

ABSTRACT OF CURRENT LITERATURE.

Acute Infection.

IMMUNISATIE TEGEN KINKHOEST EN MAZELEN, (Immunisation against whooping cough and measles) S. VAN CREVELD, *Maandschrift Voor Kindergeneeskunde*, **14**: 329, 1946.

Recent experiences speak in favour of the fact that it is possible to obtain prophylactically a complete or a partial immunity against whooping-cough by injection of large quantities of a vaccine prepared from phase 1 strains of *Haemophilus pertussis*. As the best time for the beginning of the immunisation provisionally must be regarded the age of 6—9 months. It takes at least 3 months before the immunity develops. Some investigators from a practical point of view recommend the combination of this vaccine with the injection of diphtheria and eventually also of tetanus-anatoxin.

If a quick prophylaxis or therapy is required—especially when active immunisation is not possible, such as during the first months of life—a passive immunisation has to be considered with the so-called hyperimmune serum as such, or with the gamma-globulin prepared from this serum.

As regards measles it has been ascertained already now that the use of gamma-globulin has certain advantages in preventing and in changing the course of measles. Gamma-globulin can be prepared in large quantities and even small amounts are effective. It contains no other ingredients but those already present in plasma. The injection locally does not cause any disagreeable symptom; in less than 5 per cent only temporary slight general reactions occur.

With measles convalescent serum new experiences deserving our full attention have been obtained.

The use of placenta-extracts in preventing and in modifying the course of measles also of late has proved to present difficulties.

The problem of the active immunisation of children against measles with attenuated measles virus has made progresses.

TETANUS: N. SILVERTHORNE, *Journal of Pediatrics*, 30: 195, 1947.

We have had an opportunity to study the value of administering antitoxin by different routes. Usually, the source of the infection in these patients could be traced to a scratch, a cut, or a punctured wound. In fifteen of the seventy patients, no history of injury was obtained. There was a great variation in the clinical course from very severe to very mild cases. Incubation periods varied from one day to one month, and usually, the shorter the period, the more seriously ill was the patient. Although the prognosis was definitely less favourable in patients with a short incubation period, the invasion period was of more importance in the determining the prognosis; the more rapid the invasion period, the more likely the patient was to succumb.

It was found that most of the cases occurred during July, August and September, and that the majority of the patients ranged in age from 3 to 13 years. Two were in the neonatal period. Fifty-three were boys and seventeen were girls.

The patients are kept in a quiet, darkened room with nurses in constant attendance. Fluids by mouth are given as long as possible if they do not cause spasms and choking. Intravenous fluids are given when oral feedings are no longer possible. Antitoxin is administered intramuscularly in doses of from 40,000 to 300,000 units in the course of the first few days after admission, the dosage depending upon the severity of the signs (*i.e.*, degree and frequency of spasm). If a respiratory infection develops during the course of treatment, penicillin is administered. Seconal, as suggested by Dietrich, has been used almost exclusively in doses of $\frac{3}{4}$ to 3 grains depending on the age of the patient and the severity of the spasms. Wounds have not been excised in recent years, as some patients were worse after this procedure. The wound, however, should be cleansed by the usual conservative methods.

During the years 1921 to 1928, there was a patient fatality rate of 66.6 per cent, during 1929 to 1935 the rate was 55.5 per cent, and from 1936 to August, 1946, it had fallen to 28 per cent. We believe that these results over a twenty-five-year period reveal that our treatment has improved in respect of the route of administration of antitoxin. We believe that there are other factors as well which explain this result; namely continuous nursing, more careful feeding of the patients, the use of seconal as a sedative, and the observation that many patients in recent years have had a less severe type of illness. Prevention of this disease in all

children is paramount. The prevention of tetanus with tetanus toxoid should be practised in conjunction with administration of diphtheria toxoid and whooping-cough vaccine.

PENICILLIN AND SULPHONAMIDES IN THE TREATMENT OF INFECTIONS IN INFANCY: E. C. R. COUPER, *Archives of Disease in Childhood*, **21**: 88, 1946.

In a previously reported series of cases, treatment with penicillin alone gave encouraging results and it was decided to test the efficacy of combining penicillin and sulphonamide therapy.

There are now many sulphonamide drugs from which to choose but they may be divided broadly into two groups: (a) the well-absorbed sulphonamides which may be described as anti-coccal in action, *e.g.* sulphathiazole and sulphadiazine, and (b) the poorly absorbed sulphonamides which may be described as antibacillary in action, *e.g.* sulphasuxidine and sulphaguanidine. Sulphathiazole has been selected as representative of the first group and sulphasuxidine of the second. Bacteriological investigations show that infections by organisms of the colon bacillus group are common in the early months of life and it is possible that the use of a drug such as sulphasuxidine, which reduces the number of *b. coli* in the intestinal tract, may be of benefit. Glucose-saline by mouth was administered both to overcome dehydration if present and to assist in the elimination of the sulphonamide in the case so treated. Subcutaneous salines and intravenous salines were also given as required.

TYPE OF CASE. The type of case treated was as follows: bronchopneumonia, nasopharyngitis, otitis media and premature infants who go gradually downhill, a type which is frequently found at post-mortem examination to have some infection which has eluded detection in life.

DOSAGE. Penicillin was made up in bottles containing 25,000 units dissolved in 8 c.c. saline, and was given in 1 c.c. doses intramuscularly at three-hourly intervals, each bottle lasting twenty-four hours. Occasionally twice this amount of penicillin was used.

Sulphonamide. An initial dose of 0.5 to 0.75 g. was given followed by 0.25 g. three-hourly. This smaller dose was given in order to coincide with the injections of penicillin. The usual dose for a mature infant in this hospital is 0.5 g. four-hourly.

The group treated with penicillin alone is very disappointing and the good results reported earlier have not been maintained. This group contains a high proportion of premature infants, among whom the death-rate was 72.7 per cent. Comparing this

high figure with that for premature infants suffering from similar infections and treated with penicillin and sulphonamide, the death-rate is 42.8 per cent, a considerable improvement. The virulence of such infections seems to reach its maximum in the early months of the year, when the present experiment was conducted, and this probably accounts for the difference in the results of the previously reported series treated with penicillin alone and the present group of cases treated with penicillin alone. The better results obtained by combining sulphonamide with penicillin constitute a strong argument for this mode of treatment. BURNS and GUNN (1944) describe four cases of gastroenteritis, associated with otitis media and mastoiditis, two of whom received penicillin locally into mastoidectomy wounds, one intravenously and one, which developed pneumococcal meningitis, both intramuscularly and intrathecally. One of these cases who recovered also had sulphathiazole and three, one of whom died, had sulphamezathine. The combination therefore seems to give better results than penicillin alone. Of the two sulphonamides used, combination with sulphasuxidine gives the better results.

Chronic Infection.

EARLY CONGENITAL SYPHILIS: R. V. PLATOU, A. J. HILL, Jr., N. R. INGRAHAM, M. S. GOODWIN, E. E. WILKINSON, A. E. HANSEN, and A. HEYMAN, *J.A.M.A.*, **133**: 10, 1947.

Among 252 infants with congenital syphilis, a single course of penicillin administered over a period of seven and one-half to fifteen days has yielded satisfactory results in 73 per cent, unsatisfactory in 9.1 per cent; and in 17.9 per cent results are still classed as uncertain. Empirically judged severity of syphilis or cerebrospinal abnormalities had little prognostic meaning; the latter improved remarkably after treatment. Dosage schedules employing more than 40,000 units of the drug per kilogram of body weight yielded better results than those employing lesser amounts. There is some evidence to suggest that larger dosage schedules administered over a longer period of time may be more effective. Dramatic clearing of active manifestations of infection during or soon after treatment is the rule. Clinical relapses have been infrequent, with only 6 encountered at intervals of three to eleven months after treatment. As time passes the number of cases with unsatisfactory or uncertain results diminishes, while there is a proportionate increase in that of symptomatic and serologic cures. Changes to seronegativity are not unusual a year or more after the completion of treatment, though most babies become seronegative between the fourth and twelfth months following therapy.

Judged by outcome, all planned treatment schedules employing sodium penicillin alone have been remarkably effective. Their efficacy, rapidity and safety in this "exquisitely chronic" disease have amply demonstrated that this drug is the best single agent yet employed for the treatment of congenital syphilis.

Penicillin therapy has not altered the familiar contention that treatment of the baby is far more important than treatment of its syphilis. Hazards inherent in socioeconomic environments responsible for a high incidence of this disease undoubtedly account for the high fatality rates seen under any form of treatment. Although syphilis or its direct sequelae must be regarded as potent contributory factors, deaths are almost always adequately explainable on non-syphilitic bases.

Until the true make-up of commercial penicillin has been clarified or until crystalline fractions are evaluated, we offer the following broad suggestions for therapy:

1. Young syphilitic infants should receive a total dosage of at least 100,000 units per kilogram of body weight.
2. This amount should be divided into approximately one hundred and twenty equal intramuscular injections given over a period of twelve to fifteen days.
3. These injections should be given at intervals of no longer than three hours around the clock.

Diseases Of The Newborn.

NEONATAL INFECTIONS, B. CORNER, *Proc. Royal Soc. Med.*, **39**: 383, 1946.

In children's hospitals, infant infection is considered largely in terms of gastro-enteritis and respiratory infections, but when the neonatal period is studied, rather a different problem presents itself, since pathogenic staphylococci are responsible for so many of the lesions.

Eye infections account for more than twice as many cases as any other single cause. Staphylococcal infections of the skin are the second large group. These range from the solitary pinhead pustule to the large abscess or carbuncle. Infection of the fingers is common, but most cases were trivial. The commonest cause of abscesses was the injection of oily vitamin K preparations. Since the use of watery vitamin K there has been no injection abscess. Other abscesses occurred in the breasts, and subcutaneous tissues often following pustular dermatitis. Trauma from forceps was responsible for some abscesses on the scalp. In two cases areas of bone half an inch in diameter were exposed. The

two carbuncles were serious infections, one being on the chin and the other on the cheek. Mouth infections were all very slight. During the period under review there was quite an extensive outbreak of colds; nearly all nasal infections included occurred during this epidemic, which was undoubtedly aggravated by the fact that at the time all the infants were being taken in small baskets to an air-raid shelter with no outside ventilation. Despite this, only 27 cases of bronchitis developed in these infants. Three infants developed pneumonia in this hospital, all of whom died. One was a premature baby whose mother had started to breast-feed it and unfortunately developed a cold; one infant had a serious congenital heart lesion and caught a cold during the epidemic; the third was a normal baby who developed massive collapse of one lung on the tenth day, and died, with early bronchopneumonia found at post-mortem. Gastro-enteritis has been a considerable problem. It has occurred in numerous small outbreaks affecting most of the infants in the nursery and coinciding with gastro-enteritis in the mothers.

Suppurative arthritis of the hip-joint occurred in one infant with numerous staphylococcal skin infections.

Two factors are of paramount importance in producing lesions in the infant. First, the human carrier of staphylococci, as has been demonstrated by KNOTT and BLAKLEY, and, secondly, minute trauma to the infant's skin or mucous membranes.

As long as pustules on a newborn infant's skin are dismissed lightly as "a few septic spots", so long shall we continue to get serious or fatal staphylococcal infections in the nursery. The importance of apparently trivial infections can best be brought home to the nursing staff by the keeping of accurate infant records.

I would urge that the babies be nursed by a completely separate nursing staff. This has the following advantages :

- (1) The nurse's whole attention is focused on the baby and thus minor lesions are readily observed and receive the maximum care.
- (2) The baby's routine is undisturbed by the maternal emergencies of the department, which are often many, and the nursery need never be left unattended.
- (3) The carrying of infection from mothers to babies is largely eliminated.
- (4) Use may be made of other types of nurses than the midwife or pupil-midwife for much of the routine work, and

thus the pupil-midwife may concentrate on doing her essential work well.

At the present time it seems more practical, in large maternity departments, to nurse the infants in special nurseries, paying particular attention to details of nursing technique.

PENICILLIN IN THE TREATMENT OF NEONATAL SEPSIS: F. M. B. ALLEN, J. E. MORRISON, and W. R. RUTHERFORD, *Archives of Disease in Childhood*, **21**: 19, 1946.

The object of this research has been to determine the place of penicillin in the treatment of neonatal sepsis. It is well known that in the neonatal period only a minority of cases present symptoms which enable an exact diagnosis to be made either of the site, or sites, of infection or of the nature of the infecting agent. Many of these patients present a distinctive clinical picture, however, and have an illness of sudden onset with some or all of the following symptoms; fretfulness or apathy, refusal to feed, diarrhoea, vomiting, and an abnormal fall of the postnatal birth weight, or a downward deflection of the weight curve if this has begun to climb. The temperature may be raised at some period of the illness, but absence of fever will not exclude the presence of infection. The respiration rate may be increased and icterus may seem more pronounced than would be expected in physiological jaundice of the newborn. The condition sometimes assumes epidemic proportions in maternity hospitals. When diarrhoea predominates there is then a tendency to label it epidemic diarrhoea of the newborn and to regard it, sometimes with little further investigation, as a primary gastro-enteritis of unknown etiology.

Careful and detailed autopsies on cases of neonatal sepsis, especially when dehydration has been in some measure controlled, will very rarely show any lesions in the intestinal tracts but will often show evidence of infection elsewhere, especially in the respiratory tract. Histological examination will frequently reveal acute inflammatory reaction in the nose, larynx and pharynx, lungs and nearly always in the middle ears. Some cases may show only thrombi in intracranial or renal veins, and it is then impossible either to implicate or to exclude a low-grade and disseminated bacterial infection. It is not useful at the moment to discuss whether symptoms, which in many of these cases might suggest a primary gastro-enteritis, result from a primary invasion by viruses, bacteria or both pathogenic agents in symbiosis through the respiratory tract or other portal of entry. It is enough to emphasize that, if dehydration is controlled, bacterial infection,

especially of the respiratory tract, be it primary or secondary, plays a very important role and often determines the fatal outcome.

A diagnosis of neonatal sepsis was made in seventy-one cases and every alternative case was treated with both penicillin and sulphadiazine. The remaining cases received sulphadiazine alone and served as controls. A study of the sixty-one cases which were suitable for analysis failed to show that penicillin increased the recovery rate, or influenced either the duration of the illness or the severity of decline in body weight. The importance in this connection of bacterial infection, especially of the respiratory tract by a potentially variable flora, is discussed. A few cases, chiefly of Staphylococcal infection, were thought to benefit in a further group of eighteen cases treated without controls.

Diseases Of Skin.

SEBORRHOEIC DERMATITIS : I. R. MARRE, *Post-Graduate Medical Journal*, **13**: 162, 1947.

Seborrhoeic dermatitis is an acute or chronic inflammatory condition of the skin, occurring mainly in certain areas of the body, but able to spread to any part. It is commonly associated with a scaly eruption of the scalp.

MACLEOD and MUENDE define the nature of seborrhoeic dermatitis: 'Seborrhoeic dermatitis is probably due to an infection with a yeast-like fungus, the pityrosporon, which finds a suitable soil for its growth in a skin naturally greasy from an excessive sebaceous flux.

On the scalp this may consist in the mild form of a powdery scaly condition known as dandruff. Other cases may show a yellowish, greasy scaliness on an erythematous base, which may develop into oozing crusting lesions, diffuse or in patches. There is a varying amount of itching, sometimes severe, and the condition is often associated with the loss of hair, which in the affected areas becomes frayed and brittle, and tends to fall out. This hair loss is particularly found about the temples and forehead.

Accompanying the acute condition of the scalp, the ears are often affected. Redness, scaliness, fissuring, oozing and crusting occur, especially in the post-auricular region, and may spread down the neck. The scalp eruption may extend below the hair margin in a sharply defined inflammatory line covered with crusts, known as the Corona Seborrhoica. The condition is contagious and spreads by scales shed from the scalp on to the glabrous skin.

It may also be spread by infected combs and brushes. The disease may remain confined to the scalp for months or years, or may spread rapidly to the adjacent areas, or to other part of the body.

On other parts of the body the condition first appears as round or oval scaly macules or papules, pinkish-yellow in colour, and developing into two main types of lesions: (1) a scaly erythematous type, which affects the seborrhoeic areas especially; (2) an oozing fissured type which occurs in the flexural regions.

On the face the first type is more common, with greasy scales on an erythematous base, affecting the cheeks and forehead. The condition tends to become moist, oozing and crusting about the nose and behind the ears. A reddened scaly state of eyebrows and eyelid margins is common.

On the trunk the frequent situations are the sternal and interscapular areas, where is found the characteristic 'flannel-rash' or petaloid type of eruption with polycyclic gyrate figures, of a brownish-yellow colour, enlarging peripherally. The centre tends to become clear, but sometimes remains scaly, and the spreading reddish border may be covered with scaly papules. Greasy, scaly, yellowish patches on an inflamed base also occur, and it is common to find papular and macular satellite lesions surrounding the larger areas.

In the flexures the condition usually becomes moist and oozing and often spreads rapidly to the adjacent areas. Trauma and rubbing may convert the condition into an acute eczematous one, or even to an exfoliative dermatitis.

On the limbs the flexures are also commonly affected, and here the rubbing of clothes, associated with constant movement, often leads to a thickened lichenified condition of the skin. The flexor aspects may show follicular patches.

It is wise in every case of seborrhoeic dermatitis to treat the scalp thoroughly and systematically. In mild cases it may be sufficient to rub in the following lotion once or twice daily :

R. Acidi Salicylici	gr.	20
Hydrargyri Perchloridi	gr.	$\frac{1}{2}$
Liq. Carbonis deterg.	m.	15
Olei ricini	m.	10
Spirit vini rect. or spirit meth.		
indust.	3	3
Aq. ad.	3	1

and shampoo the hair out once or twice weekly with Spirit Soap

R. Saponis viridis

Spiritus meth. industrialis ā ā p. aeq.

In the more greasy and crusted lesions of the scalp, the following ointment may be used, and should be preserved with even in the eczematous type :

R. Sulphuris precipitati	gr.	10
Acidi Salicylici	gr.	10
Adeps Benzoinat	ad.	1

Resorcin may be substituted for the precipitated sulphur, but darkens fair hair. This should be massaged well in twice daily and shampooed out once or twice weekly. Later, when the scalp is drier, the lotion may be substituted and persisted with for some-time.

In the frankly weeping eczematous condition of the scalp, the hair should be clipped, and the moist areas treated with very frequent applications of lead lotion (made by adding 1 drachm of liquor plumbi subacetat. fort. to a pint of cold tap water) for a day or two. When dry, the ointment should be substituted.

On the glabrous skin the following lotion is suitable for mild conditions :

R. Sulphuris precipitati	gr.	5
Tr. quillaia	m.	10
Lotion calaminae B.P.C.	ad.	3 1

More severe conditions will respond to :

R. Sulphuris precipitati	gr.	10
Acidi salicylici	gr.	10
Unguentum aquae rosae	ad.	3 1

or the following ointment :

R. Hydrargyri ammoniati	gr.	10
Acidi salicylici	gr.	10
Zinci oxidi	3	2
Paraff. molle album	ad.	3 1

In the acute, weeping, flexural type moist dressings or baths are indicated. Baths of 1 : 8,000 or 1 : 10,000 potassium permanganate twice daily or continuous wet dressings of lead lotion, may be ordered. Alternatively, $\frac{1}{2}$ per cent silver nitrate in distilled water applied twice daily is more than useful. When dry, these

areas may be treated with the calamine and sulphur lotion. Greasy ointments are borne badly in these regions, but if the calamine lotion prove too drying the following liniments may be used :

R. Sulphuris praecipitati	gr.	5
Calaminae prep.	gr.	30
Zinci Oxidi	gr.	20
Liquor Calcis	ʒ	2
Olei olivae or arachis	ad.	ʒ ʒ i

or

R. Sulphuris praecipitati	gr.	5
Lotio calaminae oleosa (N.W.F.)	ad.	ʒ ʒ i

Ichthyol may be substituted for the sulphur.

For the seborrhoeic blepharitis the two per cent yellow oxide of mercury ointment applied twice daily clears up the eruption.

Internal Medicine.

EXAMINATION OF THE INFANT AND CHILD: II.
APFEL, *Archives of Pediatrics*, **64**: 25, 1947.

For the purpose of simplification, this subject matter will be discussed under the following subdivisions: (A) History, (B) General Principles, (C) Technique.

History is the first step in the examination of any case. Without a correct and complete history, one cannot expect a correct diagnosis. This statement needs no qualifications. We never approach the child's bedside before first supplementing the history from the mother, even though the attending physician had already supplied a "complete" history. Not infrequently much can be added by closely quizzing the mother and whenever necessary some other member of the family. Information that may seem unimportant to them may spell the difference between failure and a correct diagnosis. This is particularly important where no objective findings can be made out.

Chronologic sequence of the complaint on the part of the patient which the mother or some other member of the family may supply may become of the utmost importance and should be stressed to its minutest details.

Family History : This is equally as relevant. It is necessary to make certain that the person who furnishes the information is competent to do that.

General Principles. The examination of a sick child when successfully carried out will lead to the scientific evaluation of the existing pathology. This is science at its best. The method of performing the examination, however, is an art. As an art, it is not to be expected that one should acquire it in "ten easy lessons".

Baby vs. the Adult : There are radical points of difference in the matter of examination between an adult and a young baby, or even the grown child, that deserves to be analyzed. No one can make an infant stop crying on command. No one can induce a young child to relax its abdominal muscles for the purpose of examination. It is equally as futile to order an infant to "breathe deeply". Has any one yet devised a method of inducing a year-old child to open its mouth and to keep it open long enough for you to inspect the interior? All these are simple matters with the adult patient but a problem, of no mean proportion, when dealing with the very young. There must be a way out of this, if we are to accomplish our objective.

Technique : The first step in beginning an examination is to locate a suitable place and also a proper light. The examiner should, quickly get a mental survey of the child's co-operativeness or submissiveness without offering any overtures or bribes.

The child's arms must be restrained by the assistant, right from the beginning, unless the child be old enough and definitely co-operative. Ignoring this precautionary measure will enable the child to pull down your eyeglasses, your stethoscope or what have you. The assistant must place his/her arms and hands in a position not to obstruct the view.

The child, if it chooses to cry, should be allowed to do so. No one must admonish it to stop crying. Invariably these children increase the force of their screams with every admonition. The child's legs should not be restrained or it would interfere with the examination of the abdomen. Allowing the child to have the freedom of his/her legs should not make you overlook the possibility of being kicked by some mama's pet.

If the child be co-operative and tolerant, you may keep its interest **alive** by talking to it. The subject matter of your talk need give you no great concern. The objective is to keep the

child's mind occupied with something to listen to and thus have no time to think about the actual examination.

One soon becomes resourceful in handling these situations, and soon learns how best to deal with the individual type of child. At times it requires sweetness and at other times sternness is the better method. Many a child will, if given a lead, open the conversation that will best suit the age environment of the individual. Finding yourself in search of a suitable topic, one can always begin with something like a pet animal or the like. If the child is to become engaged in some such conversation he or she will take the initiative from then on. If the child spurns any such advance, one must readily admit failure and proceed without any further overtures. Under no circumstances should one allow himself to become irritable or excitable. This part of the examination is not always easy. It may be wise to study the patient's environment and the I.Q. of the other members of the family in order to better understand how to approach the child.

Actual Examination : It is a good habit to commence with the head and continue downward, till we reach the toes. In that way one is not apt to omit any part of the body. The inspection of the skin takes our first attention. No small part of the skin surface must be allowed to escape our close inspection.

The eyes, the ears, the nasal passages are carefully examined. We deliberately omit the mouth at this stage of the examination, especially in the very young. We suggest that the mouth be left for the very last, even when dealing with older children, unless one is well acquainted with the child and knows that it will not upset the child to have the mouth examined.

The neck is now gone over very deliberately to check for lymph node enlargements or muscle rigidity or anything else that may strike one as abnormal.

It should be remembered here that the normal infant at about 4—6 weeks of age has a definite tonicity of the extremities as well as of the neck muscles that can easily be mistaken for abnormal rigidity. In pathologic nuchal rigidity the spasticity is constant, whereas in the normal state the muscles tend to relax from time to time in flexing the head towards the chest. Practising flexing the head on to the chest in the normal infant will give you the necessary feel in your hand to evaluate the abnormal when present.

Examination of the Thorax : The examination of the chest of a young child is quite different from examining that of an adult. First to be appreciated is the anatomic difference between the two.

There is one place in the chest of the young child that deserves special mention in order to prevent wrong interpretation. The area over the paravertebral region usually produces broncho-vesicular or even bronchial breath sounds, through the stethoscope. This is markedly accentuated when the little patient suffers with high fever even in the absence of pulmonary pathology.

More than the anatomic difference is the disturbing factor created by the baby's crying sounds. Until one gets to learn to disregard these crying sounds the examiner can be made quite unhappy and many a normal lung will be labelled "pneumonia".

There is no special rule that one can hand on to another how to disregard the baby's cries. You must learn this as you would the art of swimming, not by reading about it but by practising it daily.

Method of Examining the Child's Heart : The mapping out of the heart borders can be greatly facilitated by placing the receiving end of the stethoscope over the heart body and with the middle finger of your left-hand percussing from without to the perimeter.

Examination of the Abdomen : The examination and interpretation of the abdominal findings of a child are most vital and equally as difficult.

Examination of the Eyes, Ears, Nose and Extremities : This part of the examination is not different from what one would expect in the case of the adult patient.

Examination of the Mouth : It will take patience and time before one will learn to master the art of examining the mouth of a child.

Examining the Newborn Baby : This deserves a special paragraph. In the modern hospital, the pediatrician assumes responsibility of the newborn soon after birth. The first examination should be carried out soon after the baby is delivered.

The skin is carefully inspected. You look for any possible congenital deformities of the skeletal system. The most common, of course, is clubbing of the feet. Do not omit to examine for possible imperforate anus or spina bifida. The presence of such unfortunate conditions, as intestinal malformations, atresias or obstruction from congenital bands or hernia cannot be recognized for two or three days. In these conditions the x-ray will have to be employed to assist in the diagnosis.

Birth traumata of the soft parts as well as of the extremities can readily be made out. Palsies of the facial muscles or the muscles of the upper extremities, as a result of brachial plexus injuries must always be borne in mind and checked for.

Examination of the urine, sputum, spinal fluid, blood cultures, etc., should, naturally, be made use of whenever in your opinion the case suggests its urgency. Cystoscopies, blood chemistries and basal metabolism, as well as electrocardiogram studies should be employed whenever the case warrants such information.

INTRAVENOUS ALIMENTATION OF INFANTS, K. DODD and S. RAPOPORT, *Journal of Pediatrics*, **29**: 758, 1946.

It has been shown that maintenance of fluid and electrolyte equilibrium by parenteral fluid administration is possible even in small infants during periods of partial or total withdrawal of oral feeding. With the use of glucose, whole blood, plasma, and casein hydrolysate, a gain in weight may be achieved.

A daily record of total intake of fluid, saline, calories, and nitrogen as part of a careful plan is an essential prerequisite of such a programme.

Frequent observation of the clinical appearance of the infant and of his electrolyte and osmotic equilibrium is necessary.

Wide variation may be permitted in total fluid intake, provided salt intake is carefully regulated and is not excessive.

Premature and very young infants require less saline in proportion to their body weight than do older infants.

Contamination of the casein hydrolysate given, infection at the site of needle punctures, and thrombosis of the veins present a considerable problem. By the use of a closed system of administration, the more serious difficulties have been almost completely overcome. Thrombophlebitis and wound infection continue to be troublesome.

HYPOFUNCTION OF THE ADRENALS IN EARLY LIFE, J. C. JAUDON, *The Journal of Pediatrics*, **29**: 696, 1946.

A theory of physiologic hypofunction of the adrenal glands during the early weeks of life has been presented. Anorexia, failure to gain weight, unexplained tendency to dehydration, attacks of hypoglycemia and protracted diarrhea; one or more of these signs or symptoms originating in the neonatal period and

not responding to treatment should be considered as possible manifestations of low adrenal cortical function. These patients may be benefited by hormone therapy.

The cases recorded here present a variety of symptoms which are interpreted as signs of low adrenal function. These symptoms rapidly subside after the administration of adrenal cortical hormones. No harmful effects from the injections were encountered.

Adrenal hormone therapy may be a necessary adjunct in the maintenance of proper water and electrolyte balance, the preservation of normal intestinal function and the adjustment of a deranged carbohydrate metabolism in selected patients during early infancy.

Hypoglycemia during early infancy is not a rare occurrence and it is not uncommonly associated with symptoms of shock.

It appears that pork adrenal extract prevents the reappearance of severe hypoglycemia during early infancy.

MEDICAL ASPECTS OF PENICILLIN TREATMENT :
B. A. YOUNG, *B.M.J.*, **4496** : 290, 1947.

PNEUMONIA.

Indications for Penicillin Treatment in Pneumonia.—Administration of sulphonamides is still our method of choice. Our indications for penicillin are : (1) Cases with a bad prognosis owing to clinical severity with signs of extreme toxæmia, old age, and infancy, particularly prematurity. In these cases penicillin and the sulphonamides may be combined. (2) Cases failing to respond to sulphonamides within 36 hours, or cases known to be sulphonamide-sensitive. (3) Cases with congestive heart failure or renal disease where the excretion of sulphonamides is likely to be deficient. (4) Cases with complications such as diabetic ketosis or anaemia.

EMPHYEMA.

Treatment has been by the administration of systemic penicillin in doses of 30,000 to 60,000 units four-hourly, with repeated aspiration of the fluid and intrapleural injection of 60,000 to 120,000 units of penicillin in 20 to 50 ml. of distilled water on alternate days. The pleural fluid, given a penicillin-sensitive organism, is usually sterile after the second intrapleural injection, five to seven injections being the usual number. Aspiration must be complete and be continued for a prolonged period if a satisfactory result is to be obtained. In the majority of our cases we

were fortunate in beginning penicillin treatment early in the disease. In two cases surgery has been necessary, ribresection being carried out. The indications for surgery are a thick exudate which cannot be aspirated, empyemas coming under treatment late in the disease, loculation of the fluid, and failure to sterilize the empyema with penicillin.

MENINGITIS.

In view of the excellent results obtained with sulphonamides, intrathecal penicillin is probably unnecessary in cases of meningococcal meningitis.

Pneumococcal meningitis was treated by the intrathecal injection of 10,000 to 30,000 units of penicillin on alternate days for three injections. In each case the fluid was sterile after the first injection and recovery dramatic. Intrathecal therapy was supplemented by 60,000 units of penicillin four-hourly by intramuscular injections for 10 days and full doses of sulphadiazine.

The three cases of meningitis due to *H. influenzae* are most interesting and instructive. The *H. influenzae* was thought to be penicillin-resistant. We now realize that this organism is only relatively resistant to penicillin.

To minimize the risk of meningeal reactions, only pure penicillin of a concentration of 1,660 units per mg. is used for intrathecal injection, and to lessen the even greater risk of introducing infection, by a penicillin-resistant organism each dose is made up separately in a sealed ampoule.

SUMMARY AND CONCLUSIONS.

The following are the more important points that have arisen in our experience during the treatment of cases with systemic or systemic and local penicillin.

A bacteriological diagnosis should be obtained whenever possible, and penicillin-sensitivity tests on the organism carried out. This should not delay the institution of treatment in urgent cases, which may be started while bacteriological investigations are in progress.

Intermittent intramuscular therapy is our method of choice, injections being given four-hourly. The usual dose is adults is 30,000 units four-hourly, with 60,000 units four-hourly in severe infections. The present tendency is further to prolong the

intervals, with increase in dosage. More work on these lines is necessary.

The volume of a single dose should not exceed 1 ml. Up to 250,000 units of the penicillin at present supplied (1,400 to 1,500 units per mg.) can be dissolved in this amount of distilled water.

Intrathecal therapy should be undertaken with the strictest aseptic technique; only pure penicillin of 1,660 units per mg. should be used. Each dose should be made up separately in a sealed glass ampoule.

The scope of penicillin treatment should include that group of organisms previously classified as penicillin-resistant. Tests for penicillin-sensitivity should be carried out in concentrations up to several hundreds of units of penicillin per ml. before resistance is considered a contraindication to treatment. This conclusion I consider to be of the greatest importance.

THE INVESTIGATION OF PROLONGED PYREXIA : *Post-Graduate Medical Journal*, **22**: 405, 1946.

By prolonged pyrexia will be understood pyrexia of over ten days duration. For the purposes of this article it will be assumed that a careful clinical examination has failed to reveal physical signs of a definite character.

The following investigations should be carried out as routine.

(1) *Leucocyte and Differential Leucocyte Count*.—A high polymorphonucleocytosis will make it extremely probable that the patient is suffering from some pyogenic infection. Where the picture is indefinite, repeated counts at three-day intervals should be made. The picture may vary from day to day and, moreover, the picture may be misleading if the patient has been having a course of sulphonamidé.

(2) *Blood Culture*.—One sample of blood should be cultured on glucose broth, a second on a medium, suitable for the isolation of the Enteric Group (e.g. McCONKEY'S medium). A positive culture will usually be conclusive but a negative result excludes nothing.

(3) *Agglutination Reactions against B typhosus and B. paratyphosis A. and B.; M. melitensis and Br. abortus of Bang*. A single reading against the enteric group will frequently be inconclusive (especially if the patient has been inoculated), but a series of three tests at two-day intervals may show a rising titre of diagnostic significance.

- (4) A Blood Film should be examined for malarial parasites.

After these preliminary considerations, the various diseases likely to be the cause of prolonged pyrexia may be enumerated and briefly reviewed. They may conveniently be subdivided into the following groups :

(a) Diseases of World-Wide Incidence.

- i. Likely to be associated with a polymorphonucleo-leucocytosis.
- ii. Likely to be associated with a leucopenia.
- iii. Likely to be associated with an indefinite blood picture.

(b) Diseases peculiar to certain areas.

(a) (i) Diseases of World-Wide Incidence Associated with Polymorphonucleo-leucocytosis.

- i. *Septicæmia* (including Bacterial Endocarditis).
- ii. *Pyæmia*.
- iii. *Hidden collection of pus*.

(a) (ii) Diseases of World-Wide Incidence Associated with Leucopenia.

- i. Enteric Group of Fevers.

Agglutination Reactions :

“H” agglutination is indicative of infection with the homologous organism in an inoculated person.

“O” agglutination is not specific for separate members of the “E” group but is not produced by inoculation.

Hence, a rising titre in serial tests is of diagnostic significance of enteric infection, but is not specific.

“V” agglutinins are highly specific.

2. *Undulant Fever (Abortus type)*

3. *Agranulocytosis*.—This condition is to be borne in mind especially in view of the prevalent, and sometimes injudicious, use of the sulphonamide group of drugs. Differential diagnosis may be difficult from aplastic anaemia, acute aleukaemic leukaemia and acute mononucleosis. Examination of sternal marrow by a skilled haematologist may help.

(A) (iii) Diseases of World-Wide Incidence with Indefinite Blood Picture.

1. *Atypical Pneumonia.*
2. *Influenza.*
3. *Acute Miliary Tuberculosis.*
4. *Relapsing Fever.*
5. *Rat-Bite Fever.*
6. *Typhus Fever.*
7. *Glandular Fever.*
8. *Lymphadenoma* may be associated with pyrexia of a relapsing type (Pel-Ebstein) or irregular.
9. *Leukaemias.*—Atypical leukaemias with pyrexia and aleukaemia may present difficulty. Diagnosis depends on repeated blood examinations and examination of sternal marrow by a skilled haematologist.

(B) Diseases Peculiar to Certain Areas.

1. *Malaria.*
2. *Kala-azar (Leishmaniasis).*
3. *Undulant Fever (Melitensis type).*
4. *Amoebiasis.*

ACUTE GLOMERULONEPHRITIS: F. G. BURKE, D. C. WASHINGTON and Lieut. S. ROSS, *Journal of Pediatrics*, **30**: 157, 1947.

Treatment consisted of absolute bed rest until the urine was free from albumin and red blood cells. Several cases were discharged before the urinary sediment was completely normal when it was felt that the convalescence would be intelligently followed at home. When patients were permitted premature exercise, exacerbations of albuminuria and hematuria were noted on several occasions.

A relatively high protein, high carbohydrate, low fat, salt-free diet was employed with fluids given as desired. In those cases showing a high nonprotein nitrogen, fluids were forced. High vitamin supplements were employed routinely. Blood transfusions were given only when convalescence was well advanced and the initial phase of the attack had subsided. It was thought advisable to avoid the intravenous route in a disease with acute and generalized vascular involvement such as nephritis. In two instances when blood transfusions were given during the

first few days after the onset of the symptoms of nephritis, gross hematuria ensued shortly thereafter.

Sulfadiazine, sulfapyrazine and penicillin were employed when a susceptible infection was concomitantly present, without any untoward reaction being noticed. Penicillin appears to be the drug of choice for the treatment of such coexisting extranepritic infections, since, in the presence of impaired renal function, sulfonamides may be retained with the production of an inordinately high sulfonamide blood level. Regarding the use of chemotherapeutic agents for the treatment of nephritis per se, Rapoport and associates found no appreciable difference in comparison of a series of thirty-three patients with acute glomerulonephritis treated with sulfonamides, with a control group of forty patients who were not treated with this drug. Similarly, penicillin cannot be expected to influence significantly the course of acute glomerulonephritis.

Magnesium sulfate (0.2 c.c. per kilogram body weight of a 25 per cent solution) was given intramuscularly in those cases manifesting cerebral symptoms or in those patients who showed a rising blood pressure. This dosage was repeated every two to four hours until hypertension was under control and/or signs of cerebral encephalopathy disappeared. The intramuscular route was found adequate and in no instance was the magnesium sulfate given intravenously. It has been shown that this drug exerts its beneficial effect on hypertensive encephalopathy associated with acute glomerulonephritis due to the relaxation of the arterial spasm rather than to the production of diuresis with diminution of the degree of cerebral edema. The magnesium ion has a relaxing effect on this vasospasm.

Surgical procedures were not contraindicated by the presence of acute glomerulonephritis when they were deemed advisable, but elective operations were deferred. Hypertonic solutions were given to several patients in an attempt to mobilize the edema without success. Mercurial diuretics were not employed because of the potential harmful effect of these drugs upon an already damaged kidney. Mannithine derivatives did not appreciably hasten diuresis in the several cases in which they were employed. Intake-output records were discarded as a tedious and unreliable procedure in children, and equally valuable information was obtained by daily weighing and observation of the resultant weight curve. Only a few of the patients in the early part of this series were digitalized; however, in the later group, the majority received digitalis for the treatment of congestive heart failure.

While it is true that most patients with congestive failure due to acute nephritis will respond to bed rest alone for repair of their cardiac function, it is considered advisable to digitalize all patients with decompensation because of its possible serious import. In contrast to the deleterious effect of digitalis frequently noted in patients with acute rheumatic myocarditis, no untoward reactions were noted in the group of nephritic heart failure cases who received this drug. The preparation of choice was Digifolin and one cat unit per 100 pounds of body weight were employed. One-half the total dose was administered the first day in three divided doses, then one-half of the remainder on the second day in two doses and the rest on the third day. A maintenance dose of $\frac{1}{2}$ cat unit every day followed until evidence of heart failure had disappeared or toxic symptoms intervened.

Surgery.

TREATMENT OF ACUTE OSTEOMYELITIS WITH PENICILLIN: R. V. HUDSON, *Proc. Royal Soc. Med.*, **93**: 371, 1946.

Since March, 1943 we have submitted to laboratory and clinical investigation 400 cases of penicillin-sensitive infections at various sites in the body. 37 of these cases happened, or proved to be, acute or subacute osteomyelitis.

In 30 cases the organism causing the infection was the *Staphylococcus aureus* and in 7 *Streptococcus pyogenes*. In the majority the infection had been present for some days, in only two was the disease seen as early as the fourth day, and in one case it was a hundred and fifty days before we received the patient. The youngest patient was 1 year old and the oldest 70 years of age.

For the purposes of discussion I have subdivided these 37 cases into three groups: acute haematogenous osteomyelitis, acute recurrent osteomyelitis in which the patient had previously suffered from an osteomyelitis, and subacute recurrent osteomyelitis.

In the latter two groups it is obvious that a gross change has occurred in the soft tissue and in the bone prior to the acute or subacute exacerbation of the disease. This gross change is paralleled by patients submitted to treatment in the late stages of their first attack of haematogenous osteomyelitis. It is only in the early stages of acute osteomyelitis that penicillin has its greatest opportunity of assisting the patient.

Our method of treatment, however, in all cases was to institute penicillin and wait and observe the progress of the case.

It soon became apparent that penicillin swept the organism from the blood-stream and reduced the acute lesion to that of a chronic lesion. The subsequent fate of the patient depended upon the management of this now chronic osteomyelitis.

When we come to the systemic dosage of penicillin used I would again state that one is doubtful of the permanency of the cure in the majority of these cases. The average dose was 20,000 units of penicillin administered intramuscularly every three hours day and night for an average of ten to twelve days. Later in the series this dose of 20,000 units was raised to 60,000 units three-hourly, and the results were definitely better.

When we come to the duration of treatment and consider the amount of work that penicillin has to do to reach the organisms within the infected avascular tissue, it is probable that the duration of treatment is nearer to that of subacute bacterial endocarditis in which we did not get permanent results until a minimum of twenty-one days was reached.

Local penicillin as an adjunct to systemic penicillin made no difference to the results. In fact the recurrence rate when penicillin was used in addition to systemic penicillin was statistically higher than those who had systemic penicillin only.

Systemic penicillin, therefore, as far as we know, localized infection to the initial site in the bone, and complications were either cured or prevented. This has also been true of prophylactic systemic penicillin as far as our 11 cases can assist us in this opinion.

Primary union has been achieved in the face of infection and the dissemination of infected material prevented. In prophylaxis the uniformly satisfactory results obtained in soft tissue lesions liable to cause an osteomyelitis, and the use of a systemic penicillin "umbrella" in the surgery of infected lesions, should help to lessen the incidence of this disease.

Early diagnosis and early treatment with penicillin will prevent infection of avascular tissue and assist in the absorption and remodelling of infected avascular tissue.

At certain sites in the body owing to the proximity of vulnerable tracts or cavities and in the later stages of the disease, radical extirpation of infected tissue if appropriate and accessible will, under the cover of penicillin, still be necessary. Long incisions and drainage without the removal of infected bone appear from our results to be unwarranted.

It is my conclusion that the future holds great promise for the employment of penicillin in all forms of penicillin-sensitive infections, and this includes infections that happen to alight in bone.

Tropical Medicine.

KALA-AZAR IN INFANCY: Prof. J. E. DEBONO, *Proc. Royal Society Med.*, **40**: 155, 1947.

Although indigenous leishmaniasis does not occur in England, cases might be, and in fact are, imported from endemic areas. Their very rarity makes diagnosis more difficult unless the possibility of the disease and its main features are kept in mind. There is no essential difference between infantile and adult leishmaniasis. The parasite and the pathology are the same and it is more exact to speak of leishmaniasis in infancy. Infection in infants is associated with canine leishmaniasis and is most prevalent in the Mediterranean area. In China older children are affected and in India and the Sudan, adults are attacked. There is no hard and fast rule, however, and it is quite possible for a baby to acquire the disease in an area where the adult form is prevalent. It is important to remember that leishmaniasis is not necessarily a tropical disease and that in Europe itself it could occur in any place south of the latitude of Paris.

The basic pathological lesion is a marked and universal proliferation of the reticulo-endothelial system. On inoculation by the phlebotomus the flagellate leishmaniae penetrate reticulo-endothelial cells in the immediate neighbourhood and change into the spherical form known as the "Leishman-Donovan Body" (L.D.B.). Here they multiply and pass on to other R.-E. cells via the minute protoplasmic processes which connect these cells together. In tropical sore the infection remains localized, in visceral leishmaniasis the parasites are disseminated throughout the whole R.-E. system. Probably dissemination occurs through the detachment of infected endothelial cells and their carriage by the circulation to the spleen, liver, bone-marrow, glands and intestines.

Under the stimulus of parasitic invasion both the cells and the reticulum proliferate. The spleen enlarges to a size only rivalled by myelocytic leukaemia; the Malpighian bodies disappear. In the liver the proliferation of Kupffer's cells produce atrophy of the parenchyma. The superficial lymph glands are only moderately enlarged and rarely give rise to diagnostic difficulties. The enlargement is more marked in the tracheo-bronchial and mesenteric groups, but this is probably the result

of repeated secondary infections. In the intestines a sheet of infected cells sometimes lines the subserous membrane. Ulcers may form from time to time in the colon and give rise to dysenteric symptoms with passage of blood and mucus.

The most important changes take place in the bone-marrow. The haemopoietic elements are encroached upon and crowded out by the infected and proliferated R.-E. tissue, producing a condition analogous to aplastic anaemia. The anaemia of leishmaniasis is normocytic and orthochromic. There is no evidence of haemolysis and no reticulocytosis. The erythrocytes are not injured in any way but their production is seriously interfered with. In ordinary cases the average red count is 2,500,000 per c.mm., but in severe and advanced cases it may be as low as 1,000,000 per c.mm. The myelocytic tissue suffers to an even greater extent and leucopenia is a prominent feature of leishmaniasis. In advanced cases the leucocytes are often reduced to 2,000 per c.mm. or even less. The granulocytes are chiefly affected and a condition tantamount to agranulocytosis may occur. This neutropenia is no doubt responsible for the great liability to secondary infections and the occurrence of cancrum oris. There is a relative as well as an absolute monocytosis. The magakaryocytes are reduced to vanishing point and in the circulation the platelets may fall to 100,000 or under. This thrombocytopenia results in a tendency to haemorrhages, purpura and ecchymoses.

The plasma shows marked alterations of which the most important is a fall in the albumen and a rise in the globulin fraction. The changes in the plasma are the basis of a number of diagnostic tests and produce an accelerated sedimentation rate. The fall in the albumen level together with the low haemoglobin are responsible for the oedema commonly seen in advanced cases.

The clinical picture is a reflection of the underlying pathology. The incubation period is long, corresponding to the slow invasion and dissemination. It is usually stated to be between three and four months, but longer periods occur. If one added the latent period between the first symptoms and the full development of the disease eighteen to twenty-four months might easily elapse, and the possibility of such a prolonged incubation has to be considered in investigating the history. The onset of kala-azar is usually insidious with slight irregular fever and a gradual loss of appetite, colour, weight and energy. As these symptoms occur at a time of life when trivial complaints are common, they are often neglected and it may be months before the real nature of the disease is recognized. Occasionally, and more frequently in

children under 2 years, the onset is acute with hyperpyrexia, chills and vomiting. The initial febrile period lasts two to six weeks and constitutes the first "wave". This is followed by an intermission—the so-called "latent period" which lasts another two to six weeks but can be much longer. Thereafter the fever rises again and the spleen begins to enlarge and continues to do so at the rate of two to three finger-breadths per month.

Untreated leishmaniasis in infants is invariably fatal. The course could be acute, subacute or chronic. Acute leishmaniasis is commoner in young babies. It is characterized by a violent onset, high continuous fever, and rapid but moderate enlargement of the spleen. There is no latent period and death occurs in three to four months. The majority of cases in Malta run a subacute course lasting six to eighteen months; the trend is progressively downwards with persistent fever, increasing splenomegaly and progressive anaemia and cachexia. It is punctuated by alternating attacks of diarrhoea and bronchitis. The disease may be cut short by a fatal attack of bronchopneumonia or by the development of cancrum oris. Otherwise the child dies of marasmus and exhaustion. Sudden and unexpected death sometimes occurs even in children, who are apparently improving under treatment. It is heralded by hyperpyrexia, vomiting, rapid pulse, intense dyspnoea, cyanosis and extensive haemorrhages under the skin. The picture is reminiscent of acute suprarenal haemorrhage.

In older children the disease sometimes runs a chronic course lasting for two or more years with periods of almost total recovery, in which the only symptom is the splenomegaly. According to some Continental authors many of these cases recover spontaneously.

The diagnosis of leishmaniasis before the spleen is definitely enlarged is very difficult and often is only made retrospectively. At this stage leishmaniasis presents itself as a fever of unknown origin. The leucopenia is helpful but the most important clue is afforded by an analysis of the temperature by means of a two or four-hourly temperature chart. The fever in leishmaniasis is made up of a number of short sharp rise or *accesses* of temperature in the twenty-four hours. There is one about 11 a.m., perhaps another rise in the evening and almost invariably a rise at night, followed by sweating in the early hours of the morning. The double and even triple rise of temperature is very suggestive. In its absence the diagnosis must be made by exclusion and confirmed if possible by culture of the parasite from the blood.

In the fully-developed case diagnosis is easier. The appearance is often characteristic. The child is thin, emaciated, looks miserable and suffers from general hypotonia. The abdomen is swollen and shows a marked protuberance either in the left hypochondrium or in the hypogastrium when the child stands up. The facies varies. In dark children there is an almost pathognomonic deep greenish pigmentation of the face and exposed parts. Fair children develop a marked pallor, which together with the slight generalized oedema suggests subacute nephritis.

The spleen at this state is often enormously enlarged reaching down into the left iliac fossa and crossing over to the right half of the abdomen. It is firm but not hard and there is no tenderness unless there has been recent infraction. With considerable enlargement and hypotonic muscles, ptosis of the spleen is almost invariable, hence the pendulous and protuberant abdomen.

The disease has to be differentiated from the long list of conditions which produce splenomegaly in children. Careful clinical examination and repeated examination of the blood enable one to eliminate the majority of these including malaria. In young babies the possibility of congenital syphilis has to be considered. In Malta the diagnosis is complicated by the frequency of undulant fever, but in this disease the spleen never attains the size it reaches in kala-azar.

The decisive test—to be carried out in all cases before treatment is started—is the demonstration of the leishmaniae. This is best done by splenic puncture. Many tests and procedures have been devised to avoid the risk of this supposedly dangerous operation, but none could compare with it as regards reliability. The aldehyde, the antimony and Ray's tests are not usually positive before the fourth month and they may be positive in other conditions. The complement-fixation test is still in its infancy. Blood culture requires a meticulous technique and at best is positive in only 70 per cent of the cases. Bone-marrow, liver and gland puncture have been suggested and used as alternatives. Of these tibial puncture is probably the best, but in my opinion it is more dangerous and certainly more painful than splenic puncture. The most important point, however, is that it is often negative when the splenic juice is teeming with parasites.

- Splenic puncture is simple, and when performed with proper precautions is practically devoid of danger. In my experience extending over 2,000 cases there has been two fatalities—one in

a child suffering from leukaemia and the other in a moribund patient.

The specific treatment of infantile leishmaniasis was introduced by Caronia of Catania in 1914. The sodium-antimony tartrate used originally has been substituted by pentavalent organic antimony compounds, which are equally effective but less toxic. There are a large number of these preparations each with its own advocates and enthusiasts, but I think success depends more on the scheme of treatment and on attention to details than upon the drug itself. Before the war Neostibosan was used, but since 1940 Neostam—the only preparation that could be obtained at the time—has been employed with very satisfactory results. In the last series of 200 cases there has been 3 deaths and 7 relapses, a result which compares well with those obtained in other clinics. Stilbamidine, a different kind of preparation, which has proved very effective in the resistant Sudan kala-azar was ineffective when tried in Malta, and its use had to be abandoned on account of the severe toxic reactions.

Most of the patients in Malta were treated as out-patients. The injections were given three times a week on alternate days. It was found that the intensive treatment by daily injections was not suitable for children. It upset them too much and was often followed by relapses. The injections were always given intravenously, in young infants in the jugular vein. This presented no special difficulty. Absorption after intramuscular injection was often irregular and in many cases the drug failed to reach a sufficient concentration in those situations where it was needed. The result was the development of antimony fastness on the part of the leishmaniae, with persistence of the infection or an early relapse. When intramuscular Neostibosan was the standard treatment the relapse rate was as high as 20 per cent.

It was impossible to calculate the dose according to the weight as young children required proportionately more than older ones. The following plan was therefore adopted. The initial dose was 0.05 gramme. This was increased by another 0.05 gramme (or 0.025 gramme in the case of infants under 1 year and debilitated patients) until the limit of tolerance, shown by immediate vomiting, was reached. The average dose was 0.10 gramme to 0.15 gramme in babies under 1 year, 0.2 gramme to 0.25 gramme in those under 2 years and 0.3 gramme in older children. The treatment consisted of 16 injections. The full course was given even if improvement was immediate. On the other hand no attempt was made to exceed this number of injections even if the

spleen remained large. In most cases the splenomegaly receded without further treatment. If after two months the spleen was still large and L.D.S.s were still present, another course, with a slightly higher dosage was given. Increasing the number of injections or starting a new course before the end of two months was followed in most cases by signs of antimony poisoning.

Adjuvant treatment is of the greatest importance. Hospitalization is avoided as much as possible to avoid secondary infections. Iron and vitamin supplements were given in all our cases. Strict oral hygiene was insisted upon to avoid the development of cancrum oris. Blood transfusions were given whenever the haemoglobin fell under 40 per cent. Penicillin has no specific effect on the leishmaniasis itself, but it has proved invaluable in the treatment of intercurrent bronchopneumonia and together with blood transfusion was life-saving in the case of cancrum oris.