UNDETECTED SYPHILIS AND RHEUMATIC
INFECTION IN CHILDHOOD.*

BY

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In the course of work with rheumatic children I have recently been forced to consideration along new lines. Having had referred to me a child with acute rheumatism and carditis, it ultimately became evident that the rheumatic infection was superimposed upon a congenital syphilitic taint. Shortly afterwards a similar case was encountered, and I investigated a small series of cases with the object of obtaining information on the relationship between congenital syphilis and rheumatism. I obtained results which in their suggestiveness were to me striking and unexpected.

The following are the details, in short, of nine children dealt with in my rheumatic clinics, and who, I hold, were congenital syphilitics, and the striking feature in the cases is the frequent absence of clinical signs pointing to the presence of a syphilitic infection. I am impressed with the suggestion that an important subgroup of rheumatic children can be defined—namely, those in whom the rheumatic infection is superimposed upon congenital syphilitic infection, and more particularly untreated and undetected syphilis—and that prognosis in such cases may be seriously influenced.

The rheumatic child is not a clinical entity except in so far as the rheumatic infection is concerned, and it is possible to consider this infection in relation to the basic soil in which it acts, and to recognize that prognosis may be materially affected thereby.

When my interest was first keenly engaged in the consideration of the occurrence of rheumatic infection in congenital syphilitic children I searched my records for cases with unusual symptoms, or which had shown poor response to treatment, and carried out a Wassermann test on them. In this first group of cases there were 20 children, and to my surprise I was given a positive Wassermann reaction in 9 cases. Since then I have performed many Wassermann tests on rheumatic children coming to me for the first time, and usually the reactions have been negative. A few have been positive, but in this communication I deal only with my original group of 9 children, and the points that their examination appears to raise.

I wish to avoid laying any emphasis on the proportion of positive reactions in any series of cases, as I am dealing here with selected cases. I would also state that, as the result of many Wassermann tests on rheumatic cases, I have found no evidence that either in early or late conditions is the Wassermann reaction affected by the rheumatic infection itself.

The following is a brief synopsis of the 9 cases. I give these more fully later.

A.—Evidence as to Rheumatic Infection.

All the cases were sent to my rheumatic clinics by doctors, with a diagnosis of rheumatism.

In 5 instances (S. H., G. H., B. K., M. R., and F. P.) the children suffered from definite acute rheumatism and carditis while in hospital.

In 1 instance (M. M.) there was a history of rheumatic fever, and the child, when first seen, suffered from established valvular lesions (mitral and aortic).

In 1 instance (E. W.) there were various rheumatic symptoms, which were relieved by sodium salicylate. There were no cardiac signs.

In 2 instances (E. B., B. B.) there was a history of rheumatism; cardiac murmurs were present, but the exact significance of these was doubtful.

B.—Evidence as to Congenital Syphilitic Infection.

In 3 cases (E. W., E. B., B. K.) syphilis was admitted by the parent and the child's Wassermann reaction was positive. Of these 3 cases, in 2 instances there were no clinical signs of congenital syphilis.

In 1 case (S. H.) syphilis was denied by the parents and the Wassermann reaction of both parents was negative. The child, however, showed clinical evidence of congenital syphilis, and repeated Wassermann reactions were positive.

In 1 case (G. H.) the child showed clinical evidence of congenital syphilis and the Wassermann reaction was positive.

In 4 cases (F. P., B. B., M. R., M. M.) the children had no clinical signs of congenital syphilis, but the Wassermann reaction was positive.

In all these 9 children I concluded there was evidence both of syphilitic and of rheumatic infection, but in 6 of the 9 cases there were no clinical signs of congenital syphilis.

Training and experience are against the acceptance and direction for treatment of a laboratory reaction in the absence of clinical evidence, but the results in these cases show cause for hesitation, at least in regard to this matter of rheumatism and syphilis. If the syphilitic taint may be present in the absence of all discernible clinical signs pointing to infection, and if under such conditions it may yet cause the myocardium to be a point of weakness, it is obvious that, in the event of rheumatic infection occurring—however much it may be a pure coincidence—it must be important, both for prognosis and treatment, to recognize the position by any means at our disposal. A Wassermann report may be misleading owing to many technical causes, and sometimes repeated reports are contradictory or indefinite, and thus again one has to consider if there is a call for doing this test, or paying attention to it when done, if there are no clinical signs of congenital syphilis. In view of the cases I report I cannot but conclude that a Wassermann test should be made—if not in all serious rheumatic cases, certainly in cases displaying unusual symptoms or perplexing physical signs; and, further, that unless the reaction is definitely negative, antisyphilitic treatment should be combined with that of sodium salicylate. An accurate definition of what we are to understand by a diagnosis of acute or active rheumatic infection is still wanting, and nodules are rare in the Liverpool area.

With regard to 3 of the cases I report (B. B., E. W., E. B.) it may be held that the grounds for a diagnosis of rheumatic infection are insufficient. While I consider that most, if not all, paediatrists would agree with my diagnosis on examination of the children, I recognize that there is associated with such criticism another problem—namely, how frequently are there met with children who display no recognizable signs of congenital syphilis, who have a variety of rheumatic symptoms and cardiac signs responding in some degree to antirheumatic treatment, and who are nevertheless sufferers from congenital syphilis.

With regard to treatment, my experience is too limited to permit me to say anything further than that in those cases in which I have employed antisyphilitic treatment (S. H., B. K., G. H., M. R.) I have noted improvement, whether the child displayed recognizable clinical evidence of syphilis or not. Cowan and Rennie¹ have stated:

"We have found a positive Wassermann reaction in patients who had had acute rheumatic fever, but the recognition of even a specific element in the case, and resultant specific treatment, will sometimes turn the balance in the right direction."

In this country, however, little emphasis has been laid either on the possible importance of clinically undetectable syphilis (or for that matter on its existence at all) or on the need for bearing syphilis in mind when dealing with rheumatic children.

The work of Warthin² within recent years has been very noteworthy in that he demonstrates as a common result of syphilitic infection diffuse myocardial degeneration—an interstitial myocarditis leading to fibrosis. Johannsen,³ Gestiera,⁴ Friedländer,⁵ and other authors also stress the frequency of myocarditis in congenital syphilitics. But there is this very important point to be borne in mind—that it is sometimes, or often, unaccompanied by any clinical signs of congenital syphilis. Thus Friedländer writes:

"I am especially desirous of emphasizing the point that in many cases syphilitic myocardial degeneration may be the only manifestation of congenital syphilis."

*The subject of a communication to the Southport Medical Society, January 8th, 1930.

As regards the place of syphilitic infection in producing gross endocardial and valvular lesions the position is even less clear, and in connexion with congenital infection little is known. Matusoff and White⁶ state: "It does appear, however, from our study, that well-marked clinical evidence of such involvement is not common." There is ever present the doubtful factor of superadded rheumatic infection.

Warthin (*loc. cit.*) says: "In the younger individual latent syphilis of the heart probably predisposes to secondary bacterial endocarditis"; but McCulloch,⁷ as the result of twelve years' supervision of 1,500 cases of congenital syphilis, says:

"We feel very strongly that children who have congenital syphilis and who live to be a year or more of age do not suffer from heart disease any more than any other normal group of children. Each syphilitic child receives from time to time a very careful physical examination, so that we are inclined to believe that we have not overlooked any heart disease in these children."

Even, however, when we accept McCulloch's observations we are dealing with children recognized as suffering from congenital syphilis, and presumably under treatment, whereas syphilitic myocarditis is apparently often unaccompanied by clinical signs of congenital syphilis, and may even show a negative Wassermann reaction (Friedländer). It may be that rheumatic infection is no more common among congenital syphilitics than among other children—we do not know. But it is possible that there are many children suffering from congenital syphilis who have no obvious signs or symptoms, who are not recognized, and who are not treated. When rheumatism does affect such a child the prognosis must be affected, and it is possible that many bad rheumatic hearts are based on congenital syphilis.

Whether the incidence of the double infection be great or small, recognition of such a subgroup of rheumatic children should help to a flank attack on this subject of surprising difficulty—the etiology of rheumatism. The recent valuable papers of Nabarro and MacDonald⁸ and of Cronin Lowe⁹ emphasize, I think, the need and value of flank attacks and the probing into rheumatic manifestations under varying but determined physical conditions.

CASE HISTORIES IN DETAIL.

CASE I.

S. H., male, born 1920. Parents alive and healthy. Family: daughter, now aged 19 years, alive and well; then a miscarriage; then patient; then premature twins who died. Patient was admitted to another hospital on November 15th, 1928, suffering from "subacute endocarditis following tonsillitis" after having been treated as an out-patient. His abdomen had been noticed to be large since he was 7 years old, and he had been languid for two years. His liver extended to the umbilicus and was tender, the spleen extended five inches below the costal margin, his voice was husky, and Wassermann reactions recorded on November 8th and December 1st, 1928, were both positive (+).

The Wassermann reaction of both parents was negative, that of the father being tested twice. The patient was treated with mercury and iodide, and the liver diminished rapidly in size. He suffered, however, from a progressive anaemia of secondary type, and on February 25th, 1929, the blood picture was: red blood cells 2,737,000 per c.mm., white cells 3,300, haemoglobin 64 per cent., polymorphs 64 per cent., large lymphocytes 14 per cent., small lymphocytes 18 per cent., transitionals 4 per cent.

During January and February, 1929, he suffered from tonsillitis, pyrexia, cardiac weakness with diffuse systolic murmur, and involvement of the base of the left lung. He was transferred to the Royal Liverpool Children's Hospital on March 28th, 1929. At this time the heart was not enlarged, there was systolic bruit in all areas, the liver was palpable one inch below the costal margin, and the spleen was very large and extended below the umbilicus. A radiogram of the lungs was negative. A report on the van den Bergh reaction on April 24th was: "Direct=negative, indirect=medium positive." An electro-cardiogram seemed normal; blood fragility normal, blood culture negative. A Wassermann reaction on April 27th was strongly positive (++). He was treated with mercury and given a course of injections with kharsulphan (5 injections=0.06 to 0.14 gram). The Wassermann reaction on August 29th was still strongly positive (++); the spleen remained very large, the liver was palpable, there were many subcutaneous haemorrhages, and there were dilated veins over the lower thorax and upper abdomen. The heart was not appreciably

enlarged; there was a rough aortic systolic murmur. Blood pressure: systolic 120, diastolic 70.

He was given another course of treatment with kharsulphan, but on October 11th the Wassermann reaction was still strongly positive (++). At this time, however, he was greatly improved in his general health, and had returned to school. The spleen showed no reduction in size. He was given another course of kharsulphan and continued in fairly good general health. On December 2nd the spleen was still very large, blood platelets 310,000, red blood cells 5,100,000 per c.mm., white cells 5,200, haemoglobin 105 per cent. Heart not enlarged, ? systolic murmur in aortic area.

This child is a congenital syphilitic with distinct clinical signs. He has suffered while under observation from acute rheumatism. Antisyphilitic treatment has been markedly beneficial, but the hepatic and splenic conditions are unsatisfactory, and raise problems outside the scope of my present survey.

CASE II.

G. H., female, born 1923. Parents alive—mother asthmatic and with Wassermann reaction (December 5th, 1929) negative. Nine other children, all weakly.

The patient had jaundice when 3½ years old, followed by diphtheria and pneumonia. She was admitted to the Royal Liverpool Children's Hospital, Heswall, on July 10th, 1928, suffering from pericarditis. On admission there was pyrexia, cardiac dilatation, pericardial friction, and a basal systolic murmur. The liver was large, the spleen palpable, blood culture sterile; facies of congenital syphilis. On treatment with sodium salicylate the pericardial friction disappeared in a few days, but later recurred, with tachycardia, and double mitral bruits. An electro-cardiogram on January 7th, 1929, showed slight left ventricular preponderance. During the latter part of January and the early part of February, 1929, the child suffered from acute pyrexial pericarditis, with pleurisy and involvement of the left lung. Tachycardia and anaemia were present, the liver remained large, and the spleen became larger. In the beginning of April treatment was commenced with mercury (grey powder), and at the same time she began to improve. On August 2nd the Wassermann reaction was strongly positive (++), and at this time she was in fairly good general health, with a diffuse cardiac systolic murmur. On September 24th treatment was begun with potassium iodide in addition to mercury, and on November 8th the Wassermann reaction was negative. At this latter date the child was well, but the heart was slightly enlarged, and in addition to a systolic bruit there was suspicion of a presystolic mitral bruit. The liver and spleen were still large.

This child has clinical evidence to support a positive Wassermann reaction. She has suffered from acute rheumatism and carditis.

CASE III.

B. K., female, born 1919. The father contracted syphilis during the war.

The child was well till 1924, when she had pneumonia, measles, and pertussis, and remained weakly thereafter. During 1927 she suffered from suppurating cervical glands, which were repeatedly dealt with surgically. In September, 1927, she was treated in a hospital for acute rheumatism and carditis, the heart was greatly enlarged, a double murmur was present at the mitral area, and the electro-cardiographic report was: "left ventricular preponderance, P-R interval rather long, but not sufficiently long to indicate partial heart-block." A radiogram of the lungs was reported to be suggestive of tubercle. There was no enlargement of liver or spleen. Early in 1928 further scraping operations were performed on her neck, and in September, 1928, she was admitted to the Royal Liverpool Children's Hospital, Heswall, with the reported condition: "endocarditis, chronic osteitis of left femur, hoarseness, large unhealed wounds on neck from gland operations." At this time there was tachycardia, the left border of the heart was 3½ inches from mid-sternum, mitral systolic and diastolic bruits were heard to angle of left scapula, the pulmonary second sound was greatly accentuated, the aortic second sound was soft, with a blowing diastolic murmur.

On two occasions the Wassermann reaction was strongly positive (++). During May, 1929, she was given four injections (0.06, 0.12, 0.24, and 0.3 gram) of sulfarsenol, and at the close her neck was healed, the hoarseness of voice greatly improved, the leg greatly improved, and the heart improved. On July 6th the Wassermann reaction was positive (+). Potassium iodide and mercury were continued by the mouth, and during July and August a further course of sulfarsenol was given (0.12, 0.18, 0.24, 0.3, and 0.36 gram), and at the close she was in greatly improved health, had put on weight, and the glands and leg were well. She still had a large heart, with double mitral bruits.

She continued well, and gained steadily in weight. On October 26th she was stated to be "very well"; the heart was still large,

and there was a rough systolic murmur present. The Wassermann reaction on November 5th was still positive. When seen on December 6th she had continued well, but the heart was still large, with a diffuse rough systolic bruit.

This child is certainly a congenital syphilitic who has suffered from acute rheumatic infection.

CASE IV.

M. R., female, born 1920. Father a soldier. Two other children older than patient are alive and well. Since birth of patient there have been two miscarriages. The patient was a premature child, and has always been frail and tiny. She has had measles, pertussis, and scarlet fever.

She was taken ill in the beginning of September, 1929, and was admitted to the Royal Liverpool Children's Hospital on September 14th with acute rheumatism and carditis. The heart was dilated, and there were present double murmurs, both at the mitral and at the aortic areas. The general rheumatic symptoms improved slowly under treatment with sodium salicylate, but the cardiac condition remained unsatisfactory and the myocardial tone did not improve.

A Wassermann reaction on October 10th was "positive (+)," and on October 17th grey powder administration (1 grain daily) was commenced. By October 28th the heart tone was much improved, and dilatation of the heart was less marked. Another Wassermann reaction, taken on November 9th, showed the report "negative, but lysis is slightly delayed in serum dilution of 1 in 5." On November 19th another Wassermann report was: "Wassermann test is negative, but lysis is delayed in the presence of the larger quantities of the patient's serum." By November 22nd the cardiac condition had further improved, and while there were still double murmurs present at the mitral area, at the aortic area there was only a systolic murmur. Blood pressure: systolic 115, diastolic 75.

On December 21st a Wassermann reaction of the mother's blood was negative.

This child certainly suffered from acute rheumatism and endocarditis. She showed no detectable signs of congenital syphilis, and the mother's blood Wassermann test was negative. Shortly after the commencement of the administration of small doses of grey powder she commenced to show signs of improvement, and the Wassermann reports as detailed above were more than suspicious.

The evidence in favour of congenital syphilis is slender, but by no other means do I find the facts more readily explicable.

CASE V.

F. P., male, born 1915. There are three other children in the family, and a baby, born before the patient, died at 3 months from a "poisoned navel." One child is three years older than the patient, and the other two are younger.

He was first seen on July 11th, 1927, and had previously been treated for ? tuberculous cervical glands and nervous debility. During summer, 1927, he had various abdominal symptoms, and he was admitted to the Royal Liverpool Children's Hospital, Heswall, on August 11th of that year. While there he had an attack of acute rheumatism with pericarditis, involvement of the base of the left lung, and the development of double mitral murmurs. An electro-cardiogram on October 31st, 1927, showed left ventricular preponderance. He improved slowly but steadily, returned to school, and on May 24th, 1928, there was no enlargement of the heart and only a basal systolic murmur. He was kept under supervision, and had minor variations in health. On August 29th, 1929, there was nothing specially to be noted in the heart except a rough basal systolic murmur. On this date a Wassermann reaction was done, and the report was "reaction strongly positive (++)." He continued well and at school, and received no special treatment. He showed no clinical signs of congenital syphilis, but suffered occasionally from diarrhoea. Systolic blood pressure 110. Wassermann reactions taken on November 28th and December 12th were both negative.

This child suffered from acute rheumatism and carditis while under observation in hospital. A Wassermann test was done because the manner of his progress after illness seemed unusual, the cardiac signs variable and contradictory, and an altogether satisfactory diagnosis of the cardiac condition difficult to arrive at. It may, however, be that the first—or positive—Wassermann report was due to some error in the test.

CASE VI.

M. M., female, born 1916. Father died of pneumonia. One sister died of rheumatism; three others alive and well.

She was first seen on December 19th, 1927, with a history of acute rheumatism three years previously and several periods in hospitals because of heart trouble. The heart was greatly enlarged,

and there were double murmurs at both aortic and mitral areas. Institutional care was refused, and while attending the rheumatic clinic for occasional observation her condition has remained practically stationary. There were no clinical signs of congenital syphilis, but a Wassermann report on August 29th, 1929, was "strongly positive (++)."

CASE VII.

E. W., female, born 1914. Father died in an asylum of general paralysis. Mother had injections during pregnancy with patient, and is aware she had syphilis. Patient was treated as a baby with rashes and sores for congenital syphilis.

Patient was first seen on September 26th, 1929, with the complaint of rheumatism, fleeting erythematous rashes, pains round the joints, shortness of breath, and easily tired. There was no clinical sign of congenital syphilis, and there was no obvious cardiac disability. Blood pressure: systolic 130, diastolic 70. Wassermann reactions of both mother and patient were recorded on September 26th, and showed reactions strongly positive (++). She was treated with sodium salicylate and sodium bicarbonate, and the symptoms on October 17th were greatly relieved.

There is no doubt that this child is a congenital syphilitic, but she shows no definite clinical signs. She also shows no definite signs of rheumatic infection, but she has suffered from rheumatic symptoms, which were relieved by sodium salicylate.

CASE VIII.

E. B., female, born 1921. Mother has had ten children; the first three were premature and died; the fourth and fifth died shortly after birth; the sixth is living and well, aged 18; the seventh a miscarriage; the eighth was premature and died; the patient was the ninth, and the tenth is alive and weakly.

Patient was first seen on July 6th, 1929, with a history of faints, shortness of breath, lack of energy, rheumatism, flitting joint pains, and cardiac murmurs. There was a loud rough systolic murmur over the precordial area, loudest in the aortic area, the heart was enlarged, and there was considerable albuminuria, with pus and *B. coli* in the urine. The mitral first sound was slapping in character; an electro-cardiographic report showed "T" inverted III, otherwise normal. Pulse small, no tachycardia. The Wassermann reaction on August 30th was positive (+).

She was at first treated with sodium salicylate, and though somewhat relieved showed no marked improvement, and on admission to the Royal Liverpool Children's Hospital, Heswall, on October 4th, there were double murmurs apparently at both mitral and aortic areas. During October and the beginning of November she was given grey powder (1 grain daily), and had a course of injections with sulfarsenol (0.06 to 0.14 gram). On November 12th she was greatly improved, the heart was not appreciably enlarged, there was only an aortic systolic murmur, and the Wassermann report was negative.

This child, because of history, original Wassermann reaction, and response to treatment, appears to be a congenital syphilitic, but has no clinical signs of the condition. She has also had rheumatic symptoms, with accompanying development of cardiac murmurs.

CASE IX.

B. B., female, born 1916. Father died, aged 40, after three "strokes"—the first "when quite young." Mother has had "heart trouble" since rheumatic fever when aged 12 years. The eldest child is paralysed, there have been two miscarriages and two stillbirths, and three other children are said to be well.

She was first seen on August 29th, 1927, being sent by the doctor as "old rheumatic endocarditis with anginoid symptoms, cough, and dyspnoea on exertion." She gave also a history of flitting pains and joint swellings. The heart sounds were weak, there were no murmurs, and the heart was not definitely enlarged. Precordial pain was present.

She improved under treatment with rest and sodium salicylate, but at later periods suffered from recurrent rheumatic symptoms, painful joint swellings, breathlessness, and precordial pain. There were no clinical signs of congenital syphilis. A Wassermann reaction on September 4th, 1929, showed "reaction strongly positive (++)." She was given grey powder (1 grain daily), and on November 8th another Wassermann test proved positive (+). A course of injections was proposed, but this was refused, as she had recently improved so much.

This child had a suspicious history and symptoms with a positive Wassermann reaction, but she has no clinical signs of congenital syphilis.

SUMMARY.

1. A series of 9 cases is described of rheumatic infection in congenital syphilitic children; in 6 of the 9 cases there were no obvious signs of congenital syphilis.

2. It is suggested that undetected syphilis may in some cases form a basis for the serious course of rheumatic infection, and, further, that the study of rheumatism may be aided by the grouping of rheumatic cases along non-rheumatic lines.

REFERENCES.

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- ⁴ Gestiera: *Arch. de Méd. des Enfants*, 1927, 20, 633.
- ⁵ Friedländer: *Trans. Amer. Ped. Soc.*, 1921, 33, 308.
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- ⁷ McCulloch: *Ibid.*, 1927, 34, 403.
- ⁸ Nabarro and MacDonald: *British Medical Journal*, October 26th, 1929, p. 758.
- ⁹ Cronin Lowe: *Ibid.*, July 13th, 1929, p. 43.

THROAT INFECTIONS AS AN ETIOLOGICAL FACTOR IN PUERPERAL FEVER.

WITH A REPORT OF TWENTY-FOUR CASES.*

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THERE are a number of possible causes of puerperal infection, and in bringing evidence in support of the theory that organisms can be conveyed from the throats of apparently healthy attendants to the patient's genital tract during labour, I do not thereby exclude other sources of infection.

Faulty antiseptic methods cannot be the sole cause of puerperal sepsis, because: (1) the rate has not fallen during the past twenty years, in spite of the almost universal use of antiseptics; (2) it occurs in cases of "born before arrival"; (3) it occurs most frequently in hospitals, in spite of the most elaborate care; (4) it occurs in the private practice of even the most careful doctors and midwives. We have therefore to look for other etiological causes which are not influenced by efficient antiseptic technique. Our quest is simplified if we confine ourselves to the study of haemolytic streptococcal infections, not only because this organism is the most important cause of puerperal fever, but also because of its special characteristics, which are invaluable in its identification.

An analysis of the cases of puerperal sepsis admitted to the recently established special block for puerperal fever in connexion with the Jessop Hospital shows that there is not, as has been supposed, a winter prevalence of puerperal infection. The same characteristics are shown by the number of admissions to the puerperal fever beds at the Monsall Hospital, Manchester¹ (Chart 1). On the other hand, there

CHART 1.—Average monthly admissions of cases of puerperal sepsis, Jessop Hospital (1928-29) and Monsall Hospital (1927-29).

is a marked winter prevalence of puerperal infections caused by haemolytic streptococci, which in 1929 fell from 61 per cent. of the admissions to the Jessop Hospital in the first quarter to 14.5 per cent. in the summer quarter. This curve almost exactly corresponds with the latest available figures (1911 to 1924) of the average quarterly mortality from puerperal fever in England and Wales;² so that the type of infecting organism not only varies directly with the mortality from puerperal fever, but also with the time

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of the year when haemolytic streptococcal infections of the throat are known to be most prevalent (Chart 2).

CHART 2.—Comparison between the average quarterly mortality (per million births England and Wales) from puerperal fever, 1911 to 1924, and cases of puerperal infection from haemolytic streptococci (per cent. of admissions of puerperal sepsis) to Jessop Hospital, 1929.

The following classified list (Table I) gives the causal organism which has been found in 236 cases of puerperal infection admitted to the Jessop Hospital last year. In

TABLE I.—Type of Infecting Organism in the Genital Tract of 236 Cases of Puerperal Fever admitted to the Jessop Hospital.

1929.	Total.	Haem. Strep.	Strep. viridans.	Strep.	B. coli.	Staph. albus.	Staph. aureus.	Various.
First quarter ...	59	36 (61.0 %)	2	6	2	2	2	9
Second quarter ...	66	15 (22.8 %)	6	5	11	18	1	10
Third quarter...	55	8 (14.5 %)	4	9	15	11	0	8
Fourth quarter ...	56	20 (35.6 %)	3	5	8	8	2	10
Totals ...	236	79	15	25	36	39	5	37

addition to the winter incidence of haemolytic streptococci, an interesting feature is the relatively high proportion of infections by *B. coli* in the summer, which may be related to the dry weather at that time.

Reference to the analysis of the type of labour (Table II) which preceded the onset of puerperal fever in the cases admitted to the Jessop Hospital in 1929 shows the surprising fact that those which had spontaneous labours had the highest rate of haemolytic streptococcal infections, while "failed forceps" cases, in which there is usually the maximum amount of manipulation and trauma, were only infected by haemolytic streptococci in 12.5 per cent. of the cases admitted.

TABLE II.—Haemolytic Streptococcal Infections in Relation to Type of Delivery in 236 Cases admitted to Septic Block, Jessop Hospital (1929).

	Total.	Infected by Haemolytic Streptococci.
Spontaneous deliveries (including "B.B.A.") ...	144	Per cent. 46.5
"B.B.A." ...	[12]	41.6
Operative deliveries (including "failed forceps") ...	52	34.8
"Failed forceps" ...	[8]	12.5
Abortions ...	40	5.0
Total ...	236	

A most potent argument against the supposition that want of surgical cleanliness is really responsible for haemolytic streptococcal infections is found in the fact that this organism was present in only 5 per cent. of the septic