

number of cases treated at the London Hospital, and they arrived at the following conclusions.² Intramuscular and subcutaneous injections were first used. In primary syphilis no case failed to become negative, the average time being five weeks. In secondary syphilis one-third of the cases failed to become negative. Where a negative result was obtained the average time was 8 weeks. In tertiary syphilis only one case became negative. It is, therefore, obvious that the longer the infection the more difficult it is to influence the Wassermann reaction by treatment. With intravenous and intramuscular injections combined, no case of secondary syphilis failed to become negative. The average time was 6½ weeks. In tertiary syphilis nearly one half of the cases gave a negative reaction. There is no doubt, therefore, that the intravenous method is more effective than the intramuscular or subcutaneous. As large doses as are compatible with safety are indicated as early as the diagnosis is made, with a view to preventing the development of a strain of spirochætae resistant to the drug.

Administration of Salvarsan.

[The administration of salvarsan was next considered, and the apparatus in use at the London Hospital, devised by Dr. McIntosh and Dr. Fildes, was demonstrated.]

In the McIntosh and Fildes apparatus the injection is introduced by air-pressure, the pressure being supplied by a rubber pump connected with a bottle containing the solution. The air from the pump is passed through sterile cotton wool. The apparatus is portable, and all its parts can be sterilised and brought to the bedside of the patient in a sterile condition. It is important to observe care in the preparation of the solution, especially in its neutralisation with alkali, its freedom from undissolved particles, and its proper dilution, several of the fatalities following its use being due to the absence of these precautions. The directions given by the makers should be followed with scrupulous attention.

It has now been shown possible to eliminate almost all the untoward after-effects of the intravenous injection—viz., shivering, pyrexia, and vomiting—by the use of a saline made from freshly distilled water. It is believed that ordinary distilled water contains matter, whether bacterial or other, which is responsible for these immediate after-effects. Pyrexia, shivering, &c., have been produced in my clinic in non-syphilitic patients by the injection of 300 c.c. of normal saline prepared in the usual way. These observations have been made by my former clinical assistant Mr. H. Dearden in conjunction with Dr. McIntosh and Dr. Fildes. It is now the exception with the use of saline made with redistilled water to see any rigors, pyrexia, or vomiting after the intravenous injection of salvarsan.

[The fatalities observed after the use of salvarsan were commented upon, and it was shown that a number of them were undoubtedly due to faulty technique, e.g.: (1) failure to neutralise the highly toxic acid solution; (2) insufficient dilution; (3) sepsis leading to thrombosis and embolism; and (4) failure to insist upon patients being kept at rest after the injections. In other cases the drug had been used in unsuitable cases, moribund infants, general paralysis, extreme cachexia, and grave non-syphilitic visceral disease.]

It can be stated on the authority of the agents of the manufacturers that about a million doses of salvarsan have been sold, and presuming that half a million subjects have received injections, it becomes obvious that the mortality cannot be so high as certain authors suggest. Naturally all the fatal cases have not come to light, but supposing even 50 fatalities have occurred the mortality will not be more than 0.01 per cent., and this with a potent drug requiring a careful technique and selection of cases still in the experimental stage cannot be considered high.

The important question of the permanence of the results cannot be settled yet. Definite clinical relapses undoubtedly follow the use of salvarsan. In one case at the London Hospital, after apparent cure, the patient had a return to a positive Wassermann reaction after 36 weeks, in another after 16 weeks. During the period of observation I have not interfered with the effect of the new remedy by the administration of mercury for fear of confusing the issue. There can of course be no reason why mercury should not be given

to supplement the effect of the salvarsan, and it may perhaps be ultimately proved that this is the best method of treating syphilis, and it is now advocated by many eminent authorities.

Conclusions.

My own conclusions I may summarise as follows:—

1. The early diagnosis of syphilis is of the utmost importance (a) to prevent the spread of the infection, and (b) for efficient treatment. Treatment should be begun in the primary stage. There should be no waiting for secondaries.

2. A doubtful chancre should be examined for spirochætae. The dark background illumination method affords a reliable means provided the lesion has been untreated. Such an examination ought to be within the reach of all patients in the towns and might be arranged for by the health officer.

3. The Wassermann reaction is of the highest utility in the diagnosis of secondary and tertiary eruptions. If carried out by the improved technique practically every secondary case gives a positive reaction. The reaction is also of value in determining and estimating the effect of treatment. The Wassermann reaction ought to be as much within the reach of every patient as is the Widal reaction or the examination of diphtheritic swabs.

4. Treatment by mercury is undoubtedly efficacious. Nearly every case is influenced. After eight or more courses of injections 21 per cent. of the patients still have a positive Wassermann reaction. After two or more years' treatment by mercurial pills 30 per cent. give a positive Wassermann reaction. In the latter case it is naturally extremely difficult to be sure that the patient takes the remedy.

5. As regards salvarsan the danger is not great in properly selected cases. With rigid precautions taken in the preparation of the injections and with an aseptic technique the intravenous method has many advantages. The use of redistilled saline eliminates the pyrexia, rigors, vomiting, and other unpleasant symptoms in nearly every case.

6. The immediate effects of salvarsan both on the clinical manifestations of the disease and on the Wassermann reaction are far more rapid than are those of mercury. The ultimate effects in primary syphilis are remarkable; in early cases the secondary stage may be aborted. The effects in well-developed secondary syphilis are less striking and relapses certainly occur, and it remains for time to show the permanence of the results. In tertiary syphilis healing is extraordinarily rapid, but the Wassermann reaction is difficult to alter and relapses are likely to occur.

7. Everything points to the importance of early diagnosis and early treatment.

I am indebted to Dr. McIntosh and Dr. Fildes for many observations made in this paper. Their work has been most carefully carried out, and I am glad to know that it is now generally available through their valuable monograph.

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INTESTINAL MYIASIS.

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CASES of intestinal myiasis in this country are sufficiently interesting and uncommon to be worth recording. I met with one last summer, of which the following is a short account, necessarily incomplete because the mother of the child never came back to tell me how the case ended, nor gave me the further information which I had asked for.

Notes of case.—The child, a boy, aged 1 year and 2 months, was brought because his mother, very much alarmed, noticed that on Sept. 29th, when she lifted him up from the bed, there were a number of living "worms" under a small piece of flannel upon which he had been lying. More of these were found whenever he was left on the bed, though none were noticed elsewhere. The greatest number, probably about 50, were seen in the morning, and always under the flannel or mackintosh upon which he had been left all night. Fewer were found in the same situation during the day. They were still being found in about the same numbers when I saw the child on Oct. 2nd. The mother said that there were never any in the napkin, and that the stools were always free from them; this was certainly the case in the one which I saw, and they were found even when the child had not passed a motion. The infant, though rather poorly nourished, had

² For fuller details see their monograph "Syphilis from the Modern Standpoint," published by Arnold. See also THE LANCET, vol. ii., 1910, p. 1684; vol. ii., 1911, p. 213.

remained in his usual health and had had no sickness, constipation, diarrhoea, abdominal pain, or loss of appetite.

The "worms"—obviously dipterous larvæ, of which the mother brought about 40 in a bottle—were very active at first, but unfortunately they died before I reached home, probably poisoned by something in the bottle. I was therefore unable to breed any of the flies, but Mr. E. E. Austen, of the British Museum (Natural History), kindly examined them and identified them as larvæ of *Musca domestica*, Linn., the common house-fly, and one larva of *Fannia canicularis*, Linn., the small house-fly. He said that they were in their last instar and were probably full-grown. There is little doubt that they had left the child voluntarily, and had crawled under the piece of flannel, seeking a suitable place in which to pupate. The patient's mother said that she had not noticed many flies in the house, and that all the food was kept in a cupboard on the landing, outside the room.

Remarks.—Though *Musca domestica* is one of the insects which are most commonly concerned in these cases of accidental parasitism, I can only find ten recorded cases. In his paper read before the Entomological Society of London, 1837, the Rev. F. W. Hope collected three cases, in two of which the larvæ were vomited. Robineau Desvoidy in 1849 described a case with headache, vertigo, and vomiting, which ended in death. In Lublinski's case in 1885 full-fed larvæ of *Musca domestica* were vomited. W. M. Jones records a case which occurred in Sheffield of a man, aged 52, who passed 20 larvæ of this fly per anum; and Wirsung in 1906 gives two German cases, one in a breast-fed child aged 5 months, and the other, in which the species is more doubtful, in a child 1 year old. Mr. Austen tells me that he knows of a recent case in which larvæ of both *Musca domestica* and *Fannia canicularis* were passed together by a young baby. This is the only case I have heard of exactly like mine.

The dipterous larva most commonly found in the intestinal tract in temperate regions is that of *Fannia canicularis* (formerly known as *Homalomyia* or *Anthomyia canicularis*). The allied *F. scalaris* sometimes occurs, and Ozokov records a case in which both were found. *F. canicularis* has also been found in company with *Musca corvina* and *Calliphora vomitoria*, the bluebottle fly. Many other species have been found in cases in temperate countries, but the condition is probably much commoner in the tropics.

One of the most curious is the rat-tailed larva of the drone-fly, *Eristalis tenax*, Linn., of which I find four certain and one probable case in the literature. One occurred in a child aged 1 year and 6 months, and in an Italian case it was associated with the larva of *Calliphora vomitoria*.

Larvæ of the following flies have been found in cases of intestinal myiasis in Europe and North America, in which the species concerned has been identified:—

- Stratomyidæ.—*Microchrysa* (*Chrysomyia*) *polita*, Linn.
- Syrphidæ.—*Eristalis tenax*, Linn.; *Helophilus pendulus*, Linn.
- Estridæ.—*Tachina* (*Musca*) *larvarum*, Linn.; *Gastrophilus equi*, Fabr., or an allied species
- Sarcophagidæ.—*Sarcophaga* (*Musca*) *carriaria*, Linn.; *S. hæmatodes*, Meig.; *S. hæmorrhoidalis*, Fall.; *Wohlfahrtia* (*Sarcophila*) *magnifica*, Schiner.
- Muscidæ.—*Musca corvina*, Fabr.; *M. domestica*, Linn.; *Lucilia* (*Musca*) *caesar*, Linn.; *L. regina*, Macy., possibly intended for *Phormia* (*Lucilia*) *regina*, Meig.; *Calliphora* (*Musca*) *vomitoria*, Linn.
- Anthomyidæ.—*Fannia* (*Anthomyia*, *Homalomyia*) *scalaris*, Fabr.; *F. saltatrix* R.D. = *scalaris*, *F. canicularis*, Linn.; *F. incisurata*, Zett.; *F. manicata*, Meig.; *Allognota agromyzina*, Fall., is perhaps the species recorded as *Musca nigra*.
- Micropezidæ.—*Calobata* (*Musca*) *cibaria*, Linn.
- Piophilidæ.—*Piophila casei*, Linn.
- Geomyzidæ.—*Teichomyza fusca*, Mcq.

Their presence usually causes only slight symptoms, and even in cases where thousands of larvæ are passed those most common are anorexia, nausea, colicky pain, and constipation or diarrhoea. In the more severe cases there may be vomiting (*hæmatemeses* has been noticed once) and diarrhoea of dysenteric character, sometimes accompanied by the passage of a little blood, and in one instance true *melæna*. Nervous symptoms—such as headache, vertigo, and epileptiform convulsions, which ceased with the expulsion of the larvæ—have been observed in a few cases. Chichester records one in 1806, in a boy aged 14, who had urticaria, violent abdominal pain, vomiting, *hæmatemeses*, and inability to speak or swallow owing to pharyngeal and œsophageal spasm; later there was loss of consciousness.

Death has occurred in four cases, but the proof that the

larvæ were the direct cause is not very convincing in two of these.

There is still a little doubt as to how the larvæ gain access to the intestinal tract. It is generally supposed that ova laid on dressed meat, over-ripe fruit, sour bread, cheese, unboiled vegetables, or watercress by the various species of fly, each on the food suitable for its larva, are ingested, or in such a species as *Eristalis tenax* and *Helophilus pendulus* ova or young larvæ may be taken into the stomach in dirty water or with watercress.

It is possible, but most unlikely, in view of the strong instinct which leads almost all insects to lay their eggs on food suitable for the larva, that the fly ever lays its eggs directly on the living person, especially in such species as *Eristalis tenax*, the drone fly, and the black and yellow hover fly, *Helophilus pendulus*, or *Piophilus casei*, the cheese fly. The number of larvæ, several thousand, passed in some cases is far too great for one fly to lay at one time. The house-fly, for example, usually only lays its eggs in batches of about 120 to 150. But one of the strongest proofs that the ova are ingested is the comparative frequency with which the larvæ of two species of fly have been found associated, and which makes it almost certain they obtained ingress in no other way. The fact that in many instances the larvæ are only vomited also suggests that they were taken in by the mouth and developed in the stomach, as occurs normally in *Gastrophilus*. Chatin experimented with larvæ of *Teichomyza fusca* from a case of his, and he found that they not only lived for several days completely immersed in water or oil, but also survived when introduced into the stomachs of various mammals, and he proved their power of resistance to the gastric juice and small need of oxygen.

Jepson has shown that in the case of the house-fly development at 70° F. is very rapid. The ova hatch in 24 hours and the larvæ attain their full growth in 11 days, and in the hotter climate of India and Ceylon they are fully developed in 5 days. In the high temperature of the intestine it is probably as rapid as in India.

In many instances the source of infection has been traced with some certainty to tainted food, and in Hutton's case ova or larvæ of *Eristalis tenax* were probably swallowed in water from a golf course.

Pasquale has given the most convincing instance. He had four cases in Italian soldiers, and in the case of one of them he found that in a heap of potatoes—some of which the man had eaten, and which were beginning to decay in parts—there were larvæ identical with those passed by the soldier. The man had probably eaten them as ova, and the resulting larvæ had developed in his intestine synchronously with those in the uneaten potatoes.

The cases most difficult to explain are those in which larvæ have been passed for some months, and in two cases for some years, though in one of these there were fewer in the winter. These are almost certainly cases in which the source of infection has not been discovered, and ova have been taken into the body at frequent intervals. Even Cairns's case (which lasted for three years and in which as many as 1000 larvæ were passed in a single day) and Blankmeyer's case (which lasted 12 years) can be explained in this way, since Jepson has shown that even in this country house-flies will lay their eggs all through the winter and the larvæ will develop successfully if the conditions are favourable.

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DOUBLE COXA VARA WITH OTHER DEFORMITIES OCCURRING IN BROTHER AND SISTER.

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THE two children who are the subjects of this communication present a peculiar collection of skeletal deformities for which it is difficult to find a satisfactory etiology. The girl, aged 9, came under observation for a well-marked double coxa vara. The parents gave a history of pains in the back and an alteration in her gait dating back 18 months only. On examining her it was found that besides the hip affection she had abnormally short arms, many joints that were enlarged or creaked on movement, and eversion of the feet. (See Fig. 1.) Systematic examination of the bones with the X rays revealed deficient, unequal, and in some cases divided development of many of the epiphyses. Inquiry of the parents elicited the fact that a younger brother, aged 6½, had lately shown signs of lameness. He was admitted to the hospital and was found to have double coxa vara of a milder degree, and also a forward luxation of the upper ends of both radii. With the X rays it was seen that ossification in most of the bones was considerably advanced for his age. Brief notes of the cases are as follows:—

CASE 1.—A female, aged 9, was admitted to the Hospital for Sick Children, Great Ormond-street, on Nov. 26th, 1910, under the care of Mr. H. A. T. Fairbank. Her parents gave the history that for the last 18 months she had complained of pains in the back after exertion and became easily tired. Pains in the joints had not been a symptom. Her previous health had been good. There was an indefinite history of a fall when a few months old. As regards family history both father and mother were healthy. A grandmother had died from consumption. There was no history of syphilis or gonorrhœa. There were seven children, one dead from whooping-cough. The eldest, a girl aged 14, suffered from heart disease and rheumatism. The others, except Case 2, were healthy and normal in every way. There had been no miscarriages.

On examination it was found that the patient's general appearance was that of a particularly bright and intelligent child of a short and stumpy conformation. All the joints of the extremities were rather prominent. (Fig. 1.) The upper and lower limbs looked short in comparison with the trunk. The trochanters were very prominent, and there was some lordosis. Both femora showed well-marked coxa vara. The trochanters stood out prominently and were displaced upwards, on the right side to half an inch below, and on the left side to the level of the anterior superior spine. The subpubic angle was much increased. At the right hip-joint flexion and slight extension were possible, and to a very slight degree abduction and external rotation. No other movements were allowed. The left lower limb was held slightly abducted. No movements took place at the left hip except flexion and a little extension. Creaking could be felt in both joints. The knee-joints were in keeping with the other joints in being somewhat prominent. The enlargement was abrupt and irregular, rather than fusiform. The movements were free, and except creaking there was nothing further to note. Both feet were everted, but the arch was good and there was no flat-foot.

In the upper extremity the shortness of the limbs was obvious, in the vertical position the finger tips only reaching to 3½ inches below the tips of the trochanters. In a healthy boy of nearly the same age and size the fingers reached to 6½ inches below the upper limit of the trochanters. The shoulders were normal, except for the adventitious sounds on

movement. The elbows were symmetrically enlarged. At the elbow flexion and extension could be performed perfectly, but pronation and supination were incomplete. There was considerable thickening of the internal condyle and the head of the radius could be luxated slightly forwards by pressing from behind. Crackling could be felt on movement. The wrists were rather larger than normal, but there was no alteration in bony points or movements. The fingers were short and flat, with prominent interphalangeal joints. Flexion was freely performed at the interphalangeal joints, but could not take place at the metacarpo-phalangeal. In other words, as the patient herself vouchsafed, she "could not make a fist." This is interesting, inasmuch as her brother (Case 2) presented a similar deformity. The parents stated that this condition had been present since birth. The X rays did not give any clue to the cause of this disability. The movements of all the joints were entirely painless. The circulatory and respiratory systems were normal. The teeth were good; there was no digestive disturbance. There were a few small glands palpable on the right side of the neck, but the rest of the body was free, and the spleen was not enlarged.

CASE 2.—A male, aged 6½, came under observation on Dec. 24th, 1910. In the course of questions concerning the family history of Case 1 it was ascertained that another child had developed lately a peculiar gait. He was accordingly brought to the Hospital for Sick Children and admitted under the care of Mr. Fairbank. It was then found that he was the subject of coxa vara also. The history given was that the change was noticed first ten months previously. No cause could be assigned. The patient had been otherwise perfectly healthy in every respect. He looked a healthy and intelligent boy, without any signs of deformity excepting enlargement of the elbow-joints, a tendency to lean forwards when standing due to slight flexion at the hips, and an almost waddling gait. The left lower limb had half an inch of shortening; the trochanter was displaced above Nélaton's line to half an inch below the level of the anterior superior spine; abduction was slightly, rotation inwards greatly, limited. On the right side the trochanter was displaced upwards to 1 inch below the level of the anterior superior spine. Both the trochanters were prominent, and both hips slightly flexed, but there was no true lordosis.

In the upper extremities interest centred chiefly on the elbows. It was found that there was a forward luxation of the upper ends of both radii. (Fig. 5.) The upper end of the radius formed a visible projection in front of the external condyle and could be grasped easily between the finger and thumb, and the finger could be inserted into the concave upper surface of the radial head. All movements were performed well, and the boy had perfectly useful joints. The condition was quite symmetrical on both sides. The interphalangeal joints of the fingers were prominent, especially in the case of the middle finger of the left hand. As in Case 1, flexion could be performed at the interphalangeal joints, but not at the metacarpo-phalangeal. The spine, ribs, and clavicles were normal. The teeth were good and the cardiac and respiratory systems were sound. There were no enlarged glands, and the spleen was not enlarged.

It is on examining the skiagrams that the peculiarities of the cases are manifest. Unless stated to the contrary, it may be taken that the abnormalities are the same on both sides, differing only in degree.

In the hip-joint of Case 1 the epiphysis is quite undeveloped and appears as a thin scale-like shadow in the acetabulum. The neck, on the other hand, is greatly thickened, giving the impression of considerable bony proliferation. The edge of the acetabulum is woolly and indistinct. The shaft of the femur is abnormally thin.

In the lateral view of the knee-joint the curious condition of the patella is seen. (Fig. 2.) It appears to be ossifying in four separate and unequal portions. In the antero-posterior view the outline of the patella can be distinguished over the external condyle. On the inner side is an apparent loose body with a corresponding depression in the inner condyle. It is difficult to explain this except perhaps as a separately ossifying part of the femoral epiphysis. Were the patella not to be seen on the outer side, it might be taken as one of the parts of that bone seen in the preceding skiagram.

The skiagram of the tarsus shows the advanced ossification of the bones. (Fig. 3.) But, in addition, there is seen a new