying fits are common, and the control of the emotional centres is in abeyance. The tired and worried expression of the face becomes fixed. Physical examination will usually yield confirmatory evidence of the general atonic condition which exists. The heart sounds are weak, the pulse is extremely small and feeble, and the extremities are usually cold and blue. Fainting attacks, palpitation, and tachycardia are easily induced. Albuminuria is often present, of the orthostatic variety, *i. e.* the albumen only appears after the patient has been walking about, and is unaccompanied by any signs of organic disease. The stomach and bowels are atonic and dilated, and constipation is usually a marked feature. Headaches, backaches, and other aches of uncertain origin are often complained of. In addition to the chronic condition, nerve storms arise occasionally in the form of prostrating sickness and headache, sleeplessness, and moderate delirium.

The treatment of such cases presents many difficulties. The following negative indications may be borne in mind—

1. Do not tell the parents that there is nothing to be done and that the child will outgrow it.

2. Do not give iron and arsenic until the appetite is in a healthy condition, and then they will probably not be required.

3. Do not diagnose nephritis from the presence of albuminuria, give a bad prognosis, and treat the case as one of Bright's disease.

4. Do not tell the parents that the child has a weak heart and must never be contradicted or excited in any way.

5. Do not imagine that the patient will be cured in a day with a dose of calomel or castor oil.

The case must be treated as one of nervous breakdown and the improvement can only be slow. The exciting causes of the disturbance must be removed, and amongst these school lessons take the first place. School authorities do not recognize that a child may be suffering from school life and incapacitated thereby for school work. The first essential, however, in such cases is to stop school for three or six months or as long as the condition persists. Sometimes even the home life, in a family of boys and girls, is too trying for the over-strung nervous system. In such cases the best treatment is to send the child to some aunt or grandmother in the country, where he will not be associated with other children. All the excitements of child life, such as parties, theatres, etc., must be strictly for-

bidden. In severe cases of prostration a course of Weir-Mitchell treatment—rest, isolation, feeding-up and massage—will yield the best results. An important thing is to secure sleep, which with many of these sufferers is often restless and broken. With the absence of worry, sleep will often come naturally, but unless this is so ten to twenty grains of bromide of ammonium may be given at bedtime. It is advisable to devote two hours during the day to rest and sleep, and at least ten hours during the night.

The diet must be carefully regulated, but it is not necessary to reduce these children still further by a course of beef essences and tinned foods, which is frequently the home treatment. All stimulants such as tea, coffee, and alcohol should be strictly forbidden, as they invariably do harm in such cases. Spicy and highly seasoned foods and rich sauces are to be avoided. The patient should be put on a good mixed diet of meat, fish, eggs, vegetables and puddings. One or two pints of milk may be taken daily with much benefit, but the amount of the diet must be regulated in accordance with the state of the appetite. Constipation must be relieved by enemata and cascara, senna, or castor oil, and as the underlying condition is atony of the bowel, a course of abdominal massage will prove useful. Acute attacks of abdominal pain call for local soothing applications, rest, and low diet, but are usually of short duration. In the case of severe headaches one can employ small doses of antipyrin (grs. iij to iv) or phenacetin (grs. iij to iv) with benefit, but the prolonged use of such nervine

sedatives is distinctly injurious to the already weakened nervous system. The cardiac condition and the albuminuria do not call for special treatment, as both are dependent on the vasomotor instability present in this affection. As a routine treatment the chief indications will be usually best met by a prescription such as the following—

R. Tr. Nuc. Vom., ℥ v; Sodii Bromidi, grs. v; Extr.
Cascar. Sagr. Liq., ℥ x; Syr. Pruni Virgin., ℥ x;
Aquam ad 3 ij.—T.D.S.

This may be taken at intervals for a period of two or three months. The treatment of the affection will in all cases be prolonged, and recurrences will take place if the child is again exposed to mental worry and strain.

Convulsions.—During the early years of life there is a marked tendency to convulsive seizures owing to the unstable equilibrium of the actively developing nervous centres. Nevertheless it may be taken for granted that a healthy child reared under proper dietetic and other surroundings will not be the subject of fits. Like too many other disorders of childhood, convulsions have come to be regarded by a certain portion of the laity as almost normal occurrences. This view must be strongly combated. For clinical purposes one has to divide convulsions into two classes, the functional and the organic. In the organic class there is some gross underlying cerebral or meningeal disease, such as meningeal hæmorrhage, meningitis, cerebral tumour, encephalitis, etc. Such cases are to be recognized from the presence of the accompanying

symptoms and require treatment directed to the primary disease. Functional fits are those associated with some temporary cortical irritation, and the treatment is to be directed to relieving this irritation, first by sedatives and secondly by removing the source of irritation. If the child has been under medical observation beforehand, one will often find indications of cerebral irritation in the slight fibrillary or muscular twitching about the eyes and mouth and fingers, a condition of cortical excitability which is not physiological. In such a case, by regulating the diet, by aperients, and by rest, one may succeed in preventing any further developments. During the first two years of life—when fits occur most frequently—one will find three agents predominating amongst the etiological factors. These are (1) a nervous temperament, (2) gastro-intestinal disturbance, and (3) rickets.

The first thing to be considered is the **immediate treatment** of a convulsion, which comes usually like a bolt from the blue. Mild measures may sometimes succeed in allaying the disturbance. Amongst these the hot bath is credited with great virtues by the laity and may be recommended. The child should with as little disturbance as possible be put in a hot bath (100° to 105° F.), left there for two or three minutes, dried quickly with a warm towel, and put to bed rolled up in hot blankets to encourage sweating. More effective and less disturbing is the hot pack, in which the child is rolled in a hot wet blanket for five or ten minutes, until the skin is thoroughly reddened, and then rolled in a dry hot blanket. There should be as little fussing about the

child as possible, and to secure quiet all friends should be put out of the room and only a placid nurse left. If the fit does not yield to this treatment, or recurs quickly, a rectal injection of chloral (grs. v) and potassium bromide (grs. x) may be administered in an ounce of warm water to an infant of twelve months. The dose may be increased or diminished according to the age of the child. Before this is given an enema of soap-and-water should be administered, both for the relief obtained by an evacuation and the preparation of the rectum for the medicinal injection. If the fits are severe or continuous the best remedy to employ at once is chloroform, a few whiffs of which will usually be effectual. This can be repeated if necessary until the chloral and bromide have had time to act. Sometimes instead of chloroform the inhalation of nitrite of amyl may be tried and continued until the face becomes flushed. Although this acts like a charm in some cases, the result is uncertain and it is impossible to say beforehand in what cases it is likely to succeed. Some writers recommend the use of morphia by the mouth or hypodermically, in doses of $\frac{1}{25}$ or $\frac{1}{30}$ of a grain. Although this is undoubtedly effective in stopping convulsions it should only be used as a last resort, for the after-effects of morphia may hamper a complete cure.

Having secured a temporary cessation of the fits one has time to examine into the **nature of the exciting cause**. It will often be found that a large meal or some indigestible food had been taken, and had been followed by signs of gastric discomfort. An emetic is called for and one or two grains

of sulphate of copper in two drachms of water should be given. An abdominal examination will frequently reveal signs of intestinal disturbance in the form of flatulence, fæcal accumulation, etc., and two grains of calomel should be administered as soon as possible, or one grain each of calomel and jalapin. The temperature should be taken, and if there is found to be definite pyrexia the onset of some acute illness such as tonsillitis, pneumonia, infectious fever, etc., may be suspected and a careful examination is called for. In some cases one will find a wasted, starved, and neglected infant in a collapsed condition, and suffering from the convulsions of debility. Here the proper treatment is stimulation by means of brandy and hot milk. There will often be found signs of rickets in an acute stage, and these indicate the underlying disease which must be treated.

The further medicinal treatment of a case of convulsions consists in the use of chloral and bromide. For an infant of twelve months two grains of chloral hydrate and five of bromide of ammonium may be given by the mouth every six hours for twenty-four hours, or until the patient becomes drowsy. The dose should then be reduced by one-half, and continued until the convulsions have been absent for two days. It is necessary of course to watch the action of these drugs, but it is also necessary to push them so as to check the convulsive tendency as quickly as possible. An attack which begins apparently in a simple convulsion may become so severe as to affect permanently the nervous centres, as shown subsequently by mental defect or

cerebral paralysis. The risk of such permanent damage is to be measured by the duration and the severity of the fits. In the case of delicate infants convulsions may prove directly fatal, quite apart from the presence of other acute disease. It is no uncommon experience to find a badly nourished infant suffering from a series of convulsive seizures, of apparently ordinary severity, which terminate suddenly in death, or in profound exhaustion from which the infant does not rally. Another unfortunate fact about convulsions is the tendency to recurrence, sooner or later, unless one follows up the immediate treatment by attention to every detail in the infant's life.

Epilepsy.—The treatment of epilepsy in childhood is similar to that pursued in later years. Attention must be paid to any source of peripheral irritation, such as nasal obstruction, errors of refraction, phimosis, etc., but the removal of these does not cure epilepsy. The most that can be claimed is that it allows of other special treatment being carried out with a better prospect of success. The home surroundings are very important, and the diet, hours of sleep, and mental work must be carefully regulated so as to prevent any unnecessary strain or disturbance of the nervous centres. If school life is a pleasure and not a worry to the child it may be allowed, but the strain of competitive work should not be permitted. A healthy brain will be best secured by developing a healthy body. The diet should be plain and wholesome, and all substances like tea, coffee, and alcohol should be forbidden. If care is taken that the child is not overfed, and that too much meat

is not given, it is unnecessary to draw up a hard and fast dietary. As regards the drug treatment, the bromides are the most reliable remedy and the dosage must be regulated by the frequency and severity of fits. Children tolerate the bromide treatment well, and from ten to fifteen grains of bromide of potassium may be given three times daily to a child of ten years. When large doses are being given it is as well to use equal parts of the three bromides, potassium, sodium, and ammonium, as being less depressing. In prolonged cases the treatment should be intermittent. When the convulsions are nocturnal it is advisable to give the daily amount of bromide in one dose at bedtime. When the bromide in any of the above forms is followed by troublesome acne Dr. James Taylor advises the use of bromide of strontium. The occurrence of a peculiar and persistent bromide rash in infants and children, even when small doses are being given, is sometimes met with and calls for a cessation of the treatment. Nervine tonics should be combined with the bromide treatment, and of these the best are strychnia, the hypophosphites, and cod-liver oil. In some cases the efficacy of the bromide may be very much increased by the addition of chloral hydrate in full doses. This is specially valuable when the fits are frequent and severe and the affection may be regarded as in an acute stage. The patient should be kept in bed, and for a child of eight years the following may be ordered—

R. Sodii Bromidi, grs. xx; Chloral Hydratis, grs. x;
Tincturæ Nucis Vomicae, ℥ v; Tincturæ Zingiberis,
℥ x; Aquam ad ʒ ss.

This may be given every six hours for the first two days and twice daily for five days more, the dose being diminished if the patient is very drowsy. An interval of two days may then be allowed without any medicine, and a second course given afterwards if necessary. The important point is to push the chloral treatment until the fits have been stopped, and then to keep up the effect for some time longer with reduced doses until the habit has been entirely broken.

Night Terrors.—This is a source of very real suffering to many children who have passed the age of infancy. The subjects of the disturbance are usually excitable, nervous children, whose upbringing has not been of the wisest kind. The child goes to sleep quietly and wakes up suddenly in a state of extreme fright and screaming loudly. In some cases it is only from “dreaming dreams” that the terror comes, the child being quite unable to say what the cause of alarm is. In other cases they “see visions,” and in the half-awake condition will point to some imaginary object or animal, or will describe the horrible apparition which has been seen. The attacks may be repeated at intervals of a few days or weeks, or may be of nightly occurrence. The recurrence of the attacks may produce in the child a dread of the dark or of sleeping alone, in which case some one must remain in the room, or a light should be kept burning, until the cessation of the trouble renders such measures unnecessary.

In the **treatment** of this condition one must consider the two chief factors, which are: first, an unstable and disturbed nervous system; and,

secondly, some peripheral irritation, which is most frequently found in the alimentary canal. The state of the nervous system must be attended to, and a quiet home life without excitements and without overstrain of any kind must be secured. Any terrifying experience by day may directly induce terrors by night. If the child is afraid of the dark or of sleeping alone this source of alarm should be removed and not scoffed at. A reticent child may have some secret dread or unpleasant recollection, which is the source of night terrors and which may be relieved by kindly counsel. Suitable nervine tonics should be given, and the diet should be plain and spare. It will often be found that the dietary has been at fault, and that a condition of acute or chronic intestinal catarrh is present. This must be treated by a simple diet, without over-feeding, and by laxatives administered regularly (*vide* Chronic Intestinal Indigestion). In many cases when the stomach and bowels are restored to a healthy state the night terrors will cease. Another source of disturbance is sometimes found in the nasopharynx from overgrowth of adenoid tissue or of the tonsils. The obstructed breathing leads to broken rest, and night terrors may supervene in the form which is sometimes described by the patient as "suffocating dreams." It will be necessary to secure the patency of the upper respiratory passages in order to relieve this condition. The urine should always be examined for any irritating contents, such as uric acid, bacillus coli, etc. While such measures are being taken to remove any peripheral irritation, the comfort of the child may

be secured by a dose of chloral hydrate (grs. v to x) and ammonium bromide (grs. x to xv) at bedtime. Dr. Leonard Guthrie finds that in addition to the above form of night terrors, which may be termed symptomatic, there is another in which no source of peripheral irritation can be found, and which is apparently idiopathic. In cases of this variety one must tone up the nervous system in every possible way, at the same time giving bromides in moderate doses for a prolonged period if necessary.

Meningitis.—The two forms of meningitis which call for notice are tuberculous meningitis and posterior basic meningitis.

Tuberculous Meningitis is usually secondary to some tuberculous lesion in the body, such as a caseous gland, and is almost invariably fatal. Surgical measures for the relief of the patient have proved useless and no specific medical treatment is known. Frequently children to all appearance in the best of health are attacked, the pre-existing tuberculous focus having produced no symptoms and having been unsuspected. The preventive measures to be taken are those for tuberculosis generally. The most that can be done in the way of treatment after the onset of meningitis is to keep the patient as quiet and comfortable as possible. Symptoms like restlessness, headache, and convulsions are to be relieved by cold to the head, phenacetin, and bromides. In some cases the headache and consequent screaming are so pronounced as to call for full doses of morphia. The tolerance of this drug in cases of tuberculous meningitis is very extraordinary. I have notes of the case of a

girl of ten years who had as much as two and a half grains of morphia hypodermically in the course of twenty-four hours, with only temporary relief, and with no symptoms of poisoning. This was followed by hyoscine hypodermically (gr. $\frac{1}{16}$ in the course of twenty-four hours), which proved more effective. In some cases the screaming and headache may be relieved by lumbar puncture and the removal of excess of cerebro-spinal fluid. This proceeding can be repeated as often as necessary. Simple dieting should be carried out, and when swallowing has become impossible in the last stage it is no kindness to try to prolong life by forced feeding and stimulation.

Posterior Basic Meningitis is chiefly met with between the ages of six and twenty-four months. It is to be regarded as the infantile type of cerebro-spinal meningitis, as evidenced by the presence of the same organism in both diseases (Still). The chief symptoms are head retraction, vomiting, fever, and convulsions. The disease may run a prolonged course for several months and yet end in recovery. On the other hand many of the cases which survive are crippled by mental weakness, hydrocephalus, or some form of paralysis.

Our knowledge of the preventive treatment of the disease is very limited. It would appear probable that in many cases the specific organism finds an entrance from the nasal passages, either directly through the base of the skull, or by the Eustachian tube and middle ear. This suggests the importance of maintaining a healthy condition of the nasal passages in infancy.

When the disease has shown itself attention should be directed to cleansing the nostrils and postnasal space daily with an alkaline lotion (borax and bicarbonate of soda, grs. ij of each to one ounce of warm water). The ears should be examined, and if the membrane is bulging it should be freely incised, and irrigation should be carried out twice daily. Sometimes very striking results follow the relief of tension in the middle ear, in conditions which are described as due to basilar meningitis. It must be remembered, however, that the leading symptoms of basilar meningitis, such as vomiting, head retraction, and fever, may be due entirely to fluid pressure in the middle ear, and the rapid disappearance of all the symptoms after paracentesis makes one suspect that the disease had not really extended to the meninges. In one case of basilar meningitis under my care there was suppuration in both ears, and Mr. Hunter Tod performed the radical mastoid operation on both sides. The patient eventually made a good recovery from the meningitis, but I could not convince myself that the course of the illness was appreciably affected by the operation on the ears. During the course of the illness a purulent nasal discharge very frequently develops and the inflammation spreads to the eyes. The value of the early adoption of nasal treatment in preventing this is evident. Any sores developing about the face or the back of the head must be kept scrupulously clean, and covered with weak white precipitate ointment (one part in six of vaseline). The child must be kept at rest in bed, washed twice a day in warm water, and any parts exposed to

pressure or friction from the tonic rigidity which is often present, should be wrapped in cotton wool. The bowels ought to be carefully regulated, and in this affection mercury, with or without castor oil, is the most useful drug, from its additional effect in reducing inflammation. One grain of grey powder with four grains of bicarbonate of soda may be given twice daily for some weeks. If the child is in constant pain from the rigidity of the muscles, one does not hesitate to give opium (half-minim doses of laudanum, or half-grain doses of Dover's powder) and to continue until relief is obtained. If the pain seems to be localized about the head, one or two leeches may be applied over each mastoid region.

The food should be simple and nourishing and regular feeding must be observed. Wasting is one of the marked features of the disease, and must be counteracted by the fullest diet possible without disturbing digestion. Milk and barley-water will naturally be the diet during the pyrexial stage, and afterwards cream, cod-liver oil, Mellin's food, and simple pudding may be added if the infant is old enough. If swallowing becomes difficult, and sufficient nourishment be not taken naturally, feeding by the stomach tube may be employed regularly. No direct treatment by means of drugs seems to be of any value in this disease. While bromide may be given for restlessness or sleeplessness or convulsions, no marked benefit has yet been traced to the use of iodides.

One often obtains early in the disease, and always in the course of it, evidence of an increase of cerebro-

spinal pressure. The increase of the spinal pressure is manifested on lumbar puncture, when an excessive amount of fluid under abnormal pressure is obtained. Similarly the raised and tense anterior fontanelle indicates an increase in cerebral pressure. As probably a good many of the symptoms are traceable to these two conditions it has seemed advisable to keep down the pressure as far as possible. The simplest method of doing so is by means of lumbar puncture, with which must be combined in certain cases puncture of a lateral ventricle in the brain. In performing lumbar puncture one employs a medium-sized needle, such as is used in exploring the chest, which has been carefully sterilized. The depth at which the arachnoid sac is reached is usually from one-half to one inch in infants under one year, so that a stout needle two inches long is necessary. The skin over the lumbosacral region should be thoroughly sterilized with soap-and-water, and then ether. One blanket should be wrapped round the upper part of the body, fixing the arms, and another round the lower part, fixing the legs. The patient may be lying in bed on his side, with the spine flexed, or across the nurse's knees. The site of puncture is determined by drawing a line between the highest points of the iliac crests. This line crosses the tip of the fourth lumbar spine and the spot for puncture is immediately below this. Having marked the tip of this spine, the operator inserts the needle slightly below in the mid-line and pushes the needle firmly forwards. Care should be taken not to push the needle too far, as there is a danger of wounding the vessels in the

anterior wall of the canal. Some resistance may be encountered at the ligamentum subflavum, but this yields to firm pressure and the point of the needle is felt to enter a cavity. If bone is struck the needle must be partly withdrawn and again pushed forward in a slightly altered direction. If bone is again struck, the needle may be withdrawn and entered on one or other side of the spine. When the point enters the arachnoid cavity, fluid will flow through the needle at a rate varying with the amount of pressure present. A sterilized wire should always be at hand to clear the needle in case the fluid does not flow. In the case of young infants an anæsthetic is not necessary. In the case of infants over eighteen months the skin may be frozen with ethyl chloride. In the case of very timid and excitable children chloroform may be advisable. The fluid is allowed to flow until all tension is relieved, and when it begins to come in drops the needle may be withdrawn. The tapping should be repeated at regular intervals, and it will usually be found that once in three or four days is sufficient. The best guides are the amount of fluid which is obtained, the tension under which it exists, and the relief or amelioration of the symptoms which follows tapping.

Sometimes the cerebral pressure also will be relieved by lumbar puncture, *i. e.* when the outlet from the ventricles is not blocked. In other cases this relief is not obtained, and then it is advisable to tap the ventricles directly through the outer angle of the anterior fontanelle. A medium-sized exploring needle is pushed downwards and outwards

through the scalp and membranes and brain into the lateral ventricle and the fluid is allowed to flow until the pressure is relieved. In cases where the fontanelle is closed, it is necessary to trephine first. This relief of pressure from increase of cerebro-spinal fluid, either by lumbar puncture alone, or in combination with ventricular puncture, has appeared to me to tide the patients over the critical stage of the illness in several cases. More elaborate surgical procedures, such as tapping and draining the fluid at the base of the brain, by trephining and raising the cerebellum, have not proved successful owing possibly to the difficulty in maintaining continuous drainage.

It was hoped that Flexner's serum which has proved so useful in cases of epidemic cerebro-spinal meningitis would also prove effective in this the sporadic form of the disease. My own results, however, have not been encouraging, and I find that others have been equally unsuccessful. I have also employed an autogenous meningococcus vaccine in cases which have appeared promising from the fact that they were early and mild, but have failed to see any effect as regards the course of the disease. A serum has been prepared at the Lister Institute from Still's organism, and the results of treatment with this serum have been much more promising (Gossage). From 10 to 20 c.cm. of this serum may be injected into the spinal canal. It is only in the early stages of an attack, when the organism is still present in the cerebro-spinal fluid, that the serum treatment may be expected to act beneficially.

Hydrocephalus.—From the clinical point of view

cases of internal hydrocephalus in infancy may be classified as congenital or acquired. The **congenital cases**, with the exception of a few due to maldevelopment of the brain, are traceable to a syphilitic lesion of the meninges. The same cause may also be at work during the first six months of life, so that the development of hydrocephalus at this age may, in the absence of other definite cause, be regarded as due to syphilis. It follows from this that mercurial treatment ought to be employed, and one will probably obtain better results from a full and persistent course of mercury in every case of hydrocephalus which manifests itself at birth or during the first six months of life, than from any other line of treatment. The dosage and methods of administration are considered in the chapter on Syphilis. Small doses of iodide of potassium or sodium may be given in addition, and more especially if one finds improvement taking place under mercury.

In the **acquired cases** of hydrocephalus, acquired that is after the age of six months, one finds that the most common cause is an attack of posterior basilar meningitis. The inflammatory adhesions at the base of the brain block the exit of fluid from the fourth ventricle, and distention of all the ventricles follows. Sometimes the preceding illness has been of so slight a nature that it is only by careful questioning that one obtains a history suggestive of an attack of basilar meningitis. There is no medical treatment for such cases. It is in this class, where the lesion is a purely mechanical one, and all active disease has ceased, that one hopes for

success in the future if not in the immediate present by surgical means. Such measures as strapping, aspiration, and external drainage of the ventricles have frequently been practised, but have now fallen into disuse. Lumbar puncture will only be of use in those comparatively rare cases in which there is no blocking of the ventricles at the base of the brain; in all ordinary cases of internal hydrocephalus it is useless.

More recently an attempt has been made to maintain intracranial drainage, or as it is called in America auto-drainage, for the relief of hydrocephalus. After trephining and opening the dura mater, the surgeon takes a strand of catgut ligatures about three inches long and as thick as a piece of stout cord, pushes one end through the brain into the lateral ventricle, and passes the other under the dura mater. The latter is then stitched up tightly and the wound closed. By this means it is hoped that the excess of ventricular fluid will pass out along the drain and be absorbed from the subdural space. The difficulty is to maintain this drainage, for inflammatory adhesions quickly form between the brain and dura mater, and close up the artificial outlet. Other substances have been used for drainage, such as horsehair, decalcified bone tubes, and silver tubes, but so far very few completely successful cases have been recorded. Possibly in time surgeons will be able to overcome the difficulties met with in carrying out the drainage.

Another method of giving surgical relief is by removing the obstructive adhesions at the base of the brain and draining the fourth ventricle. As

a rule the difficulty in regulating the outflow of fluid, and of re-establishing channels of escape for the cerebro-spinal fluid into the sub-arachnoid spaces have led to very unsatisfactory results. Recently, however, Dr. A. Bruce and Mr. J. M. Cotterill have recorded a case of hydrocephalus following cerebro-spinal meningitis in a girl of eleven years which was successfully treated by this method.¹

After infancy has passed, hydrocephalus may arise as the result of new growths in the brain, meningitis, etc., but both the diagnosis and the treatment when the skull is completely ossified present great difficulty. The only hope for such cases is the relief of pressure by trephining and possibly by drainage.

Cerebral Palsies.—In childhood there are many cerebral affections which are associated with or are followed by a condition of paralysis affecting one or both sides of the body. These may be acute or chronic. Amongst the acute forms perhaps the most common is polio-encephalitis, which may occur in an epidemic or a sporadic form. The treatment in either case is that of an acute specific fever, as the disease really is, but as a matter of clinical experience the disease is not usually diagnosed, except in the case of an epidemic, until the acute stage has passed and the paralytic sequelæ are manifested. In connection with the ordinary specific fevers of infancy, such as measles, a condition of acute encephalitis may develop with paralytic sequelæ. The chronic forms of cerebral palsy may

¹ *Rev. of Neurol. and Psych.* ix, 1. 1911.

be congenital in origin, or the result of convulsions in infancy, or may be associated with hæmorrhage, tumor, abscess, syphilitic cerebral disease, etc. As regards the treatment of all forms, one important factor is the mental condition, for impairment or lack of development of the higher centres is often present. Such impairment, often overlooked by parents in the case of young children, will frequently render any treatment directed to the paralysis difficult or useless.

In the case of cerebral palsies efforts must be made to maintain and improve the power in the limb or limbs. If only one limb is affected the young patient will tend to let it fall into disuse, and to employ only the other. This must be counteracted, in the case of the arms, by tying up the sound limb for some hours daily and encouraging the use of the affected arm. In the case of the legs, the patient should be made to practise movements, and to walk as much as possible. A condition of spasticity and permanent distortion tends to develop. This must be counteracted by massage and movement of the joints in the affected limb once or twice daily. If necessary a splint should be applied to the paralysed limb at night, so fixed that the tendency to contraction is counteracted. In spite of regular massage, and passive and active movements, deformities may become fixed and relief by tenotomy may have to be employed. It is advisable to consider here several things: (1) Will the operation of tenotomy secure a useful limb? (2) Will the after-treatment necessary to prevent a recurrence be available? And (3) Is the child's mental condition

such as to make the operation advisable? As regards the first question, there are cases in which the muscular weakness is so great that no amount of tenotomies will render the limb a useful one. As regards the second question, such tenotomies are usually called for amongst the poorer class of patients, and as the after-treatment will often have to be prolonged and arduous, it is not worth while operating if this cannot be carried out. As regards the child's mental condition, amentia is often associated with cerebral paralysis, and the degree may be such as to render operation unavailing. If there is merely a certain amount of backwardness, and the child is capable of being trained to use the limb, then operation may enable the child to be more of a joy to himself as well as to others. If the treatment of cerebral paralysis is begun in the early days of the affection, and can be carried out thoroughly and continuously, along with good nursing, good food, and fresh air, then much may be done for these paralytics. But in too many cases these are wanting, and crowds of helpless cripples are the result.

Infantile Paralysis.—The view is now generally accepted that acute polio-myelitis is an acute infective disease which may occur in an epidemic or a sporadic form. There is one specific organism which in different cases may affect the cerebrum (acute polio-encephalitis), or the spinal cord (acute polio-myelitis), or both together (acute polio-encephalo-myelitis). The acute spinal form, which we are now considering, may produce so little general disturbance in the early stages that medical advice is

not sought until the paralysis of one or more limbs is discovered. During the acute stage the patient should be kept lying down in bed, a low diet of milk and water, and simple pudding should be given, and the body and limbs should be carefully protected from any chilling. In many cases the patient is otherwise healthy and has seemed in the best of health at the onset of illness. If any organic weakness or marked debility is present, suitable treatment must be adopted. The child should be kept quiet, visitors and excitements of all kinds must be avoided, and as much sleep as possible should be secured. If localized or generalized pain and tenderness are present, phenacetin or bromide of ammonium given in small doses will usually secure relief, but in the more severe cases opium or morphia may be required. Elimination by the skin, the bowels, and the kidneys is to be encouraged.

After the acute stage has passed attention must be directed to the paralysed muscles, but they should not be treated until all pain and tenderness have subsided. As a child's volitional movements bring into play most of the muscles of the body, the paralysis is readily detected, but special attention should be paid to the muscles of the back, thorax, and abdomen, as these are most easily overlooked. The child need not be kept in bed for more than a week after the subsidence of acute symptoms, and the general nutrition will be more easily maintained when the patient is out of bed. The most important part of the treatment is massage of the affected muscles, and to render this efficacious a trained nurse is essential. The muscles should be massaged twice a

day for ten or twenty minutes, and if many groups of muscles are affected longer may be required. After the rubbing, the affected limb or limbs should be carefully bandaged in flannel, and if necessary cotton wool may be added. It is extremely important in such cases to maintain the warmth of the limbs affected, and special precautions are called for in infantile paralysis, owing to the coldness and blueness which rapidly ensue. During the first few weeks of treatment marked improvement may be expected, for many muscles are temporarily affected. At the end of a month one will probably know which muscles have been more seriously affected by the spinal lesion. Massage is to be persevered with for six months at least. If at the end of that time the condition of the affected muscles has been stationary for a couple of months, then it is doubtful whether any further benefit can be expected from this treatment. If some improvement is going on, then massage should be persisted with as long as the improvement continues.

Electricity is frequently combined with the massage treatment. It must be remembered that at the age when infantile paralysis is most frequent, *i. e.* the first two years of life, electricity in the form which will be useful is an alarming and painful form of treatment, and one which it is difficult to carry out. Further, if given at all, it must be at the hands of one who is skilled. The purchase of a battery for use by home attendants is a waste of money. For these reasons the efficient administration of electricity is surrounded with great difficulty. Many cases do extremely well without it. The form of

electricity to be used is the galvanic current, and it must be strong enough to excite contraction in the paralysed muscles. If the efficient administrator and the long-suffering infant be available then a daily course of galvanism may be combined with the massage.

In many cases massage and electricity will fail to restore the function of certain muscles. As the result of this the opposing muscles gain the upper hand and contraction and deformity follow. In the case of the lower limbs the power of standing and walking may be seriously affected by the paralysis of certain muscles, while the others are in a sufficiently healthy state to allow of progression. Such cases are amenable to surgical treatment by tenotomy, suitable splints, and possibly tendon transplantation.

Mental Backwardness and Cretinism.—One frequently meets with young children, in all classes of society, whose development as regards the mental powers is distinctly defective. The condition may be quite manifest to the trained observer during the early months of infancy, but very often the parents are very slow to recognize or to admit any signs of amentia. In the majority of cases this does not matter, as treatment is of no use and there is no advantage gained by pointing out to parents that the infant is an imbecile. It is very much better in such a case to let them find out the fact for themselves, although if one is consulted on the subject it is not wise to suggest that the defect may pass off in time. In all cases it is advisable to make a careful examination of the patient, in order to ascertain if

there is any remediable condition present. In some the backwardness is due to the Mongolian type of imbecility, and although some have written of the beneficial effects of thyroid treatment it may be stated that no internal secretion or other curative measure has so far proved of any value in this affection. When syphilis is a factor, as shown by other signs of that disease, one will always try a full mercurial course. Severe convulsions may affect mental development to a marked extent, and although it is always advisable to treat the convulsions as effectively as possible, it does not by any means follow that the mental condition will be improved. The convulsions may merely be symptomatic of some underlying cerebral or meningeal disease, although in other cases the convulsions themselves are the only manifestations of disease. Many cases of mental defect date from the time of birth, *e. g.* those associated with meningeal hæmorrhage, while others are the result of acquired disease, *e. g.* polio-encephalitis. Some cases are mental entirely, while others present also manifest pathological changes in various parts of the body. The treatment of backward children is more educational than medical. As a rule the child during its waking hours will suffice to engage the whole time and attention of an adult. These children are often active, restless, passionate, wilful, imitative, disobedient, cruel, dirty in their habits, and destructive, so that they cannot be left alone, or with other children. They require firm yet kindly control, and such tactful management as will educate their mental powers as far as possible. In some cases

one or other faculty may be abnormally active; and drawing, painting or music may prove a joy to the child and a great relief to the attendant.

Few of these conditions have had the underlying cause cleared up and the therapeutic remedy discovered as is the case with **cretinism**, which although not a common disease deserves notice here. The best results are obtained when treatment is begun at the earliest stage of the affection, and the recognition of the earlier symptoms is therefore essential. The pictures in textbooks of the repugnant brute-like aspect of fully developed cretins are in many respects misleading, for in such cases the time for effecting a complete cure has passed, and although much can be done there will probably always remain a certain amount of mental and physical stunting. The earliest symptoms are an unusual lethargy and quietness about the infant, a slight puffiness about the face, a fullness of the tongue, a prominence of the abdomen, and constipation. The symptoms may appear, in the case of bottle-fed babies, within the first two months. If an infant without a functionally active thyroid is breast-fed, the symptoms do not usually appear for some months after weaning. The treatment should be begun early by means of small doses of thyroid gland. Various preparations of the thyroid gland are on the market, but the dried extract is the most convenient form and seems to meet all the requirements. In the case of infants under six months of age one may begin with one-sixth or one-quarter grain of the dry extract once a day. The plan of beginning with small doses at this age is rendered necessary

by the fact that otherwise diarrhoea and other symptoms of poisoning may be easily induced in certain susceptible patients. Such diarrhoea is apt to prove most intractable and may prove fatal. Watching the effect closely one may increase the dose every few days up to one-half grain daily, and if under this dose the temperature is normal, the swelling of the body and tongue is diminishing, and the bowels are acting normally, one may continue for some time without further increase. Between the ages of six months and a year one can commence the treatment with doses of one-third grain and increase gradually to one grain daily. After a year one should begin with the same dose, but it may be increased up to one and a half or two grains daily. The important point is not to try to produce rapid effects, which are not unaccompanied by danger, but to secure steady improvement within the limits of safety. The results are certainly very striking, and the child who was previously a mental wreck and a physical monstrosity becomes again a healthy human being. When all the definite signs of the disease have been removed the next thing is to find the amount of thyroid extract which will prevent a recurrence. It must be remembered that in a case of cretinism the thyroid gland is rendered permanently functionless, and that the treatment must be maintained through the rest of life. The dose which is necessary for this purpose may not be so large as that given during the active stage of treatment. It must be determined in each case by experience, and according to the age of the patient. In the case of children under two years, one grain

every day or every second day will probably suffice. In the case of children from two to five years of age, one and a half grains every day or every second day will probably be sufficient, and so on. The cessation of treatment, even for a short time, will quickly lead to a recrudescence of symptoms. This fact, and also the necessity for lifelong treatment, should be strongly impressed on the parents. So thorough is the effect of thyroid treatment that little else is called for. In the early stages the child should be protected from cold, well nursed, and carefully fed. During the period of active cretinism the hold on life is feeble, and no risks should be run.

CHAPTER X

DISEASES OF THE GENITO-URINARY SYSTEM

Albuminuria — Hæmaturia — Hæmoglobinuria — Incontinence of Urine—Infection by the *Bacillus Coli*—Nephritis—Vulvovaginitis.

THE examination of the urine in infancy and childhood is of great importance both in aiding the diagnosis and indicating the treatment of numerous affections. Even in the earliest days of infancy there may be a discharge of **pure uric acid** or of **urates in excess**, which causes acute pain, as manifested by restlessness and screaming. This condition is to be treated by giving alkalies and water freely. Citrate and acetate of potash may be ordered up to grs. xij in the day, well diluted with water. Contrexéville water is believed by many to be specially effective in washing out the uric acid calculi in the kidney, and may be given freely. Pus in the urine in infants is most commonly due to pyelitis (*q. v.*).

An excessive amount of uric acid, or urates, or oxalates is frequently found in the urine of children beyond the period of infancy. The condition may be temporary, as during any pyrexial illness, and more especially during rheumatic fever. This does not as a rule call for any treatment save the administration of fluids. It may be more persistent and associated with some form of anæmia, in which

case the cure of the anæmia will be accompanied by the restoration of the urine to a healthy condition. An excess of uric acid is most commonly due to digestive disturbance, traceable to over-feeding or improper feeding. It is especially in neurotic children that the condition is present, but it is not advisable to lay too much stress on the so-called uric acid diathesis. While the type of child is easily recognized, it is more important to look after the dietetic habits than to treat a diathesis. Any excess, whether of proteids, carbohydrates, or fats, may induce the hepatic and intestinal disturbance which is responsible for the disorder, but as a matter of experience one finds that farinaceous foods and sugars are the chief offenders. The treatment consists in regulating the diet, if necessary making it a spare one for a time; and in strictly limiting the carbohydrates. The fondness for sweets so often found in such cases must not be encouraged. Water should be given freely between meals, and half a pint of Vichy or Contrexéville water may be taken daily. The following medicine will also be found useful—

R. Tr. Rhei, ℥ x; Sod. Salicyl., grs. v; Potass. Citrat., grs. x; Tr. Zingib., ℥ v; Aq. ad ʒ ij.—T.D.S.

The state of the alimentary canal and liver will be improved by a dose of calomel (grs. ij), at intervals of a week.

Albuminuria is very often met with in children. It would appear that in them the passage of albumen through the kidneys is effected much more easily than in adults, and that the same significance

is not to be attached to it. This is shown by the fact that while albuminuria is very common, the other evidences of organic renal disease are but rarely met with. One form of albuminuria is particularly common between the ages of nine and fourteen years. It is that type to which Dr. Pavy has given the name of "**cyclic**," and which has been described by various writers under the terms "**postural**" and "**orthostatic**." The characteristics of this form of albuminuria are that the urine passed in the morning, before or immediately after rising, contains no albumen; that after the patient has been up and going about for some time the next specimen passed contains a definite amount of albumen; and that the albumen diminishes as the day goes on, and is absent or present only as a slight trace when he retires to rest. Nucleo-albumen is also found, appearing and disappearing with the serum-albumen. Evidences of organic renal disease in the shape of tube casts, arterial or cardiac changes, dropsy, etc., are not found. Opinion is still divided as to the prognostic importance of this condition, and it is not a subject on which one is justified in being dogmatic. At the same time, from the point of view of treatment, it is necessary to have a definite opinion. Are the subjects of this condition to be treated as the victims of early nephritis and made into chronic invalids? Such has frequently been done in the past. As regards my own experience, I have watched over a hundred cases of this nature for several years, and so far not one has manifested any signs of organic renal disease. The treatment has been directed to maintaining the

general health at the highest possible level, to avoiding mollycoddling and a low diet, and to strengthening more especially the nervous system which seems specially at fault. The renal condition has been left severely alone. Out of so many cases, if nephritis were impending, one would have expected some definite signs to have developed under a treatment not suitable for renal disease, but such has not been the case. The other symptoms associated with this form of albuminuria, and the treatment, have been considered in connection with neurasthenia (*q. v.*). There are probably other forms of "functional" or "intermittent" albuminuria in children besides that just described, but they are usually of a passing character.

Hæmaturia may be associated with nephritis, or a renal tumour, or a calculus. In any case of hæmaturia with albuminuria, one should examine for evidences of recent scarlet fever, in the shape of peeling, sore throat, swelling of the neck, etc. Many cases of scarlet fever are so mild that no medical advice is sought during the early stage, and the first symptom to attract attention may be hæmaturia. During what may be called the rhubarb season, one usually meets with some cases of hæmaturia from this vegetable. Rhubarb contains a large amount of oxalic acid, which is excreted as oxalate of lime crystals. These crystals irritate the delicate structures of the kidneys so much as to cause bleeding, often to a very marked degree. The condition soon passes off if the consumption of rhubarb is stopped, and the system is well flushed out with plain water. In infants, hæmaturia may

be the earliest sign of scurvy, and it is advisable to bear this in mind before diagnosing a calculus or malignant growth. Hæmaturia may also be associated even in very young children with the passage of uric acid crystals, which will usually be seen in considerable amount in the urine.

Hæmoglobinuria is not a common condition, and as a rule is not amenable to direct treatment. In paroxysmal cases, as a chill of some sort is the usual precursor of an attack, care must be taken to avoid this risk. The underlying disease in some cases would appear to be hereditary syphilis, but the connection between the two is not understood. Anti-syphilitic treatment should be employed when attacks of hæmoglobinuria occur in a child presenting signs of syphilis.

Incontinence of Urine.—Incontinence of urine may be nocturnal, or diurnal, or both. The first is the most frequently met with, and is common in both sexes. Rectal incontinence is sometimes an associated affection. The most intractable cases are those persisting from infancy, those arising during childhood being much less so. The condition calls for a thorough and systematic examination in every case in order to ascertain the cause or causes at work, as there is no routine treatment for all cases. This examination will comprise: (1) the urine, (2) the urinary passages, (3) the spine, (4) the dietetic and other habits, (5) the mental and nervous condition.

(1) *The Urine.*—An irritating state of the urine may be caused by excessive acidity, or excess of phosphates, or pyuria, or bacteriuria, and the

treatment of the resulting incontinence depends on the removal of the primary source of irritation. Excessive acidity may be due to overloading with uric acid or oxalates, combined with a scanty amount of urine, although the frequency with which it is passed may suggest that there is polyuria. An extremely irritable condition of the bladder is produced, which leads to frequency of micturition by day and sometimes incontinence at night. This is often the result of a domestic method of treatment, namely giving the child very little fluid in the belief that too much urine is being passed. The more concentrated the urine, the more irritating it tends to become. Consequently in such cases one should see that a full amount of plain water or barley-water is given, preferably between meals, and during the day. It is not advisable to give any fluid for two hours before the child goes to bed, as a full bladder during sleep will almost certainly provoke micturition. Phosphaturia, with a strongly alkaline or ammoniacal urine, points to cystitis. Pyuria may be due to pyelitis or cystitis. Bacteriuria is sometimes found, of which the most common form is that due to the *bacillus coli* (see p. 361). Sometimes polyuria may be present and the constant distention of the bladder with fluid may lead to incontinence, as occurs in connection with some cases of diabetes insipidus, diabetes mellitus, and contracted kidney. This condition calls for a diminution in the amount of fluid taken. Spanton has made the interesting observation, in female children, that frequency of micturition may be caused by the presence of wool fibres in the urinary passages, these

fibres coming from the "combination" garment and passing up the urethra. Speedy relief followed the disuse of the garment and the employment of Contrexéville water.

(2) *The Urinary Passages*.—Great stress has been laid on phimosis, or a long prepuce, as a cause of incontinence of urine, and few children with these conditions escape circumcision as a remedial measure. It is seldom of any benefit. If the condition of the foreskin is such as to call for circumcision on other grounds than incontinence then it should be done, but this operation should not be relied on as a cure for enuresis. A condition of cystitis if present must be treated, and the child should be sounded for stone if there is any suspicion of that complication. When cystitis and an ammoniacal urine are present the bladder should be washed out twice daily with boracic acid lotion (grs. x to the ounce), and a medicine containing salol (grs. v), urotropin (grs. ij), and tincture of hyoscyamus (℥. x) should be given twice or thrice daily. It is important to note whether the bladder is thoroughly emptied after micturition, for some cases would seem to depend on spasm or incomplete relaxation of the sphincter. This muscle only relaxes when a certain amount of urine is in the bladder, and contracts again when a certain amount has been passed, with the result that a more or less constant dribbling of urine takes place. In such cases the bladder can usually be felt on abdominal examination to be distended after micturition. In the treatment of this form it may be necessary to pass a catheter twice a day so as to ensure complete

emptying of the bladder. *Nux vomica* and *bella-donna* will also be found serviceable. If the patient is found to be suffering from pyelitis, one may order salicylate and benzoate of soda (five grains of each thrice daily), or urotropin (five grains, well diluted with water, thrice daily).

(3) *The Spine* should always be examined for spina bifida or caries. In some rare cases the only trace of a healed spina bifida may be vesical incontinence (with possibly rectal incontinence), due to the involvement of the sphincter branch of the long pudic nerve. There is no cure for such a condition. In other cases there may be spinal caries, which is amenable to treatment. Incontinence may also be due to organic disease of the cord or brain.

(4) *Dietetic and other Habits.*—In many cases of enuresis it will be found that the child has been systematically overfed or improperly fed. It is not so much the material that is at fault as the quantity. Nevertheless an excess of strong meats or meat-soups will do more harm to the unstable nervous system than an excess of fatty or farinaceous or sugary diet. In all cases a simple mixed diet should be ordered, and the quantity should be limited at each meal so as to ensure complete digestion and no overloading of the blood and tissues. The subject of fluids has been already referred to. All stimulating diuretics such as tea, coffee, beer, and spirits must be strictly forbidden. Also spicy foods, sweets, and salted articles of diet are contraindicated. An effort should be made to secure as sound sleep as possible. During the night micturition usually occurs at the beginning or towards

the end of the sleeping period, when the senses are not absolutely dulled. The child's bladder should therefore be emptied immediately before retiring to rest. He should have a light evening meal, preferably half a pint of boiled bread-and-milk, so as to have the stomach completely empty before going to bed. This meal should be taken at least two hours before bedtime. The bedroom should be cool and airy, and the bedclothes should be light and warm. If there is any tendency to cold feet, night socks or a hot bottle should be used. Too great warmth in bed is to be avoided. The child should be taught to sleep on his side, at full length, and not curled up. Any source of irritation which tends to produce broken sleep should be removed if possible. Amongst such must be classed obstruction from adenoid growths in the nasopharynx, and large tonsils. The procuring of normal respiration by the removal of nasal obstruction will often do much good in cases of enuresis. Another source of nocturnal disturbance is the irritation caused by threadworms, and this must be relieved if necessary. A useful measure in the early stages of the treatment is to take the patient out of bed an hour after retiring, for the purpose of emptying his bladder, but this is only to be a temporary proceeding. During the day the child should be encouraged to empty his bladder at regular times, and not too frequently. At the same time much unnecessary cruelty is often practised at school by preventing the child responding to the frequent calls of nature. This must not be allowed.

(5) It must be conceded that all the preceding

factors are but occasional and accidental in the production of enuresis. In other words many children will be found to have one or more of these conditions present, but not to have incontinence of urine. In the background of all cases there will probably be found to be some *defect or disorder of the nervous system*, cerebral or spinal, or both. As regards the cerebral condition, there may be epilepsy or backward development, or hyper-excitability. Incontinence may be the only sign of a mild form of nocturnal epilepsy, but this is probably rare. If confirmatory evidence of epilepsy is present, suitable treatment must be adopted. On the other hand it will frequently be found that signs of backward or delayed intelligence are present in the subjects of incontinence. The condition may be a temporary and slight one, or it may be marked and progressive. In the latter class the prospect of recovery is not good. In the slighter cases the physician will have to depend for the diagnosis on his own examination, for the condition is one which parents will seldom recognize or admit. These are not to be regarded as hopeless cases by any means, for delayed development does not necessarily mean defective development later on. One must hesitate, however, about the prognosis, for unless the cerebral development does advance, treatment of the incontinence is apt to be unsatisfactory. Another type met with is the quick, bright, nervous child whose cerebral functions seem to be over-developed and over-active. In such cases it is probably the inhibitory centres which are not correspondingly developed, so that slight stimuli

produce too active responses. Sometimes, with or without definite cerebral disturbance, the lumbar centre for micturition seems to be in a particularly unstable condition, and to act too promptly on any vesical stimulus.

The nervous theory seems to get strong confirmation from an everyday hospital experience that admission into a ward leads promptly to the disappearance of incontinence in many intractable cases. The subject is usually a child of from seven to fourteen years of age, and the control of the bladder has been acquired after infancy but has been lost later on. No lesion of the nervous system or the urinary system or any other system has been discovered on careful examination. Dietetic and drug treatment have been tried in vain. If such a patient is admitted to hospital, is kept in bed, and is left severely alone so far as any other treatment is concerned, the result usually is that no incontinence and no frequency of micturition take place. If incontinence does occur the nurse is instructed to inform the patient that this must not occur again. Then every two hours by day and by night the child is given an opportunity of passing water; after twenty-four hours this interval is lengthened to three hours; after another forty-eight hours the interval is made four hours; and finally the child is left to summon the nurse when it wants to pass water. A few days later, in the absence of incontinence, the child is allowed out of bed. All the time she has the usual hospital full diet and takes no medicine, save a mild aperient as required. I have tried this over and over again, and in almost all

cases the result has been the same, namely a complete cessation of the incontinence. What is the conclusion that one naturally draws from such experiences? It seems to be this, that in many of the so-called intractable cases of incontinence we are dealing with a bad habit pure and simple; with a defective power of cerebral control owing to a defective power of parental control; and that the stimulus of strangers and an ordered establishment was sufficient to bring out the dormant inhibitory powers. Some of these cases have relapsed when they have gone home, but here again it has been the fault of heedless and weak parents. When a sensible mother is informed of the result of the hospital life she will take good care that similar results are obtained at home. For this class of case, and it is one which is often a subject of reproach to us as reputed healers, I am convinced that no special medicinal treatment will do permanent good, but that in the supervision of the child's habits by a capable woman lies the best chance of securing a permanent cure.

In some cases there may be an unstable condition of the nervous system, allied to that of neurasthenia, which calls for steady development of the higher nervous centres, without excitement, without overstimulation, and without over-restraint. As a rule school life is injurious. It is advisable to arrange for three or six months of home life, provided that superintendence can be carried out at home. In some cases the lack of supervision at home will be worse for the patient than the ordinary life at school. Sometimes if the child is sent away to friends, the mental effect may be such as to lead

to greater control over the faulty centres. Encouragement may be offered by suitable rewards, but punishment should never enter into the treatment of enuresis. The digestive system must be regulated, and it will be found useful to give a bi-weekly dose of calomel. If the child's general health is bad, there is no better tonic than cod-liver oil with hypophosphites. Anæmia and other signs of debility must be treated.

The drug which has deservedly secured the first place in the treatment of this affection is belladonna. Some prefer to use the tincture, in which case one begins with ten-minim doses thrice daily, and gradually increases the dose until a drachm or more is taken daily. In all cases the drug should be pushed until some definite physiological effect is produced such as dryness of the throat, dilatation of the pupils, or erythema. More exact dosage and, as many believe, better results are obtained by using atropine. One should begin with half-minim doses of the liquor atropini thrice daily for a child of five years, and increase this in a week to one minim. The drug must be steadily pushed, but if there has not been any improvement when six minims daily are being taken, it does not seem advisable to increase the dose. If improvement has begun, then one is justified in still further pushing the drug. If symptoms of poisoning appear, such as delirium, difficulty in swallowing, etc., the atropine should be stopped for some days until the patient has recovered, and then resumed, the dose being half of that which had led to these symptoms. If under the atropine treatment the incontinence has been

checked entirely, the drug may be continued in the same dose for a fortnight, and then reduced by half. It is rather difficult to fix any definite period for the administration, but if the incontinence has ceased entirely for a month, there is no need for further continuous treatment. For the next two months the same dose may be given every alternate week. If at the end of that time there has been no recurrence one may reasonably hope that the case is cured. Relapses are very common, and are largely due to the faulty habits at home to which the patient has been allowed to return. These relapses must be treated on exactly the same lines as the original trouble. No other drug has stood the test of experience like belladonna, but some others are occasionally found to be beneficial. Amongst these may be mentioned the liquid extract of ergot (half-drachm doses), the fluid extract of *rhus aromatica* (ten-minim doses), and antipyrin (five-grain doses).

Infection by the *Bacillus Coli*. — There are many organisms which may be found in the urine at times and may give rise to certain symptoms in the urinary system and elsewhere. Of these by far the most important and the most common is the *bacillus coli*. Locally it may lead to cystitis or pyelitis, or in rare cases to nephritis.

The importance of the subject of the infection of the urinary passages and the system generally by the *bacillus coli* has been much dwelt on by various writers during the past few years. The diagnosis is not difficult when the urine is properly examined, but the symptoms are often so indefinite

that the condition is not even suspected. Although the subject of symptomatology does not properly come under consideration, some reference seems to be desirable in connection with "coliuria," as this special infection has been termed by Dr. Moreland McCrea.

In one class of case there are no local signs of coliuria, but there is constitutional disturbance, presumably from the absorption of toxins produced by the *bacillus coli*. There may be only two leading symptoms, namely pyrexia and malaise. On physical examination no evidence of disease can be made out, and the child gives no indication of local discomfort. The pyrexia is of the hectic type, the temperature usually rising at some period of the day to from 103° to 106°. The course of an attack may last six weeks or longer, and there may be intermissions of the pyrexial condition lasting for a few days or a few weeks. There is no doubt that in the past such cases were often classified as due to fever of unknown origin, or were erroneously diagnosed as pneumonia, typhoid fever, meningitis, etc. The patients are often very irritable during the illness. One other symptom of extreme importance may sometimes be present, namely rigors, which are very rarely met with amongst all the other affections of infancy and childhood. This symptom is usually associated with the presence of pyelitis and is of great diagnostic value. Sometimes the brunt of the toxæmia seems to fall on one special organ, for example the brain. An infant was suddenly seized with convulsions and hemiplegia. She recovered entirely in a few days, but a fortnight

later the temperature again rose, and she had an acute illness characterized only by pyrexia and cerebral symptoms. The latter comprised attacks of unconsciousness, stiffness of the neck, irregular and shallow respirations, fainting turns with cyanosis, a pulse rate of two hundred per minute, and other symptoms of medullary paralysis. The discovery of a condition of coliuria and the adoption of suitable treatment brought a five weeks' illness to a speedy and satisfactory termination.

In another class of case there are symptoms pointing to some disturbance of the urinary passages, which suggest an examination of the urine. There may be frequency of micturition, dysuria, or incontinence of urine. There may be pain and swelling in the region of one kidney, usually due to pyelitis. Sometimes attacks of severe pain develop suddenly, with vomiting, pyrexia, and marked constipation, so that intussusception or appendicitis is simulated.

An examination of the urine to be complete should be macroscopic, microscopic, and bacteriological. In a typical case, on macroscopic examination, the urine has a fishy odour, which becomes much more offensive on standing. When passed the urine is definitely acid, but on standing it soon becomes alkaline. It is cloudy from the presence of bacteria, and possibly also of pus. The cloudiness is not immediately dispelled on the addition of heat, acids, or alkalies. Microscopic examination of a centrifuged specimen will show the presence of active bacilli and probably of pus cells. The amount of pus in some cases is very great. Bacteriological examination of a catheter specimen shows the presence

of *bacillus coli* on straining and on culture. While these are the usual conditions of the urine it must be noted that the urine may be alkaline in some cases, and that both the cloudiness and the purulent state of the urine may appear and disappear from time to time.

The source of the infection is probably always the large bowel, but the route by which the bacilli reach the kidneys has not been definitely determined. Possibly it varies in different cases, some arising from without *per urethram*, others by the lymph stream, and others by the blood. It is probable that under healthy conditions of the intestinal mucous membrane the *bacillus coli*, like the tubercle bacillus, does not penetrate the wall of the bowel or only in trifling numbers, but under other conditions large numbers of that organism may enter the system. "Such conditions are minute lesions and pinpricks, which may be produced by sharp particles of food, by intestinal worms, and by other agencies; and to these minute lesions we, perhaps, should add the inflammatory foci which are said to occur on the mucous membranes in measles and some other of the specific fevers" (Louis Cobbett¹). The organisms passing through the intestinal wall are rapidly excreted by the kidneys and set up irritation and inflammation in some part of the urinary passages.

As a rule attention is first drawn to a case by an attack of sharp fever, with or without some signs of local irritation. Constipation has probably been present, and to the relief of this condition attention

¹ "Portals of Entry in Phthisis," *Proc. Roy. Soc. of Med.*, July 1911.

should be paid. The bowels should be thoroughly evacuated by means of castor oil or calomel, and if necessary by enemata. To check any excessive production of *bacillus coli* in the bowel antiseptics such as salol and beta-naphthol may be given by the mouth. All through an attack the bowels must be carefully regulated by means of mild aperients such as senna pods, cascara, or liquid paraffin; or, as suggested by Dr. Robert Hutchison, phosphate of soda, because it has the additional advantage of rendering the urine more alkaline. The diet should be of a simple although not necessarily of a specially restricted character. Attention must also be paid to flushing out the urinary passages as thoroughly as possible by the free use of water. The patient should be encouraged to drink freely between meals of plain water, or imperial drink, or barley-water, or lemonade. This will tend to the elimination of the *bacillus coli* from the urinary passages, and diminish the concentration of large numbers of the organism in that region.

In the direct treatment of an attack most reliance is to be placed on the administration of alkalies. As already stated the urine in these cases is usually markedly acid, and when it is rendered definitely alkaline the activity of the *bacillus coli* and the absorption of toxins are usually checked. For this purpose citrate of potash and bicarbonate of soda may be ordered, commencing with twenty grains of each three times a day for a child of five years, and half doses for an infant. No benefit usually follows until the urine has become alkaline, and the acidity is often so pronounced that it is necessary

to increase the dose very considerably in order to produce this effect. From two drachms of the mixed salts in twenty-four hours one may have to increase the amount to four or six drachms, or even an ounce, daily before the urine becomes markedly alkaline. When this result has been obtained, which is usually from three to five days after the treatment has begun, the best plan is to reduce the dose by one half, and to continue with that amount for another week. The effect of this alkaline treatment is often very striking, the temperature quickly falling to normal, and remaining there, while the local symptoms subside, the pus lessens in amount, and the number of bacilli in the urine is greatly reduced. If the treatment is discontinued too soon there may be a recrudescence of all the symptoms along with an increasing acidity of the urine.

Another drug which is recommended by many is urotropin. This may be given along with the alkaline treatment or in place of it. It is advisable to give the urotropin in a separate mixture, and at a different time, preferably on an empty stomach. Full doses are required, 30 to 60 grs. in the day, and they should be well diluted with water. Although favourable reports of this treatment have been recorded, I cannot say that in my own experience it has given results of a definite value. Failing success with either of those methods we have the treatment by means of a vaccine to fall back on, and if possible an autogenous vaccine should always be used. My own experience of a *bacillus coli* vaccine has not been very favourable. While in some few cases it seems to give beneficial results,

in the great majority it fails entirely to alter the course of an attack in any way. It appears to be more useful in the acute condition than at the stage when the infection has become chronic and persistent. Perhaps if adopted very early in the course of an attack the vaccine treatment might prove more effective. As the alkaline treatment is more convenient and usually acts well it is advisable to give it a trial first of all. In some cases I have employed the alkaline, the urotropin, and the vaccine treatment in succession without effect, and have succeeded finally on returning to the use of alkalies in full doses.

Local treatment by washing out the bladder and injecting iodoform emulsion has been found to be beneficial by Jeffreys, and he suggests that the iodoform finds its way to the pelves of the kidneys in the manner that pigment particles do, as shown by Bond. Mr. Waugh has successfully treated three cases by excision of the vermiform appendix, which seems to point to that organ being the source of infection in some cases.

After all the symptoms of an acute attack have been cured the patient is still liable to relapses. As a rule the urine is not rendered free from the *bacillus coli* for some time, and a condition of chronic bacilluria will often persist for months or years. If the urine is clear and non-purulent no special treatment is called for. But in the presence of a urine which is at times cloudy from bacilluria or purulent, it is advisable to give at intervals a course of the alkaline treatment, and to search for any possible lesion about the bowel, such as appendicitis or

colitis, which may be treated in such a way as to cut off the infection at its source.

If the disease involves the kidney structure either in the form of an acute nephritis or of multiple abscesses, no treatment is of any value, and the illness usually terminates fatally (John Thomson).

Nephritis is not a common affection of childhood, and the vast majority of the cases met with are secondary to some infectious fever. Amongst these scarlet fever takes the first place. It is a safe rule in all cases of acute nephritis to think of scarlet fever, and to examine carefully for a history of sore throat, glandular swelling in the neck, or a rash, and for signs of desquamation, sore throat, aural discharge, etc. The disease may be acute or subacute or chronic, and the symptoms in the various forms are the same as in adult life. One point to be remembered in connection with the acute form is that the prognosis as to ultimate recovery is better than in later years, and that therefore no pains should be spared to make the treatment thorough, and if necessary, prolonged. As regards the treatment of the various forms of Bright's disease in childhood, it does not differ in any respect from that employed in adult life.

A child suffering from acute Bright's disease should be put to bed between blankets and carefully protected from any chilling of the surface of the body. Rest in bed is to be maintained until the urine has been free from albumin for a week at least, and in most cases six weeks in bed may be regarded as a minimum period for any save the very mildest cases.

The work of the kidneys is to be spared as much as possible. For this reason the diet should be very simple in character and very limited in amount. As a rule milk only, diluted with thin barley-water, should be given for the first ten days. After that a certain amount of farinaceous material in the form of bread, pudding, or oatmeal porridge may be given twice a day. Gradually one may add potato, stewed fruit, a baked apple, and eggs. Whether the child is hungry or not, whether the case is mild or severe, the important thing is to limit strictly the quantity of food taken during the early stages of the illness. Whether in scarlatinal or other cases there is a condition of toxæmia present and the toxins have to be eliminated. Partly this is done through the kidneys, and to render the process as little irritating as possible water should be given freely. Any simple drink the child will take readily, such as plain water, lemonade, thin barley-water, or imperial drink will serve the purpose. Elimination by other channels will help to relieve the kidneys. The bowels should be well opened, at least twice a day, by means of salines (citrate of magnesia, sulphate of soda), and an occasional dose of calomel. The free action of the skin is to be encouraged by the use of hot sponging, hot packs, or hot baths. The above, with good nursing, represent the chief measures in the treatment of an acute attack, and it is probable that the additional use of diuretics, of whatever class, does more harm than good.

Special indications call for special treatment. When the urine becomes scanty, and the œdema more pronounced, there is probably increasing

congestion of the kidneys. For this dry cupping or poulticing over the region of the kidneys may be used with benefit. A hot-air bath by causing free diaphoresis will often give relief and can be repeated daily. Holt and Kerley recommend very strongly the use of colonic irrigation with hot water (108° to 110° F.). From one to two quarts should be given several times a day until free diuresis is established. The amount of liquids taken by the mouth should be strictly limited. If there should be acute œdema of the lungs, or the pleuræ, or the pericardium, the same lines of treatment are indicated. The onset of uræmic symptoms, convulsions, etc., calls for very active purgation and the use of nervine sedatives, such as bromide of potassium, chloral hydrate, or hyoscine (gr. $\frac{1}{200}$ hypodermically). Cold applications may be used to the head, and if these measures fail venesection from the arm to the extent of three or four ounces should be employed. Lumbar puncture will sometimes have the effect of checking convulsions, and the same result may follow the inhalation of nitrite of amyl, but one cannot tell beforehand the special cases which are favourable for this treatment. However, both procedures are quite harmless.

After a month or six weeks the albumin may still persist although the other symptoms have passed off. It is not of any advantage from the point of view of the renal condition to keep the patient longer in bed, and the further treatment to be adopted is that suitable for chronic nephritis. Probably more benefit will follow from care as to the diet and the surroundings than from the use of drugs. As regards the diet

the important thing is that it should be strictly moderate in quantity. More harm will be done by giving large quantities even of milk and pudding than by heavier and more indigestible food materials in moderation. It must also be remembered that too restricted a diet will interfere with the health and development of the child in other ways. A mixed diet is probably best for cases of chronic nephritis, in which we include eggs, milk, puddings, fish, chicken, and occasionally beef and mutton. The child should be carefully protected from chills, which often induce an attack of subacute nephritis and do still further damage to the kidneys. Often residence in a warm climate during the winter months is of great benefit. The skin and bowels should be kept acting freely. The treatment of chronic nephritis by the restriction of chlorides may have a certain limited benefit in cases with œdema, but it is by no means curative. Operations on the kidneys, such as decapsulation (Edebohl's operation), are not at present regarded as beneficial.

Some cases of chronic nephritis are undoubtedly syphilitic in origin, and this possibility should be kept in mind, so that the Wassermann reaction and other tests may be employed. Chronic interstitial nephritis is sometimes associated with syphilis.

In such cases mercury should be given a trial, as it is the only direct method of treatment available.

Vulvo-vaginitis, in its most common form, is due to a want of cleanliness. This will usually be speedily relieved by frequent bathing of the external genitals with a lotion of sanitas (one drachm to half a pint) or boracic acid lotion. The parts

should then be carefully dried and dressed with white precipitate ointment (one part) and vaseline (three parts). The condition is also apt to arise when the general health or vitality is lowered, *e. g.* during or after prolonged illness. A more serious form of the affection is that associated with **gonorrhœal infection**. This may be acquired in a perfectly innocent way from some article which has been in common use in an infected family. It is a disease very difficult to cure, and very apt to spread amongst female children if the strictest precautions are not taken. In the case of an institution where female children are living together the possibility of this form of vulvo-vaginitis must be kept in mind, the nurses in charge should be instructed to report any case of a vulvar discharge, and if a gonorrhœal case is detected the patient should be at once isolated or sent home. At Paddington Green Children's Hospital no patient suffering from a vulvar discharge is admitted, until the presence of the gonococcus in the discharge has been excluded, as the risk to the other patients is considered to be so great in the case of gonorrhœa. A patient with gonorrhœal vulvitis should as far as possible be kept in quarantine, and all the articles used by her, such as soap, towels, clothes, bed-linen, etc., must not be touched by other children. The nurse in charge must take all precautions as in infectious disease. Diapers should be worn so as to prevent the child carrying infection to its eyes. Local measures consist in syringing the vagina and douching the external parts thoroughly with sublimate lotion (1-1000) twice or three times daily. Holt advises

irrigation of the parts with protargol (1 to 10 per cent. solution), or argyrol (5 to 25 per cent. solution). In addition to irrigation the parts may be packed with gauze soaked in these lotions. Frequent applications are necessary. A stock or autogenous vaccine of the gonococcus should be administered in the case of children over one year, commencing with 20 or 30 million, and increasing the dose up to 60 million. The disease tends to run a prolonged course in spite of careful treatment, and complications may arise such as peritonitis, arthritis, and conjunctivitis.

In all cases of vulvo-vaginitis it is advisable to make a bacteriological examination of the discharge. Besides the gonococcus other organisms may be the chief factors in maintaining the discharge. Dr. Harold Chapple has described recently two cases of vulvo-vaginitis in girls of eleven and thirteen years respectively, in which the presence of the pneumococcus was determined. Recovery followed in both cases under the use of permanganate of zinc lotion as a vaginal douche, and an autogenous pneumococcal vaccine.

CHAPTER XI

DISEASES OF THE INTEGUMENTARY SYSTEM

Eczema—Impetigo Contagiosa—Pediculosis Capitis—Scabies—Ringworm—Lichen Urticatus—Chilblains—Erythema Nodosum.

Eczema.—Opinion still differs as to what eczema is, and as to whether it is to be regarded as a disease of the skin simply, or one in which the state of the constitution and the viscera plays a part. Dermatologists tend to look on eczema as a skin disease pure and simple, while the clinical physician tends in the matter of treatment to look inwards as well as outwards. Probably in some cases the skin only is at fault, in others there is some visceral (gastro-intestinal) disturbance, while in a third class eczema may be a manifestation of some constitutional disease, such as gout or rheumatism. These three possible factors should be borne in mind in dealing with individual cases, and the physician who takes them all into account will probably be more successful than he who pins his faith to one etiological factor only. The fact that the alimentary tract is only a more highly developed form of skin tissue explains why it is that the peculiar and often congenital sensitiveness of the skin seen in cases of eczema is also accompanied by a similar condition in the alimentary tract.

Babies are not infrequently attacked by eczema in an acute or chronic form, and cause an amount of disturbance in the family circle which is quite out of proportion to the gravity of the affection. As a rule the baby is of good physique and well nourished, and does not suffer in general health from an illness which may last for weeks or months. On the other hand, the parents are in a state of chronic nervous breakdown and the doctor in attendance has a most trying time. In dealing with the subject of treatment we do not wish to imply that all cases can be cured rapidly and easily, for many cases of generalized eczema will test the patience and powers of the practitioner most severely.

In older children the same lines of treatment apply as in infants and are more easily carried out from the assistance the patient can give. It is also useful to remember that some very bad cases of eczema during the first year of life show a marked improvement later with the lapse of years, quite irrespective of any or every treatment. There need be no fear of trying to cure a case of eczema as quickly as possible. The fear of sudden death from driving the eczema inwards is still present amongst certain of the lay public. Such a danger does not exist and any unfortunate results which may have followed were probably due to the absorption of some poisonous drug applied too freely, or of septic material from the skin. The more quickly an attack of eczema can be cured the better it is for all concerned.

General Treatment.—While even in the case of babies eczema may be direct evidence of a gouty

parentage it is not advisable to put the infant through a course of colchicum, etc. All we can say on the subject is that a particular sensitiveness of the skin has been inherited which manifests itself in this way, and that probably other idiosyncrasies will also be present which call for special care. More especially does this apply to diet. One will often find that the alimentary tract is particularly sensitive, not only to excess of food leading to gastro-intestinal catarrh, but to special articles of food. Sometimes this sensitiveness would appear to act reflexly, as when the child's face becomes red and inflamed within a few minutes of the food entering the stomach, and at other times it would appear as if certain foods were really toxic to the individual. It is therefore of the first importance to see that the food and feeding are carefully regulated according to the child's age and special tendencies. As regards the foods which seem to prove toxic, or irritating, I have found that oatmeal, barley, and rice, must be avoided by certain eczematous patients as they seem invariably to induce an attack. With others fatty foods are badly tolerated. It is impossible to lay down any hard and fast rules as to the articles of food to be avoided, but the mother or nurse should be told to make careful observations as to sudden outbreaks of eczema after certain foods. The question does not seem to resolve itself into the digestion of proteins, fats, or carbohydrates, but is one of special foods.

In the case of breast-fed infants the milk should be examined. In one case I found the fat globules were unusually large, and the eczema did not cease

until the baby was weaned. The habit of nursing mothers of taking alcohol freely often disturbs both the quality of the milk and the skin of the infant. In the case of bottle-fed babies great care must be taken to observe the proper rules as to food, the times of feeding, and the quantity at a meal. Sometimes a complete change of diet for a time from milk to chicken or veal broth or to carbohydrate food may prove beneficial. Fat babies always benefit from a regimen in which plain water is the chief constituent.

The regulation of the bowels should be carefully attended to, and during an acute attack a mixture containing ten grains each of sulphate and phosphate of soda may be given with advantage. Any evidence of gastro-intestinal disturbance calls for treatment. It is difficult to cure a case of eczema if the kidneys are not acting freely, and a concentrated urine with excess of urates or uric acid calls for treatment by grey powder and alkaline draughts. When the skin irritation is so great that the child is unable to sleep a full dose of bromide of ammonium, ten to twenty grains, should be given an hour before bedtime. Hot stuffy rooms increase the child's discomfort and the irritation of the skin, while an equable and moderate temperature of the room, along with plenty of fresh air is specially beneficial. Over-heating of the body by too thick clothing should be avoided. Rest in bed may be advisable during the very acute stage, but afterwards the child may be out of doors daily, provided that he is not exposed to chilling or damp winds. Inland air is usually better than seaside air for eczematous patients.

There is no specific drug treatment for eczema. Arsenic has long had a high reputation in this connection, but in the case of children it seems to increase the activity of the trouble in acute conditions, and it is but rarely that it proves effective in chronic ones.

Local Treatment (*Acute Eczema*).—It goes without saying that every infant's skin should be dealt with tenderly, quite irrespective of an outbreak of eczema. In those who have a tendency to eczema the use of strong soap, of too hot or too cold water, of soiled diapers or diapers washed in strong soda solution, or of rough towels may easily induce an attack. A similar result may follow from bright sunlight on exposed parts, *e. g.* the face, or from cold air; or from chilling of the skin, or from parts of the skin being left undried after a bath, *e. g.* behind the ears or at the flexures; or from an accumulation of dirt on the skin. Very often neglect of scalp washing, and the accumulation of dirt and sebaceous matter about the fontanelle, lead up to an attack of seborrhœic eczema.

When acute eczema occurs the part affected should not be touched with soap or even plain water or any irritating substance. The cleansing of the surface and the removal of crusts can be carried out by means of warm olive oil or vaseline applied with a soft clean rag. If marked crusting of the exudation has taken place there may be a preliminary softening of the surface with a boracic fomentation or a hot bran bath. One pound of bran or oatmeal is boiled in a sufficiency of water for the bath for half an hour, and then the water is strained off through fine muslin

and when sufficiently cool is used for the bath. A lotion similarly prepared may be used for cleansing the eczematous areas occasionally. The parts affected should be protected from exposure to the air, and after a suitable application (lotion, ointment) has been applied a layer of butter muslin is placed over the inflamed area and fixed in position with a soft bandage. In the case of the trunk and extremities this is a comparatively simple matter, but in the case of the face and head it means the cutting out of a mask which has to cover the whole face and head and to be fixed in position there. All this may be successfully accomplished, but another factor comes in to spoil the result. The irritation of the skin is so great that the infant seeks relief in scratching, and this must be prevented at all costs. The ingenuity displayed by an infant in accomplishing its object, the immediate relief of irritation by friction, and the way in which the most elaborate dressings are quickly disposed of almost passes belief. If thick gloves are applied they are quickly made a mass of holes, chiefly by mastication, and the fingers are free again. If the hands are tied down the face and scalp are rubbed so vigorously on the pillow that soon the mask vanishes and the eczematous area is made acutely inflamed by vigorous friction on the pillow. As long as this scratching or rubbing goes on it is impossible to cure an attack of eczema. The only thorough way to prevent it is to have a night and a day nurse so that the infant is constantly watched and prevented from irritating the parts. This is but rarely possible and we have usually to be content with some method of fixation. At night

by means of shoulder straps, and a bandage passed through them and round the bed, the child may be prevented from exerting much friction of the upper part of the body. The arms may be placed in well-padded Gooch or cardboard splints, extending from the shoulders to the wrists, which effectually prevent the fingers from reaching the face, but permit of free movements of the arms. If necessary thick gloves are also to be worn, *e. g.* when the lower trunk or extremities are eczematous. Whenever the infant is not under observation it is useful to fix the limbs by means of a pillow-case. The head is passed through a hole made in the blind end, and the pillow-case comes down over the trunk and limbs. A series of safety-pins is inserted between the trunk and arms, and around both sides of the legs, so that the arms and legs are lying in separate compartments and cannot be used for scratching. It is only a very experienced nurse, however, who will be able to anticipate and circumvent the various ingenious methods of an eczematous baby bent on scratching. Herein seems to lie the chief difficulty in curing many cases of eczema quickly, and the explanation of fresh outbreaks when things seemed to be progressing quite favourably.

In connection with the local treatment, lotions, ointments, and powders are in common use. These are only to be regarded as curative in that they protect the surface from external irritation and allow full play to the natural tendency of the body towards recovery. A large number of medicaments is at the disposal of the practitioner, of which only a few examples will be given. Lotions are specially

indicated in acute eczema with considerable exudation. Care must be taken that the lotion is renewed sufficiently frequently to prevent the surface of the skin from becoming dry and the cloth adjoining sticking to the skin. While a certain amount of "poulticing," by means of thin macintosh tissue may be advisable at the outset, for cleansing purposes, it is not advisable to keep up this action. Ointments are also used in acute cases, especially after active exudation has ceased, and should always contain sufficient of an oily basis to prevent their drying up. If plentifully applied they do not require renewal more than once a day, when undisturbed by the patient, and before renewal the parts affected should be carefully freed from the old ointment, crusts, and exudation by means of warm olive oil or oatmeal-water. Powders may be used in acute exudative cases, but tend to dry up and form crusts on the surface, which irritate and are difficult to remove.

A lotion sedative to the acutely inflamed skin may be prescribed as follows—

R. Calaminæ, \mathfrak{z} iij; Pulveris Zinci Oxidi, \mathfrak{z} ij; Aquam
Calcis ad \mathfrak{z} x.

When the itching is very marked, the following may be prescribed—

R. Liquoris Carbonis Detergentis, \mathfrak{z} j; Liquoris Plumbi
Subacetatis, \mathfrak{z} ij; Pulveris Zinci Oxidi, \mathfrak{z} ij; Aquam
ad \mathfrak{z} x.

If a more astringent action is desired, nitrate of silver (grs. ij to iij to the ounce) may be used, and for an antiseptic action, when there is some added

infection of the skin, corrosive sublimate (1 in 5000 solution). A lotion composed of equal parts of black wash and lime-water, used once daily, has sometimes a very beneficial action, probably in checking the growth of irritating micro-organisms.

In the acute stage a sedative ointment may be prescribed as follows—

R. Pulveris Zinci Oxidi, $\bar{3}$ ss; Liqueoris Calcis, $\bar{3}$ iij;
Lanolini, $\bar{3}$ ij; Oleum Olivæ ad $\bar{3}$ ij.

Lassar's paste is not only an excellent preparation in itself, but it also serves as a vehicle for other drugs directed to special indications. Its formula is as follows—

R. Pulveris Zinci Oxidi, $\bar{3}$ ij; Pulveris Amyli, $\bar{3}$ ij;
Paraffinum Molle ad $\bar{3}$ j.

To this may be added subnitrate of bismuth (grs. xx) as a sedative, or salicylic acid (grs. x) as an antiseptic, or liquor carbonis detergens (\mathfrak{M} x) as antipruritic, or carbolic acid (grs. ij) or resorcin (grs. x).

For the so-called *Seborrhæic Eczema* the following ointment is useful—

R. Pulveris Zinci Oxidi, $\bar{3}$ j; Sulphuris Precipitati,
grs. xv; Lanolini, $\bar{3}$ ss; Paraffinum Liquidum ad
 $\bar{3}$ j.

Powders are useful in the treatment of eczema about the flexures of the body. After the surface has been bathed with a lotion and dried the following powder may be dusted on—

R. Pulveris Calomelanos, $\bar{3}$ j; Pulveris Zinci Oxidi,
 $\bar{3}$ iij; Pulveris Amyli, $\bar{3}$ ss.

The opposing surfaces should be kept from contact by pledgets of cotton-wool dusted with this powder.

Chronic Eczema.—In some cases eczema is of a chronic or recurrent type, and here it may be possible to determine more easily than in the acute forms some definite form of irritation, external, intestinal, or in the blood. Ointments are more useful than lotions. When the skin becomes thickened and dry and scaly, salicylic acid is of great value in softening the skin and inducing a healthy action. The tar preparations are useful both in relieving the irritation and in curing the disease.

R. *Liquoris Carbonis detergentis*, ℥ ss; *Acidi Salicylici*, grs. xx; *Vaselinum* ad ℥ j.

R. *Unguenti Picis Liquidi*, ℥ j-ij; *Pulveris Zinci Oxidi*, ℥ ij; *Vaselinum* ad ℥ j.

When a tar preparation is applied extensively a watch must be kept on the state of the urine, as tar may give rise to albuminuria (John Thomson).

Impetigo Contagiosa.—Impetigo is a very common affection in children whose cleanliness is not properly attended to. Beginning as a vesicular eruption about the mouth or nose, it quickly spreads over the face, partly by direct continuity and partly by means of the fingers of the patient. The fingers are themselves often infected by contact. When the eruption spreads to the scalp a mass of crusts is formed which produces great matting of the hair. Sometimes impetigo develops in association with pediculosis, and it is then due to inoculation of the skin of the scalp from scratching.

As regards the treatment of impetigo the first thing to do is to remove the yellow crusts, and the

next to apply a weak parasiticide ointment to the raw surface thus exposed. The crusts can be softened with olive oil or boracic lotion, and must all be carefully removed. An ointment of white precipitate (hydrargyrum ammoniatum grs. v, vaseline \bar{z} j) is then to be applied one or twice a day, and recovery usually follows rapidly. The same treatment is to be applied to any part of the skin surface affected, but in the hairy scalp it is more difficult to eradicate the disease. When only a few isolated spots are affected it will suffice to cut the hair over these, remove the crusts, and apply the above ointment. When the scalp lesion is extensive it will be necessary to cut all the hair short and apply a boracic poultice under a rubber cap during the night. On the following morning the softened crusts can be removed and the ointment applied.

Pediculosis Capitis. — This may occur as a separate affection or may be complicated with impetigo. In hospital practice it is frequently met with and is usually treated by soaking the hair thoroughly in oil of sassafras for twelve hours. The oil may be rubbed into the hair with the hands, or applied by means of a stiff brush. If the scalp is at all tender the oil is distinctly irritating, but the rubbing in of some olive oil will soon remove the irritation. Both pediculi and nits are destroyed by this means, and the detachment of the nits can be secured by softening them with vinegar and the free use of a close comb. Another effective parasiticide is paraffin or petroleum oil, which is to be similarly rubbed thoroughly into the hair. The former, sassafras oil, has the disadvantage of a

somewhat objectionable smell, and the latter, petroleum, that it is volatile and inflammable, so that the child must be kept at a distance from any naked light.

Other lotions are also in common use, such as the following—

R. Saponis Mollis, part. 1; Aquæ Ferventis, part. 2;
Spiritus Methylati, part. 5.

Or—

Crushed Cevadilla seeds, \mathfrak{z} ij; Alcohol, \mathfrak{z} ij; Acetic
Acid, \mathfrak{z} iij ss; Water to O j.

The seeds should be macerated with the alcohol and acetic acid in 14 oz. of water for seven days, and the fluid then expressed and made up to one pint with water. After the initial application of one or other of these lotions under a cap of protective tissue for twelve hours, the hair should be assiduously combed daily with a close comb dipped in perchloride of mercury solution (1 in 1000), so as to remove all the nits.

When the hair has become thoroughly matted together from impetigenous exudation, the only thorough method of treatment for the double infection is to cut all the hair off, wash the scalp with soft soap and water to remove the crusts, and then rub on dilute white precipitate ointment.

Scabies.—This affection is disseminated by direct contact with an infected person, and as regards children this usually means the mother, or nurse, or some other child. The disease is most frequently conveyed at night and in bed, probably as the warmth leads the *acarus scabiei* to come to the

surface of the skin. In some cases toys, or other things freely handled by an infected person, may be the means of spreading the disease.

The treatment is simple when the affection is recognized. Often, however, the irritation is so great that from scratching an eczematous form of eruption may be superadded, or impetigo may develop, so that the real underlying affection is overlooked. In each of these cases the trouble will not probably be cured until the scabies has been recognized and treated.

In a case of scabies the treatment commences with a hot bath at night, and a thorough soaking and scrubbing of the affected parts. This softens the skin and allows of the penetration of the parasiticide which should be applied after the skin is thoroughly dried. The parasiticide most commonly used is sulphur, which may be ordered as follows—

R. Sulphuris Sublimati, grs. x-xv; Vaselinum ad ʒ j.

This is to be thoroughly rubbed into every part of the body which is affected, and then to be left undisturbed during the night. In the morning the ointment may be washed off, but the hands and feet should be again anointed and gloves should be worn during the day. The whole process should be repeated for three or four consecutive nights, and the disease will then probably be completely eradicated.

Secondary developments such as eczema or impetigo may require further treatment on the lines already described on previous pages. At the beginning of the treatment all the underclothing in

use should be disinfected by heat or boiling water. Other members of the family and the servants should be examined for any signs of scabies, so that they may be treated if necessary. While the sulphur preparations are always the most efficacious, in some cases of acute and generalized infection they may prove too irritating. In such cases betanaphthol (grs. j to ij) in an ounce of vaseline may be used, or balsam of Peru.

Ringworm.—Ringworm of the scalp has for long been a source of much trouble to the patient, the physician, and the Board School authorities. Treatment was as a rule disappointing, and the duration of the infection was often prolonged for one or two years. More recently the adoption of treatment by means of the X-rays has entirely altered the position of affairs, and both the control of the disease amongst school children and its rapid cure in individual cases have been successfully accomplished.

The usual treatment has been by means of ointments or lotions containing some irritating and antiseptic substances, which were rubbed into the scalp after the hair had been removed. They produced an inflammation of the scalp, but as a rule this was too superficial in character, and did not penetrate sufficiently deeply into the hair follicle to destroy the bulb. The changes have been rung on copper salts, mercurial salts, iodine, etc. At the present time at Paddington Green Children's Hospital the remedy in use is sodium chloride, made into an ointment with equal parts of vaseline. This seems to be more efficacious and more rapid in its action than any of the other preparations, and Dr. H. G.

Adamson states that in perhaps one-third of all cases it produces a comparatively rapid cure. It is, however, a painful remedy, so much so that in some cases the pain is so great that it has to be stopped. It also tends to produce a pustular eruption about the scalp and neck, but this may be prevented by fomenting the scalp daily with hot water. The salt ointment produces a dermatitis which remains localized to the ringworm patches and leads to falling out of the hair stumps, the production of bald areas, and eventually the growth of sound hair again over these areas. Hospital patients receive a supply of the ointment with the following printed instructions for its use—

1. Cut the hair quite short over the whole head.
2. Rub the ointment well in over the whole head every morning.
3. Bathe the head for ten minutes every evening with hot water (without soap).
4. If the head becomes sore, leave off using the ointment, and bathe the head with hot water twice a day.

Should the salt ointment prove too irritating or too painful one must resort to some milder preparation, such as an ointment of oleate of mercury (5 %) or of sulphur (5 %). After all signs of the disease have gone the scalp must be carefully examined from time to time, as fresh patches are apt to appear, and the patient should not be declared free from the disease until the growth of fresh and healthy hairs has been in evidence for

some weeks. During this period a mild parasiticide may be applied, such as an ointment containing salicylic acid (1 %), which also tends to further the growth of the hair.

The most effective treatment for ringworm of the scalp is by means of the X-rays, and after one exposure properly carried out the diseased tissues are destroyed. According to Dr. Adamson, about a fortnight after exposure the hairs begin to come out, and at the end of from six weeks to two months a fine downy growth of healthy hairs begins to appear.¹

Ringworm of the body may be associated with that of the scalp or it may be entirely separate and due to contagion from another child, a dog, or a cat. It is usually rapidly amenable to treatment by a parasiticide ointment containing sulphur or white precipitate. The liniment of iodine, painted on once daily until the skin becomes tender, is also very effective.

Lichen Urticatus.—Urticaria is frequently met with during early life, and the common varieties are to be treated as similar conditions are in adult life. There is one form which calls for special notice, namely, lichen urticatus. This is a very troublesome affection in childhood and occurs most frequently during the first two years of life. The question of treatment is a difficult one because no one explanation of the nature of the disease has as yet been generally accepted. As a matter of fact we do not know the cause, and the skin lesions are of such a character as to afford little opportunity

¹ For details of this treatment see *Skin Affections of Childhood*, by H. G. Adamson, M.D. (Oxford Medical Publications.)

for their treatment save in a palliative way. The hard papules or vesicles are easily irritated, but it is extremely difficult to affect them in any other way.

Hutchinson believes that the eruption is the result of the bites of insects, but this view does not seem to be generally accepted. My own experience is that an attack of lichen urticatus is usually associated with the presence of fleas about the patient. In the case of children of the hospital class such evidence is of no value, but amongst the well-to-do classes I have usually found when careful examination was made that the infant had been exposed to the bites of fleas. In all probability the eruption is not the direct result of flea-bites, and on careful examination of the papules with a lens, there is usually no trace of a puncture like that caused by a flea. It has certainly appeared to me that in some cases at least the eruption of lichen urticatus was due, primarily, to the irritation of the skin produced by flea-bites; and, secondarily, to some peculiar underlying sensitiveness of the skin. This may be termed the urticarial tendency of the skin. That certain babies are born with such peculiarities of the skin is illustrated in the case of eczema.

Another view is that lichen urticatus is due to gastro-intestinal disturbance. This is probably also a factor of importance in many cases. Not only may gross errors of diet induce an attack, but also certain articles of food may prove irritating to the gastro-intestinal mucous membrane and lead to a skin outbreak. Through the absorption of toxins from the alimentary tract, or through nervous

reflex irritation from the bowel, a condition of chronic lichen urticatus may be established.

Like everything else which may occur in infancy lichen urticatus is popularly ascribed to teething, and there is this much to be said for such a view, that in the present state of our knowledge we cannot brush aside as negligible any source of peripheral irritation. But in the case of a definite eruption such as this, irritation of the gums cannot be regarded as anything more than an exciting cause, and it is to be placed in the same category as worms, a tight prepuce, adenoid growths, etc. The subjects of this affection are as a rule otherwise healthy and there is no known association with any constitutional or local disease.

Lichen urticatus may develop as an acute or as a chronic affection. In the acute form there is usually found some definite source of irritation about the skin (*e. g.* fleas), or in the alimentary tract, and the removal of this irritation will often lead to a rapid recovery. In other cases, however, the acute attack does not subside, and in yet a third class of case the affection is chronic from the outset. The chronic form may last for months or years, with fresh outbreaks even after all traces have completely disappeared for a time. The patient does not require to be kept in bed during the treatment, save in those cases in which the eruption is generalized and the irritation is extreme.

As regards the treatment, one must seek for and relieve if possible any source of irritation. Attention is to be directed to the feeding, and the quantity and quality of the food must be carefully regulated.

The action of the liver and kidneys must be examined into. A concentrated urine, with excess of urates or uric acid, is an indication for the employment of grey powder, alkalies and plenty of water between meals. Special articles of food may be toxic to the patient and keep up the skin lesions. Amongst these may be mentioned barley, rice, certain fruits, fish, and excess of sugar in the diet. If the abdomen is persistently distended, from fermentation in and dilatation of the stomach and bowels, the use of milk may be stopped for a time, and a more purely protein diet given, such as beef, mutton, and chicken in fluid or solid form, according to age. As constipation is likely to be associated with toxæmia the bowels should be kept freely open, at first with castor oil or calomel, and later with senna pods or liquid paraffin.

The skin should be preserved from all obvious sources of external irritation. If fleas are in the neighbourhood of the child the affection will not probably be cured until they have been removed. Flannel clothing next the skin is apt to be irritating, especially when the eruption is present, and garments of silk or linen should be worn. The intense irritation caused by the spots is always worse at night, *i. e.* when the body is warm in bed, and care should be taken that too many bed-clothes are not employed. During the night the scratching will often lead to further skin lesions, to bleeding from laceration of the papules, and also to secondary infections of the skin, *e. g.* impetigo. Scratching must therefore be prevented in the manner already described in connection with the treatment of eczema. The

skin should not be irritated by too hot or too cold water in washing, and should not be exposed to chilling from cold air.

The application of sedatives to the skin is called for, but in this affection the remedies at our disposal cannot be described as very efficacious. The hard papules on an unbroken skin are not easily penetrated by lotions or ointments. A warm lotion of carbolic acid (1 in 100) or of tar (liquor carbonis detergens, 3 ss, water $\frac{3}{4}$ x) may be applied with cotton-wool over all the parts affected and allowed to dry. Simple alkaline lotions (a saturated solution of sodium carbonate), or lead and opium lotions, or calamine lotions, are sometimes useful. After the lotion has dried the skin may be dusted freely with a powder containing equal parts of starch, zinc oxide, and bismuth subnitrate.

There is no specific drug treatment and yet sometimes benefit may be derived in individual cases from the use of one or other drug. I have sometimes found arsenic most beneficial in chronic cases, but it is very uncertain in its action. To secure rest at night it may be advisable to give the patient a dose of bromide of potassium at bedtime. Some have found benefit in this affection from the use of large doses of quinine.

Chilblains.—Chilblains are a common and troublesome condition in childhood. The subjects of it are usually spoken of as having "a weak circulation," but the weakness is usually in the constitution generally. Much benefit will usually follow from a course of feeding up, the special food requirement being fat, which should be given freely in

the form of milk, cream, and especially cod-liver oil.

The hands and feet should be kept warm, and in cold weather loose woollen gloves and thick stockings should always be worn. Warm water should be used for washing, and the hands and feet should be thoroughly dried afterwards. Those who have manifested a tendency to chilblains will also benefit from regular massage of the hands and feet with warm olive oil. When the skin is unbroken relief will be afforded, and ulceration prevented, by painting the affected parts with *liminenum saponis compositum*, or tincture of iodine. In obstinate cases a course of thyroid treatment (gr. j T. D. S.) may be tried, or of calcium lactate (grs. v-x T.D.S.), for three days at a time.

If ulceration has taken place the patient should be kept in bed and the parts dressed with boracic fomentations and later with boracic ointment, until the lesions are completely healed.

Erythema Nodosum.—This is a common skin affection in children, but is not a skin disease, as in all probability it is merely a manifestation of a general infection, at present of unknown character. The illness runs the course of that of a specific fever. It is often regarded as a rheumatic manifestation, and in my own experience it may be associated with true rheumatic fever. In such a case the important thing to treat is the rheumatism and the erythema nodosum will run its ordinary course. Some have regarded it as a tuberculous manifestation, basing this view on the extremely pronounced form of von Pirquet's reaction which can usually be produced

in a patient suffering from erythema nodosum. Apart from this there is no evidence of any association with tuberculous disease.

As a rule an attack of erythema nodosum will develop without any signs of other disease. The patient is feverish, complains of pains about the parts affected (legs and arms), and suffers from general malaise. Rest in bed should be maintained as long as the fever and pain persist. A low diet should be given and the bowels should be well opened by means of calomel and salines. If the pain in the parts affected is great, a lead and opium lotion or glycerine and belladonna may be applied, and the limbs wrapped in cotton-wool. In the beginning of the attack joint pains may be troublesome and can be relieved by a few doses of salicylate of soda. The whole of the active treatment is symptomatic, and the general treatment is that of a specific fever lasting for a week or ten days.

CHAPTER XII

PHARMACOPŒIA FOR CHILDREN

THE following prescriptions are selected from the pharmacopœia of the Paddington Green Children's Hospital, by kind permission of the Committee. The dose in each case is one suitable for a child of two years.

MISTURA FEBRIFUGA.

R.	Liq. Ammon. Acetat.	.	.	.	.	.	℥ xv
	Sp. Æther. Nitrosi	.	.	.	.	.	℥ v
	Syr. Aurantii	.	.	.	.	.	℥ v
	Aq. Destill.	.	.	.	.	.	ad 3 j

MISTURA ALBA.

R.	Magnes. Sulphat.	.	.	.	.	.	grs. x
	Magnes. Carbon.	.	.	.	.	.	grs. ijss
	Syrupi .	.	.	.	.	.	℥ v
	Aq. Menth. Pip.	.	.	.	.	.	℥ xxx
	Aq. Destill.	.	.	.	.	.	ad 3 j

MISTURA AMMONII ACETATIS.

R.	Liq. Ammon. Acet.	.	.	.	.	.	℥ xv
	Potass. Citrat.	.	.	.	.	.	gr. ijss
	Syrupi .	.	.	.	.	.	℥ v
	Sp. Chlorof.	.	.	.	.	.	℥ j
	Aq. Camphor.	.	.	.	.	.	ad 3 j

MISTURA BELLADONNÆ ET BROMIDI.

R.	Tinct. Belladon.	.	.	.	.	.	℥ ij
	Potass. Bromidi	.	.	.	.	.	grs. ij
	Ammon. Carbon.	.	.	.	.	.	gr. ss
	Syr. Tolutani	.	.	.	.	.	℥ xv
	Aq. Destill.	.	.	.	.	.	ad 3 j

MISTURA CARMINATIVA.

R.	Sodii Bicarb.	.	.	.	.	.	.	grs. ij
	Sp. Ammon. Arom.	.	.	.	.	.	.	℥ ij
	Sp. Chlorof.	.	.	.	.	.	.	℥ j
	Aq. Carui	.	.	.	.	.	.	ad 3 j

MISTURA CASCARÆ COMPOSITA.

R.	Extr. Cascar. Liq.	.	.	.	.	.	.	℥ v
	Extr. Glycyrrhiz.	.	.	.	.	.	.	℥ v
	Tr. Nuc. Vom.	.	.	.	.	.	.	℥ jss
	Tr. Belladon.	.	.	.	.	.	.	℥ ij
	Aq. Destill.	.	.	.	.	.	.	ad 3 j

MISTURA DIURETICA.

R.	Potass. Acetat.	.	.	.	.	.	.	grs. v
	Sp. Æther. Nitrosi	.	.	.	.	.	.	℥ v
	Decoct. Scoparii.	.	.	.	.	.	.	ad 3 j

MISTURA FERRI ACIDA.

R.	Liq. Ferri Perchlor.	.	.	.	.	.	.	℥ iv
	Ac. Hydrochlor. dil.	.	.	.	.	.	.	℥ ij
	Glycerini	.	.	.	.	.	.	℥ x
	Inf. Calumb.	.	.	.	.	.	.	ad 3 j

MISTURA FERRI ALKALINA.

R.	Ferri et Ammon. Citr.	.	.	.	.	.	.	grs. ij
	Ammon. Carb.	.	.	.	.	.	.	gr. ss
	Sod. Bicarb.	.	.	.	.	.	.	grs. iiij
	Glycerini	.	.	.	.	.	.	℥ x
	Aq. Destill.	.	.	.	.	.	.	ad 3 j

MISTURA FERRI APERIENS.

R.	Ferri Sulph.	.	.	.	.	.	.	gr. ½
	Magnes. Sulphat.	.	.	.	.	.	.	grs. x
	Ac. Sulph. dil.	.	.	.	.	.	.	℥ ss
	Aq. Menth. Pip.	.	.	.	.	.	.	ad 3 j

MISTURA GENTIANÆ ACIDA.

R.	Ac. Nitro-hydroch. dil.	.	.	.	.	.	.	℥ iv
	Glycerini	.	.	.	.	.	.	℥ v
	Inf. Gent. Co.	.	.	.	.	.	.	ad 3 j

MISTURA GENTIANÆ ALKALINA.

R.	Potass. Bicarb.	.	.	.	.	.	.	grs. iiij
	Inf. Gent. co.	.	.	.	.	.	.	℥ xxv
	Aq. Chlorof.	.	.	.	.	.	.	ad 3 j

MISTURA OLEI RICINI.

R.	Olei Ricini	℥ x
	Tinct. Rhei	℥ v
	Glycerini	℥ v
	Tragacanth.	gr. ss
	Aq. Menth. Pip.	ad 3 j

EMULSIO HYPOPHOSPHITUM.

R.	Sodii Hypophosph.	
	Calcii Hypophosph.	āā gr. ss
	Ol. Morrhuae	℥ xxx
	Ol. Cassiae	℥ $\frac{1}{10}$
	Glycerini	℥ vj
	Tragacanthæ	q.s.
	Aq. Destill.	ad 3 j

MISTURA SENEGÆ.

R.	Ammon. Carb.	gr. $\frac{3}{4}$
	Aceti Scillæ	℥ iiij
	Syrupi	℥ viij
	Inf. Senegæ	ad 3 j

PULVIS HYDRARGYRI ET OPII.

R.	Hydrarg. c. Cretâ	
	Pulv. Ipecac. Co.	
	Pulv. Cret. Arom.	āā gr. ss

PULVIS HYDRARGYRI ET RHEI.

R.	Pulv. Rhei	grs. iiij
	Hydr. c. Cretâ	
	Magnes. Carbon.	āā grs. jss

PULVIS SANTONINI.

R.	Santonini	grs. jss
	Calomel.	
	Pulv. Amyli	āā gr. ss

LINIMENTUM TEREBINTHINÆ ACETICUM.

R.	Ac. Acet. Glac.	part. 1
	Olei Terebinth.	part. 4
	Olei Lini	part. 2
	Olei Dulcis	part. 2

LOTIO CALAMINÆ.

R.	Calam. Lævig.	.	.	.	.	.	grs. xl
	Zinci Oxidi	.	.	.	.	.	grs. xx
	Glycerini	.	.	.	.	.	. ℥ xx
	Aq. Destill.	.	.	.	.	.	ad ℥ j

LOTIO SODII COMPOSITA.

R.	Sodii Carbon.						
	Sodii Chloridi						
	Sodii Biborat.	.	.	.	.	.	āā ℥ j
	Glycerini	.	.	.	.	.	. ℥ ij
	Aq. Destill.	.	.	.	.	.	ad ℥ iv

PULVIS SPARGENDUS.

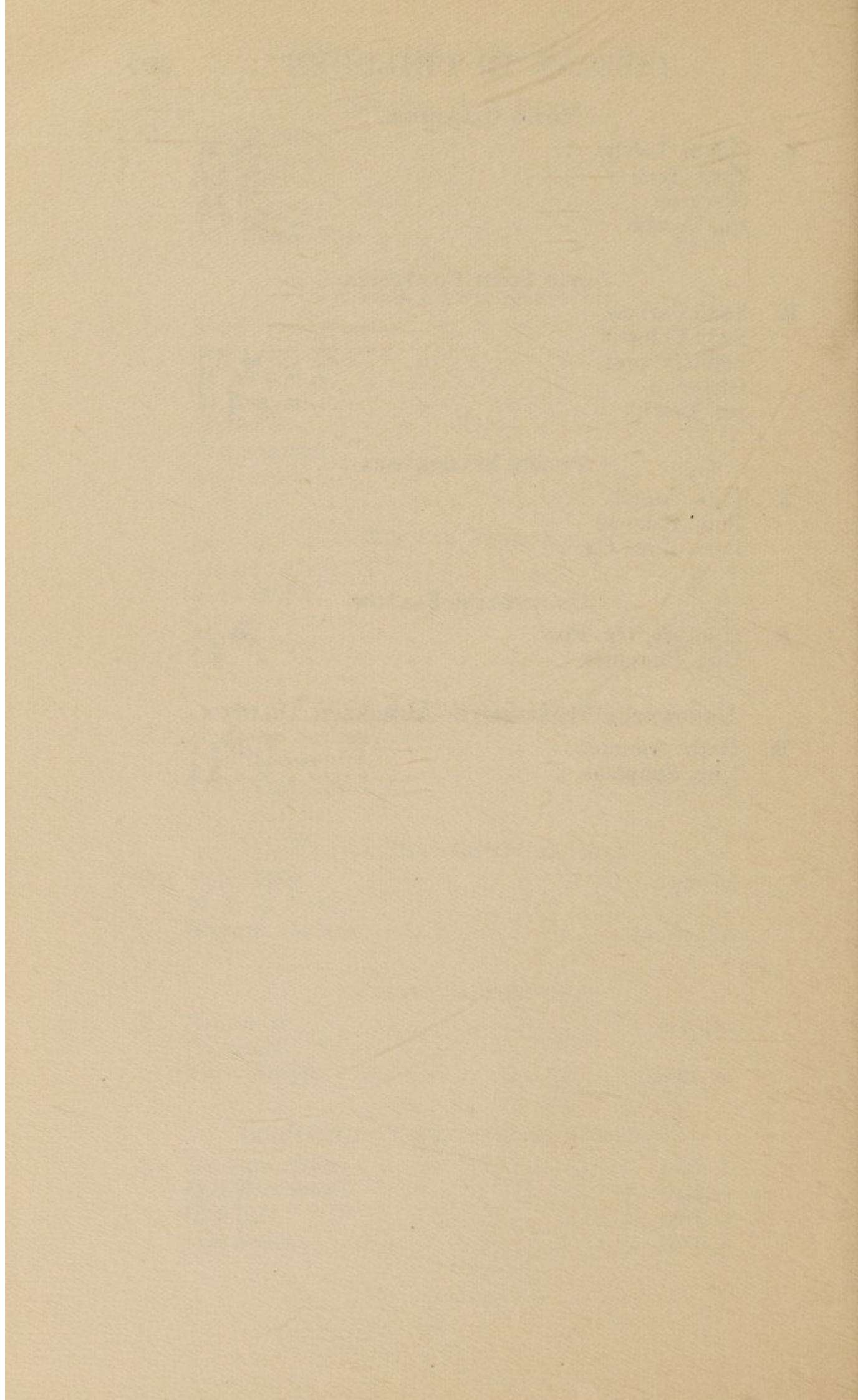
R.	Pulv. Amyli						
	Pulv. Calomel						
	Pulv. Zinci Ox.	.	.	.	.	.	āā

UNGUENTUM FLAVUM.

R.	Hydrarg. Ox. Flav.	.	.	.	.	.	grs. iv
	Ung. Simplicis	.	.	.	.	.	℥ j

UNGUENTUM HYDRARGYRI AMMONIATI DILUTUM.

R.	Hydr. Ammon.	grs. v
	Ung. Simplicis	℥ j



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