SOME ASPECTS OF CONGENITAL SYPHILIS*

BY

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Introduction

In 1917 Sir William Osler, in his Oration to the Medical Society of London, referred to the 20,000 syphilitic stillbirths which Sir Arthur Newsholme estimated then occurred annually in this country, and the numerous cases of eye, ear, bone, and joint, and—above all—nervous and mental disease which are due to congenital syphilis. In 1928 and again in 1930 Colonel Harrison referred to “the 16,000 and probably many more syphilitic expectant mothers who should be under treatment annually for their syphilis but are not.” In 1930 Marjorie Smith-Wilson, using two different methods of computation,

treated by the surgeons, so that it was a graceful act on their part to permit a physician to discourse to them on infantile syphilis.

Present-Day Statistics

The tables in this article have been compiled from the Annual returns of the Registrar-General. Table I gives the number of deaths under one year of age in England and Wales from congenital syphilis, meningococcal meningitis, and tuberculous meningitis and tuberculous disease of the central nervous system from the years 1933 to 1947. Two points of interest are shown in this Table—first, the high death rate from congenital syphilis as compared with the two specifically meningeal infections; in the year 1943 for example, I think it is quite probable that with the

TABLE I

DEATHS UNDER 1 YEAR OF AGE IN ENGLAND AND WALES FROM CONGENITAL SYPHILIS, MENINGOCOCCAL MENINGITIS, AND TUBERCULOUS MENINGITIS

(From the Registrar-General's Returns)

Disease	Annual average of 5 years		1943	Annual average of 5 years 1943–1947	1947
	1933–1937	1938–1942			
Congenital syphilis	161	111	153	114	83
Meningococcal meningitis ..	185	249	187	172	182
Tuberculous meningitis and C.N.S. tuberculosis ..	214	196	179	165	153

estimated that of the children attending the elementary schools in England and Wales at any one time no fewer than 7,000 and possibly as many as 20,000 were syphilitic.

In 1896 Dr. J. A. Coutts, a physician at the Shadwell Children's Hospital, delivered the Hunterian lectures at the Royal College of Surgeons, although he himself was a physician. The title chosen by him was “Some Aspects of Infantile Syphilis.” For very many years the venereal diseases, syphilis and gonorrhœa, were diagnosed and

TABLE II

DEATHS IN ENGLAND AND WALES FROM SYPHILIS

(From the Registrar-General's Returns)

Age	Annual average of 5 years					
	1918–22	1923–27	1928–32	1933–37	1938–42	1943–47
Under 1 year ..	1202	628	371	182	116	114
Under 30 years ..	1375	751	491	261	209	180
From 1 to 30 years ..	173	123	120	79	94	66

cases of congenital syphilis certified as having died from malnutrition, prematurity, atelectasis, sepsis, or some other camouflage, the number of deaths under one year of age from congenital syphilis may have equalled or even exceeded those from either meningococcal or tuberculous meningitis. These figures may come as a surprise to many members of our profession. Secondly, the Table shows a very gratifying diminution in the number of deaths from congenital syphilis, the number in 1947 being about half the annual average for the five years 1933–37; the two other infections do not reflect such a satisfactory state of affairs.

Table II, which gives the number of deaths in England and Wales from syphilis under 1 year of

* An Address delivered to the Medical Society for the Study of Venereal Disease on March 25, 1949.

age, from 1 to 30 years, and under 30 years of age, also shows the tremendous improvement which has taken place during the past thirty years. The annual number of deaths under one year, during the five year period 1943-47 was less than one-tenth the number during the period 1918-22. When we analyse the figures for the deaths from 1 to 30 years of age we find that the improvement is not nearly so marked; the reduction in the 1 to 30 years' period being from 173 to 66 instead of to 17 if the reduction had been in the same proportion as for the patients under one year. I have for many years held the view that the official figures for congenital syphilis in England and Wales, whether they be the cases attending the clinics for the first time, or the recorded deaths from the disease, fail to give an adequate picture of the evil. Dr. Wattie in her paper to this Society in 1944 made the statement that the marked difference in the recorded rates for congenital syphilis in the two countries (England and Wales and Scotland) showed that the clinic figures cannot be taken as an accurate index of the incidence of the disease. Dr. Wattie's Table shows that whereas the population of England and Wales is roughly about eight times that of Scotland, the clinic figures for new cases of congenital syphilis recorded in England and Wales are only two or three times as big as those recorded in Scotland. The legitimate inference is that the diagnosis is better made in Scotland for the disease is kept in mind by the various authorities comprising the public health service—the antenatal, child welfare, school medical service, and venereal diseases treatment scheme, particularly in the big towns.

There is of course the other and perhaps more obvious explanation, namely that the disease is really much more prevalent in Scotland than in England and Wales, which I do not believe to be the case.

Changing Manifestations of Congenital Syphilis

During the time (now over half a century) that I have seen cases of congenital syphilis, I have witnessed a profound change in the way in which the disease manifests itself. In my student days and for some years afterwards frank cases of the disease were very common, and their recognition, even before the discovery of the *T. pallidum* and the Wassermann test, presented no great difficulty in most cases. The snuffles, the characteristic and rather pleomorphic rash on the face and body, particularly in the ano-genital region, the enlargement of the spleen and liver, the lymphadenitis, and the lesions of the bones and joints rendered most of the cases obvious. They were treated in the ordinary medical or surgical out-patients' departments, or in the skin department,

to which many of them were sent for confirmation of the diagnosis. Treatment was by the time-honoured drug, mercury, which seemed to act as a charm in many cases. After treatment lasting a few weeks to two months a cure usually seemed to have been effected. We did not realize at the time that these cures were not real but only apparent, and that after a period of latency, it might be only three or four years, or it might be ten or more years, the manifestations of late congenital syphilis would arise in the form of eye, ear, bone, or mental disease.

At a rather later epoch a species of modified immunity or a communal resistance to the disease seemed to establish itself, so that the infantile lesions became less marked, until we come to the period of the 1914-18 war. At this time the *Treponema* seems to have been reinvigorated by the introduction of new strains or by some other evolutionary process; severe cases were frequent, and many died in spite of attempts at treatment with the new drugs—the arsphenamines. Others died not in spite of but because of treatment, of a Herxheimer reaction so it seemed, though in all probability they would have died in any case from the intensity of their infection. Those who recovered after the combined treatment with arsenic and mercury or bismuth, appeared to be really cured,* for it was possible to follow some of them for ten or more years, during which their annual overhaul, including a blood test, remained satisfactory. Unfortunately, the upheaval caused by the 1939-45 war prevented follow-up for a longer period and led to loss of contact with many former patients.

In the 1930's, probably owing to the increasing use of the arsphenamine and heavy metal treatment and to the more prolonged use of these drugs, the virulence of the *Treponema* again appeared to become less marked and cases of congenital syphilis became less conspicuous than formerly, so that unless the physician were suspicious and the disease were looked for it was very likely to be missed, it might be for a period of months, sometimes even for years, much to the detriment of the patient. Another factor in the masking of cases of congenital syphilis has been the antenatal treatment of the expectant mother. This is not to say that I am opposed to the antenatal treatment of the expectant mother. I have been advocating it for twenty-five years, and agree that it should be undertaken as soon as pregnancy is diagnosed and that it should be carried out as efficiently and for as long as possible during the pregnancy. If that is not done the infant's syphilis may not be prevented, but only rendered latent unless it is specially looked for; and, if untreated, it

* It seems to follow from Warthin's work (1916) that we can never be certain of the cure of a syphilitic patient.

FIG. 1.—Infant, 3 months old, with marked rash on body and face, showing deep fissuring round the mouth and ulceration of chin. Did well on bismuth injections.

FIG. 2.—Infant, 3½ weeks old : desquamation of feet.

FIG. 3.—Infant, 9 weeks. Radiograph of lower limb showing the typical "cat-bite" appearance of the cortex at upper inner aspect of tibia ; also periostitis of tibia and rarefaction at lower ends of tibia and fibula. The patient died.

FIG. 4.—Boy, aged 9 years, with Clutton's joints.

FIG. 5.—Girl, aged 10 years 10 months. Typical Hutchinsonian upper central incisors. The edges of lower c. incisors are also slightly concave.

FIGS. 6 and 7.—Boy, aged 6 years 11 months before operation on nose ; at 14 years 8 months an operation was performed on the nose. Fig 7 is a postoperative photo taken at 16½ years.

may manifest itself years afterwards. Whatever the cause, congenital syphilis is much less prevalent and more benign in character than it was a generation ago, and consequently it is more difficult to diagnose than it formerly was.

Finally we come to the penicillin era, about which I am unable to tell you very much from my own personal experience, so that my evidence on this point must be "hearsay" or "indirect." This era has brought in its train still further modifications in the symptoms and treatment of congenital and acquired syphilis, the end of which is not yet visible. The short term results appear to be very good; but we must wait ten, twenty, and perhaps even twenty-five or thirty years before the late results can be assessed, particularly the results on the cardiovascular and central nervous systems of the body.

Some Case Histories

The following are a few of the cases that have left a lasting impression for one reason or another on my memory.

Case 1.—The first was that of a male child who was brought to the out-patients' department of the Hospital for Sick Children, London, at the age of 9 months with the following history. He was born in October 1916, the first child of his parents, who were not blood relations. He was a full-term child weighing 6½ lb. at birth and apparently healthy. He had been breast-fed for five months and then fed on cow's milk from the bottle. He had snuffles but no rash at three months. At that time he was said "to lie still in his cradle and did not kick about like other children." At 9 months the snuffles were worse and the child made no attempt to sit up, so he was taken to see a doctor who referred him to Great Ormond Street with a tentative diagnosis of spinal trouble. He was under the care of my late colleague, Mr. Addison, and he was placed on a board on which he was kept for one year and ten months. Because of the history of snuffles, which had become worse during the following months, the child was also seen by my late colleague, Dr. Poynton, and the blood of mother and child was tested. This was "weakly positive" in both mother and child, and the possibility of syphilis was seriously considered; indeed the clinicians had already come to that conclusion and were treating the child by inunctions of mercury.

The father maintained that he himself had never suffered from venereal disease, and a blood test was negative. This was my first year at the clinic (1917) and I had not then realized what I came to realize later, that a large proportion of the fathers of children with congenital syphilis have negative Wassermann tests (Jeans and Cooke in 1930 report it in over 40 per cent. of fathers, and in one series of 123 fathers I found 60 per cent. negative). Being unaware of this at the time I had to try to explain the positive reaction in mother and child, which I evidently did not succeed in doing for the man threatened to divorce his wife for alleged unfaith-

fulness: in the end he did not take action because a second blood test of the mother was negative, but there was more tragedy to follow. The repeat blood test on the child was stronger than it had been previously, so he was given some injections of neoarsphenamine, after which the Wassermann reaction became negative in about six months and was again negative at two subsequent annual tests. The diagnosis of syphilis in the child appeared to be strengthened by a steaminess of the corneæ which appeared at the age of 1 year and 2 months and for which he attended the ophthalmic department for about six months but without any improvement. When nearly 3 years old he was operated on for double hernia; he made a good recovery and was able to walk round the table etc. holding on. At 4½ years he appeared to be dwarfed, with a large head, and he said only a few words. He looked like a cretin, and was given thyroid extract for some months. Because he was getting thinner (October 1921) the thyroid medication was stopped and he was given a dried thyroid, thymus, and pituitary preparation. When finally he was brought up to the hospital practically moribund in January 1922, aged 5 years 4 months, he was so grotesque that I could hardly bear to look at him; unfortunately I did not have him photographed. There is no doubt whatever that he was a "gargoyle," though he was not recognized as such at the time. As you know, this syndrome is probably due to disordered lipid metabolism, which may account for the weak and partly positive Wassermann reactions in 1917 and 1918.

Similar Cases.—Since that case I have seen two others, one in 1932 and one in 1935, both of which were sent up to hospital as cases of congenital syphilis and in one of which the Wassermann reaction is said to have been found positive by the late Dr. Creed. "Very strong positive, 200 units" was his report. After treatment with mercury and bismuthyl injections the Wassermann reaction one year later (also by Creed) was negative. Thus we see that the condition known as "gargolism" has a place in the differential diagnosis of congenital syphilis.

Case 2.—Another interesting case was that of a girl 6 years of age who was admitted to the Hospital for Sick Children, Great Ormond Street, under the care of Dr. (now Sir) Robert Hutchison suffering from "mental disorder." At the time this mental disorder was thought to have been of very short duration, a matter of three weeks; but it was ascertained from her school teacher that the child had been mentally peculiar since she first attended school about five months before she was admitted to hospital. In fact she had juvenile general paralysis of the insane with characteristic findings in the blood and cerebrospinal fluid. She was given energetic treatment from August 1925 to March 1927, a period of about twenty months, which included: intravenous neoarsphenamine, intracisternal injections of salvarsanized serum (twelve injections in two courses), a course of malaria, injections of bismuth and arsenic, and protoiodide of mercury. The result of all this treatment was not (as might have been expected) the death of the patient, but a paper published in the *Lancet* of Oct. 1, 1927, entitled "A Case of Juvenile General

Paralysis successfully treated by Malaria and Intravenous and Intrathecal Injections." At the time that paper was written the blood and spinal fluid were not quite negative, but they became negative in 1929 and were still negative in 1946—the blood after an interval of eighteen years and the spinal fluid after nineteen years. In November 1948 the blood Wassermann reaction was still negative after an interval of twenty years.

The after-history of the case is probably of interest, but is to me a keen disappointment. After having redeemed the patient from a condition of raving lunacy and apparently transformed her into a healthy but backward child of seven or eight with a negative blood and cerebrospinal fluid, I now set about having her educated. To this end I had her examined by a psychiatrist at the Tavistock Clinic; with the aid of several hundred pounds collected from friends I endeavoured to carry out the psychiatrist's advice by procuring for her individual attention, but it was all in vain. Her brain is damaged beyond repair and at the moment she is a harmless amment. Of course she has to remain in a mental hospital, which is not the future I had envisaged for her, but she appears to be of some, though limited, use, judging by the comments of the hospital superintendent who wrote me in January 1948: "E . . . is still alive and doing very well. She works in our laundry and though of limited intelligence (mental age of four) she is quite helpful in fetching and carrying, in these days of shortage of manual labour. Temperamentally she is docile and quite happy, and appears to enjoy institutional life where everything is ordered for her and entertainment in the shape of dances and pictures provided. Though your cure was perhaps a little too late to prevent irreparable damage to her brain, it has undoubtedly arrested further damage. The patient is quite oblivious to the good things that go with a full intellect, but never having experienced such luxury of the mind, she does not miss it. She has her useful place and a part to play in a closed community such as ours and we are grateful for her help, however small. Your cure has therefore from this point of view served a useful purpose." In February of this year (1949), the patient being then 29 years old, the Superintendent reported that "She continues to work in the laundry and is a very efficient 'folder.' She is well behaved and causes no trouble."

Case 3.—Another interesting case,* this time from the point of view of diagnosis, was that of a male infant, aged 2 months, who was brought to hospital on account of swelling and tenderness of the upper part of the right leg. The patient did not appear to be acutely ill; he was slightly febrile, the leucocyte count was 8,000 to 10,500 per c.mm., and the blood culture was sterile. There were no obvious signs or symptoms of congenital syphilis and the surgeon in charge of the case was so convinced it was one of coccogenic osteomyelitis that he almost insisted on operating upon the patient. A blood test gave positive Wassermann and Kahn reactions and the x-ray appearance and the site of the lesion suggested that the condition was due to congenital syphilis, although

there were no concomitant signs of the disease and the tibia was apparently the only one of the long bones to be affected. The condition improved considerably under anti-syphilitic treatment but the child unfortunately contracted fatal gastro-enteritis.

Enlargement of Salivary Glands

Among the rarer manifestations of congenital syphilis that I am bringing to your notice, perhaps the most interesting are enlargements of, or other manifestations in connexion with, the salivary glands, particularly the parotid gland. Between the years 1921 and 1938 I came across nine cases of parotid involvement and three in which other glands were affected. The patients varied in age from 2 years and 8 months to 49 years. The condition presented some interesting features. In several of the cases the clinician, either physician, surgeon, or dental surgeon, was uncertain whether the swelling was an enlarged lymphatic gland in the parotid or the parotid gland itself.

One case, which I did not see at the time the swelling occurred, was that of a congenitally syphilitic mother, aged about 24 years, who when three months pregnant developed a swelling over the right parotid reputed to be the size of a "small orange." She told me afterwards, when she brought her baby to hospital on account of its congenital syphilis, that during her pregnancy and when her face was swollen, she had been to two hospitals and that the doctors "did not know what to make of it." She had no blood test and received no anti-syphilitic treatment and the parotid swelling subsided in about three months. When I saw her with her baby (which was then aged 11 weeks) some hard shotty nodules or glands could be felt on, or just under the surface of, the parotid.

These hard shotty nodules have been a distinctive feature of several of my cases, but it does not help us much concerning the pathology of the condition for they might be lymph nodes in or upon the parotid gland or small gummata of the gland. Three of the patients tended to have recurrences: thus the first patient to show the condition had the first attack at the age of 9 years and 7 months and the second attack eight years later, when it was diagnosed as mumps by his local doctor, who kept him at home for three weeks. His Wassermann reaction had then long been negative after prolonged arsenical and heavy metal treatment. This patient's sister had a similar parotid swelling at the age of 7 years and 4 months and suffered four recurrences in the succeeding fifteen years. This was the only instance in which the parotid swelling was observed in siblings. One patient had enlargement of the parotid when 11 years and 5 months old, and fifteen months later, while her blood was still somewhat positive, she developed mastitis. This combination, parotitis

* This case is referred to in Garrod, Batten, and Thursfield's "Diseases of Children," fourth edition, 1949, p. 900.

and mastitis, had, according to Kemp and Moore (1922), been recorded by one previous observer. Rather more frequently the submaxillary and the sublingual glands have been affected either alone or in association with the parotid gland. I have seen two such cases in congenital syphilitics and an interesting one in a mother who probably had an oral chancre two or three months after marriage (I did not see her then) and in whom at three-monthly intervals during her pregnancy, about the time her period would have appeared, the sublingual gland was enlarged.

There are several contributions to the literature of this aspect of syphilis, of which I will refer to two. The first is that of Kemp and Moore, already mentioned, which summarizes the sixty-one cases they found in the literature down to the year 1922. To these they were able to add four of their own: one with a primary chancre on the upper lip and in which the submaxillary gland was affected, the other three with lesions in the parotid region which they considered were gummatous in nature. Only six of the sixty-five reported cases are stated to have occurred in congenital syphilitics, and in all six the parotid gland was affected. Pressure paralysis of the terminal branches of the facial nerve may occur. Kemp and Moore observed it in one of their cases, but so far as I could ascertain none of my cases had facial paralysis. Kemp and Moore make no mention of recurrences of the swellings or of the shotty nodules which persist in the region of the parotid long after the general swelling has subsided.

The other paper of interest is one by Adam (1939-40) entitled "A Presumptive Sign of Syphilis." He states that in nearly all the early and in many late cases of syphilis he has noted changes in Stensen's duct, œdema and congestion or swelling of the duct and adjacent area, and an erythematous inflammation of the orifice. The pathology he thinks is to be explained by the swelling of the lymphnodes which are present in the substance of the parotid and which presumably participate in the general adenopathy of syphilis. This may in time interfere with the flow of saliva from the gland and so lead to inflammation about the orifice of Stensen's duct. Adam is of the opinion that ascending lymphatic or hæmatogenous infections of low-grade character result, as shown by the sign he describes.

The following three papers are also relevant to the topic under discussion. One by Hamilton Bailey (1948) on "The surgical anatomy of the parotid gland," although not directly concerned with syphilis, is of interest since he maintains that the parotid lymphnodes, which are frequently stated to be within the parenchyma of the gland, are extracapsular, as is also the facial nerve. He also mentions

the theory that the parotid gland is a bilobed structure with the facial nerve "sandwiched between the superficial and deep lobes."

Bruce-Pearson (1935) has written upon recurrent swellings of the parotid glands, and of his eleven non-infected cases, seven were in children under 12. Syphilis is not mentioned in the ætiology of the condition, and Bruce-Pearson regarded allergy as being the root cause in eight out of the eleven cases.

In 1940 Payne published a paper on cases of pneumococcal parotitis in which he made no mention of the Wassermann reaction. Upon enquiry he informed me that he had not carried out blood tests upon these patients because about ten years previously, when he was interested in diseases of the salivary glands, he did a routine Wassermann reaction in all cases of chronic and recurrent parotitis, and in all cases but one—a case of acquired syphilis—the Wassermann reaction was negative.

Congenital Syphilis and the Cardiovascular System

It is generally accepted that in acquired syphilis *T. pallidum* is a potent factor in the ætiology of aortic aneurysm and aortitis as well as of heart disease, and there is no *a priori* reason why the same should not apply to the congenital disease. There is much divergence of opinion among clinicians, pathologists, and radiologists upon the subject; and despite the fact that in 1943 Hinrichsen was able to publish a review of 157 papers on cardiovascular involvement in congenital syphilis we seem to be no nearer to a solution of the problem today than we were in 1906 when, as Hinrichsen tells us, five authors reported that they had found *T. pallidum* in the hearts of congenitally syphilitic infants. She reviewed the subject under the following heads: (1) post-mortem findings (*a*) of myocarditis, (*b*) of aortitis, with or without aneurysm, and (*c*) of other vascular lesions; (2) clinical records of cardiovascular involvement; (3) x-ray investigations of the heart and aorta; and (4) studies on the possible causal relation between maternal and/or congenital syphilis and congenital morbus cordis.

Post-mortem Findings.—Several observers have reported lesions of myocarditis in syphilitic fœtuses and in infants who survived birth only a few hours or days. The lesions might be diffuse or localized, and they were variously described by the older writers as myxoma, myoma, and gumma of the heart-wall when localized, and as interstitial myocarditis when diffuse. Warthin (1911) found treponemas in the heart when they could not be found elsewhere in the body. When an infant is born with manifestations of congenital syphilis it may be so ill that involvement of the heart may not be diagnosed clinically; and at autopsy, in the absence of any

localized heart lesion, interstitial myocarditis may be overlooked unless a microscopical investigation of the heart muscle is undertaken.

Aortitis, with or without aneurysmal dilatation, has been described in syphilitic stillbirths and in very young infants by several observers (Melchior, 1904; Wiesner, 1905; Bruhns, 1906; Rach and Wiesner, 1907; and others). Practically all the infants died within a few days of birth. It is generally believed that in acquired syphilis the interval between the date of infection and the onset of symptomatic cardiovascular disease is from fifteen to twenty-five years, so if the same is true of congenital syphilis the symptoms and signs of cardiovascular involvement would not appear until late childhood or adolescence or even later. Turnbull (1915) reported two such cases, one in a girl aged 17, the other in a girl of 7. Allbutt (1921) recorded an instance of abdominal aortitis in a congenitally syphilitic girl aged 16. Stuart McDonald, Jr. (1932), reported a case of syphilitic aortitis in a boy aged 9. The occurrence of this case induced him to keep a special watch for similar cases, with the result that two years later (1934) he was able to report eleven further cases of syphilitic aortitis in patients under 30 years of age, most of whom were undoubted or probable congenital syphilitics. This strongly suggests to me, as it did to McDonald, that if physicians would bear in mind the possibility of cardio-aortic disease in young adults being of congenitally syphilitic origin, and would make full enquiries into the family history of these patients, many more such cases would be revealed. Furthermore, I should like to add that just as I have seen congenital tabes and congenital general paralysis start in the fourth decade of life, it is presumably equally possible for congenital cardio-aortic disease to manifest itself after the age of 30.

Whatever doubts some authorities may have as to the occurrence of congenital syphilitic aortitis, there can be no doubt about the frequent occurrence of specific arteritis in the peripheral vessels of these patients. The arteries at the base of the brain are those most commonly affected; and since Sir Thomas Barlow, in 1877, reported two cases in children, aged 10 and 15 months respectively, there have been many similar cases reported in which serious cerebral symptoms, such as hemiplegia, epileptiform seizures, and mental deterioration, preceded death. Numerous cases of the kind were met with in our clinic at the Hospital for Sick Children.

Clinical Records of Cardiovascular Involvement in congenital syphilis, even in the absence of any past

or present rheumatic history, are given by several observers. Stobie (1921) states that, of eighteen cases of aortic disease, thirteen had a syphilitic aetiology; two of them, aged 21 and 22 years, almost certainly had congenital syphilis. He refers to the work of Cowan and Fleming (1911-12), in which evidence is adduced suggesting that mitral stenosis and renal fibrosis may in many cases have a common cause, and that the cause may in some cases be syphilis.

X-ray Investigations of the Heart and Great Vessels have been claimed by the Beretervides (1923, 1925) to be of great value in the diagnosis of syphilitic affection of these organs. An increase in the diameter of the ascending aorta from the normal 1 to 1.3 cm. (according to age, from 2 to 14 years) to 1.5 cm. or more being regarded by these observers as a certain sign of syphilis. Although there have been several publications which appear to confirm the findings of the Beretervides, the matter must for the present be considered to be *sub judice*.

Congenital Heart Disease and Congenital Syphilis.

—The same must be said of the possible connexion between maternal or congenital syphilis and congenital heart disease. Browning (1914), Findlay and Robertson (1914), De Stefano (1920) and others have reported positive Wassermann reactions in as many as 50 to 72 per cent. of the patients and/or their mothers, whereas most American observers conclude that congenital syphilis is not an important factor in the causation of congenital heart disease.

In my view it is probable that some of the cases of cardiovascular disease in young adults and even in the middle-aged, ascribed to rheumatism or to acquired syphilis, may really be due to congenital syphilis—stigmata such as Hutchinson's teeth, which may originally have been present, having disappeared. Some patients, on the other hand, may never exhibit any stigmata, yet a careful inquiry into the family history may elicit a specific background, such as the father's death from general paralysis or from aneurysm; or evidence of congenital syphilis, such as interstitial keratitis in a brother or sister. The patient's serum reaction might still be positive, which would help in the diagnosis of syphilis (but not between congenital and acquired), or the serological reactions might have become negative by efflux of time. Readiness to suspect congenital syphilis and to investigate the history thoroughly are important in this connexion.

Prevention and Treatment of Congenital Syphilis

In pre-penicillin days prevention of congenital syphilis was achieved, admittedly with a certain small risk to the mother, by means of arsenical and

heavy-metal treatment. The advent of penicillin has enabled practitioners to administer a drug which is non-toxic and over a much shorter period of time than was formerly possible. The dosage recommended for prophylaxis by Goodwin and Moore (1946) is "not less than 2.4 million units in aqueous or saline solution at intervals of not less than two or more than three hours, night and day for a period of not less than seven and a half days." Absorption delaying methods such as oily suspensions are not recommended. The treatment is followed by monthly clinical examinations of the patient including a quantitative serological blood test. In the event of clinical or serological relapse, or if the original titre of the blood does not significantly decline within three months of treatment, the course is repeated. The authors found that the results were almost 100 per cent. successful, and forty-two out of fifty-nine infants were followed for six months or more, which they consider long enough after birth to make practically certain of the diagnosis of "no syphilis" (personally I feel this is too optimistic an attitude). These results in the prevention of congenital syphilis are better, they say, than any obtained hitherto by any method whatever. They state further that there is no satisfactory evidence that penicillin is directly or indirectly responsible for abortion. Lastly, they recommend that in syphilitic expectant mothers penicillin be used as a routine and to the exclusion of all other methods for the prevention of congenital syphilis.

The question whether a woman who has had adequate treatment for syphilis need be treated in every subsequent pregnancy appears to be answered in the negative by Goodwin and Farber (1948) as a result of their study of 596 pregnancies in untreated mothers: 549 (92 per cent.) of the children were born alive, and of more than 70 per cent. of these who were followed for upwards of one year not one was found to be syphilitic. Of the forty-eight infants stillborn or miscarried, twenty were examined at necropsy and there was no sign of syphilis to be seen in any of them. They conclude therefore "that it is safe to withhold treatment of a syphilitic expectant mother, regardless of (a) the stage and duration of her infection at the time of her original diagnosis and treatment, and (b) of the interval between the previous treatment and the pregnancy in which it is contemplated to omit further treatment, *provided* that (1) the mother has previously received at least 4 g. of arsenamine (or its arsenical equivalent) together with concomitant bismuth; or 2.4 or more million units of penicillin (given for early syphilis in herself; this probably holds good also for a diagnosis of late latent syphilis in the mother) and whether this treatment was given during an earlier

pregnancy or during a non-pregnant interval; (2) the mother shows no clinical signs of active syphilis; and (3) the mother's blood is negative or, if still positive, is so in low titre only (1 to 8 units of dilution)."

In so far as the treatment of the congenitally syphilitic patient is concerned, we are all agreed, I think, that the sooner this is undertaken the better is the prognosis for the patient. Some authorities maintain that if treatment is delayed until after the patient is six months old we can never be certain that a cure will be effected. This may quite well be true, but even with my fairly long experience of the disease and of its treatment, I feel that I am not in a position to refute or to confirm the statement. Syphilis is a difficult disease about which to be dogmatic, and until one has made a careful and extended post-mortem investigation of the patient's organs and tissues, as Warthin has informed us, one can never declare that a patient has been cured of syphilis. Personally I have treated with arsenicals and bismuth a number of patients, some of them several years old when the treatment was started, who were apparently cured and who subsequently married and had healthy children. I do not propose to say anything here about the older methods of treatment, but shall confine my remarks to penicillin treatment of which, as I have already said, I have no first-hand experience. In the United States the treatment of congenital syphilis (prenatal syphilis, as the Americans prefer to call it) is now carried out almost entirely, if not entirely, by penicillin alone with, according to the published reports, uniformly successful results. In this country most authorities prefer to give combined treatment with penicillin and arsenicals and bismuth.

The latest American reports recommend a dosage of 50,000 units per lb. body weight, in 120 equal doses, given intramuscularly, three-hourly during the day and night for fifteen days. There are records of bigger doses being given. For example Rose, Gyorgy, and Ingraham (1948) have given as much as 207,000 units per lb. body weight to a child of six months, to see what effect, if any, it might have had upon the extensive bone lesions, though the result has not yet to my knowledge been reported upon. The consensus of opinion is that the most satisfactory results are obtained in young patients, those under 3 months. The rate of the fall in titre of the serological reactions seemed to bear no relation to the amount of penicillin used in the under-3-months group of patients. Of thirty-three patients treated in that age-group, six died and the surviving twenty-seven were all serologically negative and apparently cured. The follow-up of the whole group of these authors' patients extended

over three years in some of the cases.

At the Hospital for Sick Children, Great Ormond Street, Bodian (1945) treated a few cases of congenital syphilis with penicillin alone. He used small initial doses: 4,500 units daily for four days, then 6,000, 7,500, and 9,000 units each for two days, and finally 10,000 units daily for eleven days. The total dosage, 173,000 units, is the weight-equivalent of 2.4 million units in an adult. Cathie, at the same hospital, is continuing the penicillin treatment of congenital syphilis, but with the American system of dosage, and by so doing hopes to be able in time to assess the value of this line of treatment and to compare the results with those of English and other authorities who prefer to employ the combined treatment, penicillin, arsenic, and bismuth. On the whole the results so far have been satisfactory; the infants, with the exception of two who died, did well and have remained free from clinical and serological relapse for as long as three years in some cases. On the other hand, two 5-year-old children with clinical neurosyphilis and spinal-fluid changes have not done well.

The number of cases now available for treatment is much smaller than it was before the late war. Thus far about a dozen cases have been treated at the Hospital for Sick Children with penicillin alone, so that it will be a long time before Cathie will be in a position to give results that will satisfy the statistically minded.

Concluding Remarks

Whereas we have made great strides in the reduction in the incidence of congenital syphilis in this country, we should now aim at its virtual extinction by the adequate antenatal investigation and treatment of the expectant mother. My belief is that by so doing we should not only reduce congenital syphilis to a minimum, but might also reduce the incidence of congenital deformities and malformations in addition to obscure diseases of infancy and childhood which possibly result from untreated maternal syphilis.

We have in penicillin a remarkable and potent remedy for the treatment of syphilis. Although the short-term results are very felicitous, we must not lose sight of the fact that it will be many years before we can express a confident opinion as to the claim that penicillin is a cure for syphilis. One of the greatest obstacles to an adequate enquiry into this subject is the difficulty of maintaining contact with patients over a sufficient number of years—practically for the remainder of the patients' lives. Possibly under the new Health Service this may prove easier of accomplishment than was formerly the case, when many of us must have been bitterly disappointed

that the assessment of our treatment of venereal disease patients was nullified by inadequate follow-up, which in my clinic culminated in the cataclysm of the 1939-45 war, when so many children and young people were evacuated from their homes in London.

I would suggest that penicillin-treated patients to be followed up should include the following categories: (1) patients with primary or secondary acquired syphilis; (2) patients with acquired cardiovascular and neurosyphilis; (3) congenitally syphilitic infants who started treatment at under six months of age; (4) congenitally syphilitic infants who started treatment at over six months; (5) children with congenital neurosyphilis; (6) the clinical and serological follow-up for as long as possible of children born after the mothers' antenatal treatment with penicillin alone.

At the conclusion of the address, various aspects of congenital syphilis were exemplified by a series of lantern slides which I had prepared over a number of years during my directorship of the clinic at the Hospital for Sick Children, Great Ormond Street. Dr. Wilfrid Sheldon, physician to and curator of the museum at the hospital, kindly permitted the loan of several interesting pathological specimens of syphilitic bones and organs, including gummata of the lung and syphilitic ulceration of the intestine, from the hospital's museum. I am much indebted to him and also to Mr. Derek Martin, the assistant curator, who was responsible for the beautiful mounting of the specimens exhibited.

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DISCUSSION ON CONGENITAL SYPHILIS

DR. MARY SHAW said she had been taught that in these cases a routine x-ray picture of the lower end of the femur should be taken, but Dr. Nabarro apparently found the tibia more frequently involved; perhaps it would be better to radiograph the tibia than the femur.

DR. FORGAN said that between the two wars the incidence of positive serological reactions in expectant mothers became so low that the London County Council for a time abandoned routine Wassermann examinations at antenatal clinics. The fact that penicillin was so effective in the treatment of syphilis in pregnant women ought to mean a further reduction in the number of cases of congenital syphilis; but it was to be hoped that there would, in future, be no relaxation of routine blood examinations in pregnancy.

DR. HAMILTON WILKIE (the President) thought it would be interesting to have Dr. Nabarro's opinion on the case in which a child was suspected of congenital syphilis but the mother had a negative Wassermann. There might be evidence later that she also had syphilis. It was not uncommon for the diagnosis in children with congenital syphilis to be missed because the mother had not a positive Wassermann reaction.

DR. R. R. WILLCOX also drew attention to the not uncommon perplexing finding of the sero-negative mother of the child with congenital syphilis. Only recently he had been consulted by an anxious mother because her husband had died of aortitis. Over a period of three months he tested her blood on three occasions, each time with negative results, and chest radiograph and cerebrospinal fluid examinations were also negative. He did not treat her, but kept her under observation. He was distressed some weeks later to find that her twenty-year-old daughter was receiving treatment for an undoubted congenital infection. The mother was suffering from "burnt-out" syphilis.

DR. S. M. LAIRD thought Dr. Nabarro's opening remarks regarding incidence were of great interest.

While no doubt the recorded incidence of congenital syphilis in this country had fallen, this should not encourage complacency. The rate of fall had been considerably less than in other countries. He remembered being in Stockholm in 1939 and being taken to see the Welander Home, which had been established for the institutional care of congenital syphilitic children. His host apologized for the fact that he could not show him any cases, and added that congenital syphilis had become almost negligible in Sweden.

From his own experience in this country Dr. Laird felt certain that congenital syphilis was seen in rural communities much more than in big cities. He referred not to congenital syphilis in infancy, but to the late manifestations of congenital syphilis. Suffolk, where he practised now, provided material for those interested in congenital syphilis. There they saw cases some of which were obvious clinically and which had been referred from other departments because of nerve deafness, keratitis, etc.; but many cases came to him as a result of antenatal blood-testing or the testing of potential blood donors, and a number of these had a positive blood test and were examples not of acquired but of congenital syphilis. Some of these people in their thirties or forties had stigmata of congenital infection.

On that point there was a warning which he would like to utter. They had heard Dr. Nabarro frequently, and he lost no opportunity of pressing his plea for antenatal blood-testing. But that was not the whole difficulty. In his area until June 1947 the antenatal service took blood for Wassermann and Kahn tests, and the blood went to a laboratory which was doing all the venereal disease serology for that area. In the middle of June 1947 the blood transfusion service took over and insisted that in pregnant mothers the Rh factor must be estimated and that a routine Kahn should also be done. This was awkward because the antenatal services said, "We cannot very well take two specimens of blood"; and so the previous laboratory ceased to function, and the routine antenatal blood specimens now went to a laboratory which estimated the Rh factor