

A contribution to the etiology of scarlatina in surgical cases : from the Clinical Records of the Evelina Hospital for Sick Children / by W.E. Paley ; communicated, with observations, by James F. Goodhart.

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A CONTRIBUTION
TO THE
ETIOLOGY OF SCARLATINA IN SURGICAL
CASES.

*From the Clinical Records of the Evelina Hospital for Sick
Children*

BY W. E. PALEY.

COMMUNICATED, WITH OBSERVATIONS,
BY JAMES F. GOODHART, M.D.

THERE has been some discussion of late upon the nature of an eruption like that of scarlatina which occasionally occurs after surgical operations. Enough has been said to show that its cause is still open to question, and, consequently, that there is room for fresh facts concerning it. Whether it be scarlatina or something else ; its irregular course ; its definite relation in many cases to surgical operations ; are all points still involved in much obscurity.

Many cases of this kind have occurred at the Evelina Hospital, and seeing them from time to time, as one has done, seemingly sporadically, the relationship to an operation of some kind has been the most prominent feature in many instances, and I have been disposed to regard the rash as due to some blood changes dependent upon the operation, and not to the appropriation of any particular poison. But what little literature there is upon the subject points decidedly to just the opposite conclusion. Dr. Gee, in his article on scarlatina in 'Reynolds' System of Medicine,' devotes a paragraph to

“Surgical Scarlet Fever.” Sir James Paget treats of “Scarlet Fever after Operations,” and Mr. Howard Marsh follows him.¹ M. Trélat² holds to the same opinion, and Hensch of Berlin³ also. Other isolated cases have been recorded in addition to a very valuable paper—I think the most valuable of all—by Dr. Braxton Hicks, on “Scarlet fever after parturition” in the ‘Transactions of the Obstetrical Society,’⁴ and a review of all these communications certainly balances strongly to the view that the disease is one and indivisible, viz. scarlatina.

However, knowing that cases, now amounting to no inconsiderable number, had occurred at the Evelina Hospital from time to time, and feeling that facts, unlike opinions, are never worthless, I asked my friend Mr. Paley, our resident medical officer, with the consent of my colleagues, to put together the notes of all the cases that he could collect from the records. This he has done with no little labour, and the twenty-five cases subjoined will form a contribution to the natural history of the disease, whatever may be its nature. A kindred subject has also been laid under contribution by collecting notes of two outbreaks of measles, which are appended to those of the cases of scarlatina.

The cases are more fragmentary than could be wished, but this cannot be helped. The notes have been made by different reporters—and systematic reporting in young children is often marred by various difficulties not presented by adults. Moreover, it often happens even in the best reports that unless special observations are made by those who are interested, points are overlooked or missed which an analysis of many cases may show to be important.

In the subtle questions suggested by the behaviour of the exanthemata such wants are manifold always; but we must take what information we can get, and hope to obtain any additional facts that may be necessary as time goes on.

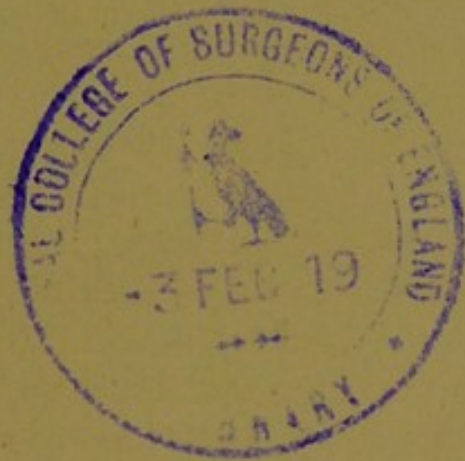
And now to proceed to the notes of the cases; but as a preliminary to this, and in order that our readers may know better what they are about, we give first a plan of a horizontal section of the first floor of the hospital building.

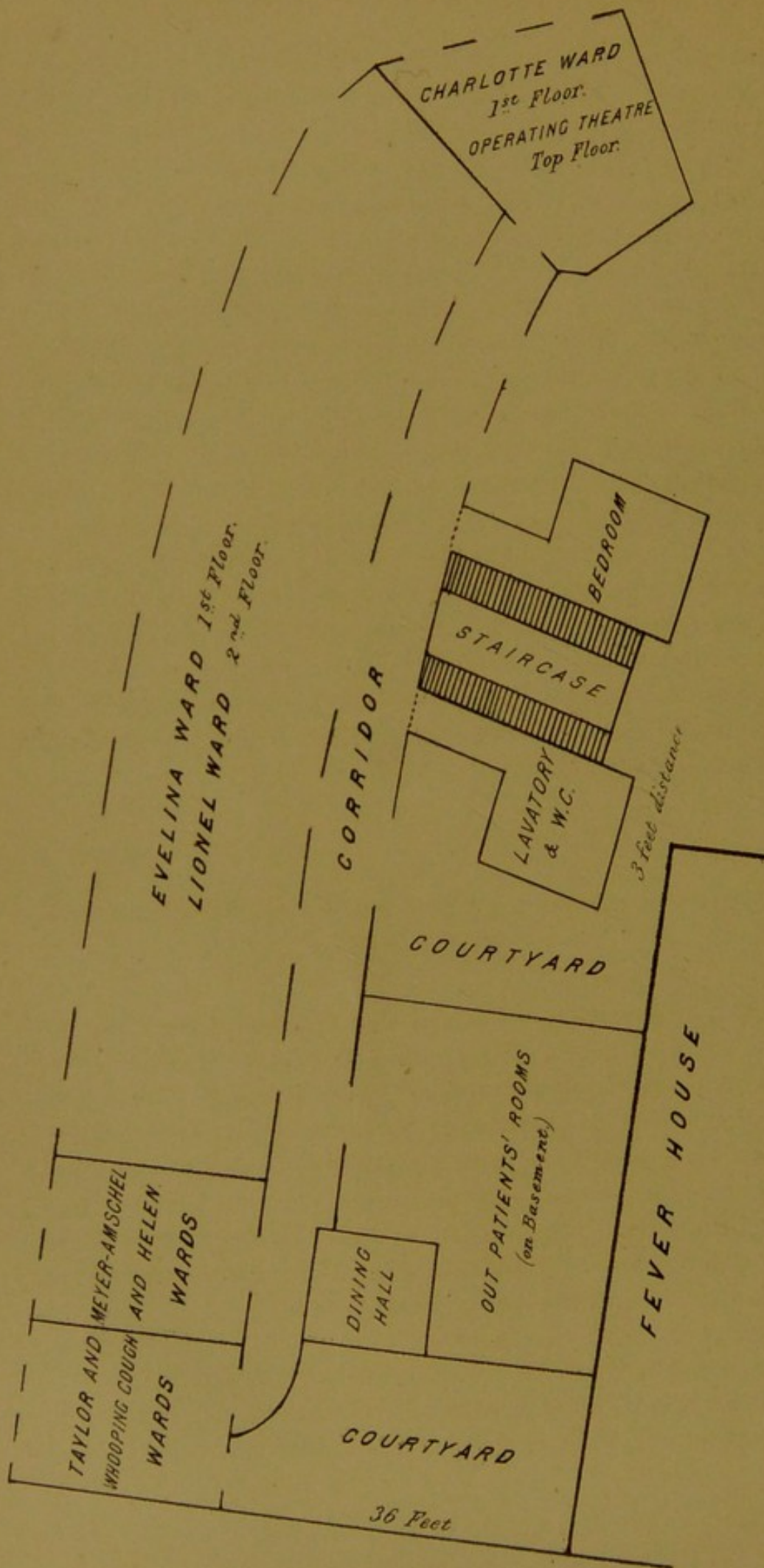
¹ ‘Clin. Lect. and Essays,’ edited by H. Marsh.

² ‘Le Progrès Médical,’ Sept., 1878, and ‘Lond. Med. Record,’ 1878.

³ ‘Charité Annalen,’ 1878.

⁴ Vol. xii.





From this it will be seen that the building is long, and slightly curved in its length; with but little depth, except where outbuildings are added; and that it is truncated at either end. The two main wards, Evelina and Lionel, one above the other, are long wards running along the central half of the building; and at either end, making up about the other half of its length, are small wards. Along the hollow of the curve runs a corridor, and this and the long wards constitute the whole thickness of the building, except where closets, nurses' bedrooms, &c., are built out from it. The main wards are separated from the corridor, not by a wall but by glass windows, all of which open upon pivots, allowing them to pass from the vertical or closed condition to the horizontal or open one at will. Thus the two main walls of the ward are composed in great part of windows. The advantage of this plan is that thorough ventilation can be procured at any time and to any extent. The fever wards are built upon the out-patient rooms, but they have no communication with the hospital, and access to them is only to be obtained by descending to the basement and going across a small uncovered courtyard. For the rest the lettered plan will suffice.

(1.) *Notes of cases where a scarlatina-like eruption has attacked surgical cases.*

CASE 1.—A female, *æt.* 2 years, was admitted with hip-joint disease on July 14th, 1869, under the care of Mr. Willett. The abscess was opened on August 18th, without antiseptics. The wound was still discharging, when on September 16th a scarlet rash was noticed, and this remained until the sixth day. There were occasional traces of albumen in the urine. The state of the wound is not noted. It does not appear that there was any sore throat or typical tongue, at any rate they are not mentioned. The patient was discharged well.

Sources of infection.—A case of dropsy after scarlatina was admitted on August 20th, 1869, probably not desquamating; and another similar case was admitted into the same ward on September 9th. This case was desquamating and had had

scarlatina two months before. It was removed from the ward September 18th, and died on September 28th.

Also another case of scarlatinal dropsy was admitted on August 26th and was discharged on September 24th. No notes were made of it.

CASE 2.—A female, æt. 6 years, was admitted with genu valgum on July 31st, 1869, under Mr. Willett. No operation was performed. A scarlet rash was noticed on September 14th. The temperature for twelve days ranged between 100° and 105°. The submaxillary glands were swollen and the tonsils ulcerated. The urine contained traces of albumen which did not disappear till October 4th, when she was discharged well.

Sources of infection.—The same as No. 1, unless it be considered to be due to epidemic influence. It is worthy of note that no operation had been performed, and the case ran a typical scarlatinal course. There were traces of albumen in the urine on September 24th.

CASE 3.—A boy, æt. 8 years, was admitted under Mr. Howse, with disease of the hip-joint and necrosis of the femur, on January 17th, 1872. On July 6th, 1872, resection of the hip was performed under the antiseptic method. On September 27th, the wound being still open and still dressed antiseptically, the child was feverish with vomiting and rash and sore throat. There are no further notes of this case.

Source of infection.—A case of scarlatinal dropsy was admitted on September 20th, 1872, and died on September 24th. There is no note as to desquamation being present. Large white kidneys were found at the post-mortem.

It cannot be said at this date into what wards these patients were admitted.

CASE 4.—A boy, æt. 7 years, was admitted under Mr. Howse, on January 2nd, 1873, for encysted hydrocele. Some doubt existed as to the nature of the swelling, and an exploratory operation was performed on January 4th, antiseptically. Antiseptics notwithstanding, the temperature next day was 103°, and on January 8th, the temperature having remained high, the report states:—"There is an erythematous flush in the vicinity of the wound, which is looking very healthy,

and a papular rose rash over the arms, thighs, and abdomen. No sore throat. Temperature $100\cdot8^{\circ}$. A very small quantity of urine was excreted. There is no note of any albuminuria. The rash lasted till January 11th, when the temperature fell.

Sources of infection.—None traced unless from Case 5, which hardly seems likely. Case 5, admitted the day before the eruption was noticed in Case 4, might have been then incubating. But it seems more probable, as Mr. Paley says, that Case 4 was first scarlatinal, and was the source of infection for the following one.

CASE 5.—A boy, *æt.* 9, was admitted under Mr. Howse, on January 7th, 1873, with a psoas abscess, which was opened antiseptically on January 11th. The ward into which this child was taken is not stated. On January 15th, the temperature rose towards evening to $101\cdot8^{\circ}$, and he had rigors; on the 16th he had headache, sore throat, a flushed face, and a temperature of $101\cdot8^{\circ}$. His tongue was furred and dry, but the wound looked healthy. On the 20th the temperature rose to $104\cdot2^{\circ}$. On February 8th he had pain and swelling in the right knee-joint. There is no mention of suppuration.

The notes of this case are imperfect, but death ensued on May 13th. There are no notes of any *post-mortem* examination.

Source of infection.—Except the preceding case, which was not at the time considered to be scarlatina, no scarlatina or measles is to be traced in the hospital. Is this a case of pyæmia following the absorption of the scarlatinal poison from Case 4?

CASE 6.—A boy, *æt.* 3 years, was admitted under Mr. Howse, on August 9th, 1873, for a scald on the chest. The scald had occurred the day before, and the temperature on admission was 101° . The child vomited, and had a furred tongue. The wound occupied the front of the thorax, from the level of the second rib to the epigastrium, and from nipple to nipple laterally. The cuticle was partly raised in blisters and partly destroyed, leaving a raw surface. The dressings consisted of powdered starch and wool. On August 10th the child had a bright scarlet rash over the neck, arms, and abdomen, with injection

of the fauces. No other symptoms were noted. It was discharged well.

Sources of infection.—None could be traced. I may here quote, à propos of this case, another which has lately been published by Surgeon-Major Ffolliott, of Peshawur.¹

Private Chapman, of the Fusiliers, was sent with his company from Jumrood to form part of the garrison at Ali Musjid, nearly a month after that fort was captured. He had been a few hours in the fort, when urged by curiosity, he strolled about the place, and while in the vicinity of the Afghan powder magazine, he threw a lighted match on the ground after lighting his pipe, a quantity of powder which lay unobserved upon the ground became ignited, and he was "blown up," being severely burned on the left hip, and inside of the thigh, and on the arms and face. The accident occurred on December 21st, and next day he was sent to Peshawur for treatment. On Dec. 25th there was considerable constitutional disturbance, and a bright scarlet rash was found upon the abdomen. This spread over the whole body, and next day he resembled a boiled lobster. Several medical officers pronounced the case scarlatina. The temperature, which was 101° at the onset, subsided after the appearance of the eruption, and this declined gradually after lasting for five days, to be succeeded by general desquamation. Mr. Ffolliott remarks, that although scarlatina is not unknown in India he has never seen or heard of a single case in twelve years service, and there was no such disease in camp. The man was 24 years of age and had been three years in India. The writer therefore concludes that there can be little doubt that the absorption of septic poison into the circulation is capable of producing a scarlet rash upon the body.

For further information on this point the reader is referred to the subsequent remarks, from which it will be found that Sir Joseph Fayrer is quite in accord with the writer above mentioned.

CASE 7.—A boy, æt. 5 years, was admitted under Mr. Marrant Baker, on August 19th, 1874, with an abscess over the upper dorsal vertebræ. He was said, by his mother, to have had scar-

¹ 'Brit. Med. Journ.,' 1879, vol. i, p. 505.

latina two months before his admission, the evidence being that the child had had a rash and sore throat, which were considered at the time to be scarlatinal, and that the other children suffered from the same complaint. He is known to have had measles at a different time. The abscess was opened on August 20th antiseptically, but the spray had been omitted, and the wound was being dressed with zinc ointment and lint on September 5th. The child went on well till September 5th, when the temperature rose suddenly to 105° . There was no rash and no redness around the wound.

6th.—Temperature still 104° . The fauces are injected, and the tonsils large and swollen.

Convalescence was established after September 10th. There is no note of albuminuria. He went out well.

Sources of infection.—(1). A case was admitted on September 3rd with well-marked scarlatinal dropsy, the urine highly albuminous, containing granular casts, and the skin desquamating.

(2). A case was admitted on August 28th, feverish, vomiting, and with sore throat. No rash was present, but another child in the same family had a rash; the fauces of this child were injected, and there was slight desquamation. It died on September 3rd, with a temperature of 105° , and the disease is entered in the report as one of scarlatina, which, no doubt, it was.

In connection with these cases it must be added that a child ill with bronchitis was admitted on August 27th, and developed a well-marked attack of scarlatina on September 7th. It desquamated freely, but had no albuminuria.

Case 7 had no rash, and, therefore, strictly speaking, should not perhaps be included; but it is none the less interesting as showing the susceptibility of a patient, under surgical treatment for an open wound, to the influence of the scarlatinal poison, and, therefore, it is really one of the most instructive of all the cases. It is also interesting in another way: the child was said to have had scarlatina two months previously. If so this was a second attack, and the anomalous course it ran might then be due as much to the fact of the previous attack as to that of the surgical operation. Both conditions appear to predispose to an atypical development of scarlatina. It may be noted that this case is in some respects similar to one mentioned by Sir James Paget in

his 'Clinical Lectures and Essays,'¹ which at any rate corroborates the possibility of a double attack. A boy operated upon for stone had a scarlatina-like rash and constitutional symptoms twice within a month while under Sir James's own observation. The first eruption appeared the day after the operation; the second, attended by desquamation and hæmaturia, after a month. It is of course well known that, of all the exanthemata which are protective against themselves after having occurred once, scarlatina is least so. Numerous cases are on record of the occurrence of scarlatina twice in the same individual, and even within short periods of time.

CASE 8.—A boy, æt. 9 years, was admitted under Mr. Howse into Charlotte Ward, on April 3rd, 1875, with disease of the hip-joint and abscess. The latter was opened with antiseptic precautions on April 4th, and the child went on well till April 9th, when the temperature rose to 104°. On April 10th, a bright scarlet rash was noticed all over the feet and legs and slightly on the abdomen; there was none on the face or chest. The throat was not sore, the tongue was clean, and his general appearance was lively and intelligent.

12th.—The eruption has appeared on the chest. The temperature is still high.

14th.—Eruption still present. The condition has exercised no unhealthy influence upon the wound, which is suppurating moderately. He has no sore throat.

15th.—The rash is fading and the skin is desquamating.

20th.—The rash is gone. There is still slight desquamation.

The presence or absence of albumen was not noted in the report till some time after, when none was found.

This case was seen by all the physicians to the hospital, the balance of opinion being that *per se* it should not be called scarlatina.

Source of infection.—A patient was admitted, though not into the same ward, with diphtheritic paralysis on March 5th, 1875. It was transferred to the fever ward with scarlatina on March 14th, and was not discharged till May 12th. No other case was known to have been in the hospital since October 1874.

CASE 9.—A boy, æt. 4 years, was admitted under Mr.

¹ P. 349.

Howse on May 1st, 1875, for the operation of radical cure of a hernia. This was performed on July 2nd, with antiseptic precautions.

On July 25th, his temperature rose to 101°. He was drowsy and languid, with a furred tongue, tonsillitis, swelling of the submaxillary glands and a uniform red rash on the legs. He was much better on the 27th, and the wound at this date looked very healthy. There is no note of either desquamation or albuminuria. This child had an attack of measles seven months later.

Sources of infection.—A case of pleurisy after scarlatina in April, was admitted on May 7th, and discharged on July 16th. A case of pneumonia after measles was admitted on July 3rd, and was removed on July 29th, in much the same state as when admitted.

CASE 10.—A girl, æt. 11½ years, was admitted into Charlotte Ward under Mr. Marrant Baker on October 24th, 1876, for a sinus over the great trochanter. No operation was performed. On November 6th, the report says, “The wound looks angry, with an erythematous blush around it. The skin is hot and the child has vomited once.”

On the 7th, the skin of the trunk and extremities was covered with a punctate red rash. There was no soreness of the throat. The wound looked dusky and foul.

8th.—Condition of wound the same. The rash still continues on the body, legs, arms, and face, and strongly resembles the rash of scarlatina. There is no note of albuminuria. The patient was discharged well on December 7th.

Sources of infection.—A case of scarlatinal dropsy was admitted into the Fever Ward on October 10th, and discharged November 27th. A second case of scarlatinal dropsy was admitted, also into the Fever Ward, on October 17th, desquamating freely; the urine was dark, smoke-coloured and contained three fourths of albumen. The child was discharged on November 28th.

Remarks.—It will have been noticed that for many of the foregoing cases the sources of infection given are cases of scarlatinal dropsy, but with regard to these it must be remembered that they are usually admitted at once into our fever ward, which it

will be seen upon reference to the plan of the building has practically no communication whatever with the main edifice except through the medical staff. So that they are possibly of more importance as indicating an epidemic influence in the atmosphere of the neighbourhood than any immediate source within the hospital.

CASE 11.—A girl, æt. 6 years, was admitted into Lionel Ward under Mr. Marrant Baker, on January 16th, 1877, with spinal disease and an iliac abscess, which *was not opened*. On January 30th a well-marked scarlet rash appeared over the body, the temperature being 100°. Her throat was sore, with a dusky patch on the right tonsil, not injected; the glands behind the jaw enlarged, but not tender. Desquamation took place afterwards, and lasted until the end of February. Albuminuria is not noted. She was transferred to the fever ward on January 31st. A case of hysteria was admitted into the same ward on December 18th, 1876, and was removed to the fever ward with scarlatina, on January 3rd, 1877. She had scarlatinal rheumatism on January 7th, and was discharged on February 12th.

CASE 12.—A girl, æt. 3 $\frac{3}{4}$ years, was admitted into Evelina Ward under Mr. Howse, on February 3rd, 1877, for extreme rachitic curvature of the legs. Osteotomy of the tibia and fibula was performed on February 19th.

On February 26th the child had a well-marked scarlet rash, with sore throat and feverishness, and there was no healthy reparative action about the wound. The report says that the rash, though probably scarlatinal, was not like a typical case of that disease; it was less uniform and bright; it lasted longer, and varied in intensity both as regards locality and colour.

March 4th.—There is some desquamation over the lower part of the abdomen, but it is possible this is a slight eczema due to the irritation of urine, as she is not a clean child. The temperature is lower. Still no action about the wound.

7th.—The wound over the tibia is still sloughy. There is now pain and swelling in the left wrist (? scarlatinal rheumatism).

9th.—No other joints are affected.

20th.—Desquamation is still proceeding. There is no note of any albuminuria.

The patient was discharged well on June 9th, 1877.

CASE 13.—A girl, æt. 5 $\frac{3}{4}$ years, was admitted, under Mr. Howse, into Lionel Ward on February 12th, 1877, with a spinal abscess. This was opened with antiseptic precautions on February 19th, and on February 25th a scarlet rash appeared. The attack was very similar to that in Case 12, but the rash was not so well marked, nor the tonsillitis so great. There was no complication about the wound. She was transferred to the fever ward, and was discharged well on May 15th, 1877.

There is no note of albuminuria or desquamation.

CASE 14.—A boy, æt. 3 years, was admitted into Charlotte Ward for talipes equino-varus on January 13th, 1877. The tendo Achillis was divided on January 28th. On March 16th he had a bright scarlet rash upon the skin. This was spread universally and was accompanied by sore throat and a temperature of 102°. He was removed to the fever ward for this. The rash faded on March 20th. There is no note of any albuminuria.

Between March 20th and May 1st this child had measles. The date is not given in the report, but the attack is described as being *well marked* and *severe*.

N.B.—Tenotomies are always *dressed with gauze*, and probably this was done under the spray.

It is obvious in this case that the operation—which was trivial and far removed in time from the onset of the scarlatina—could hardly have had anything to do with the occurrence of the exanthem. The case is not, however, placed here merely as one occurring with others about this time, but as one of scarlatina in a patient under surgical treatment. I shall refer to this point again after the reports of the cases are finished, but in the meantime I may say that it does not appear to me that occurrence of scarlet rashes is limited to those patients upon whom *recent* operations have been performed. There seems to be a liability on the part of surgical cases, operation or no operation, to contract them, while medical cases enjoy an

immunity from them, whatever the explanation of this may be. This also appears remarkably in an epidemic of measles to be mentioned subsequently.

CASE 15.—A boy, æt. 6 years, was admitted, under Mr. Howse, into Lionel Ward on March 17th, 1877, for an iliac abscess due to carious vertebræ. This was opened under anti-septic precautions on March 19th.

On the 26th there is a note to the effect that the temperature has been up to 102° since the 23rd, and there is some mottling of the skin, but no sore throat. There is no note of albuminuria.

This case was probably not transferred to the fever ward, but there are no notes to that effect.

Cases 11 to 15 inclusive go in a regular sequence. Case 11 probably contracted scarlatina from the source mentioned under it. Cases 12 and 13 developed the rash, &c., while Case 11 was in the hospital desquamating, and Cases 14 and 15 while Case 12 was in the same condition. Moreover, assuming that Case 11 contracted the disease from the case of hysteria, three out of five occurred in Lionel Ward, whence she had been removed, the other two occurring upon the lower floor and in contiguous wards.

CASE 16.—A boy, æt. $3\frac{1}{2}$ years, was admitted into Lionel Ward, under Mr. Marrant Baker, with an abscess over the upper part of the left femur, on November 21st, 1877. No operation was performed and there was no wound. On November 26th a scarlet rash appeared, for which it was removed to the fever ward, and this was followed on December 14th by nephritis, the urine containing one third of albumen. On December 20th there was still an eighth of albumen, with dyspnœa and râles all over the chest. The urine was free from albumen on January 30th.

This child is known to have had measles in January, 1879, two years after.

Source of infection.—None could be traced. No case had occurred in the hospital since October 7th, and of the case then admitted no notes can be found, but it was probably one of scarlatinal dropsy.

CASE 17.—A boy, æt. 3 years, was admitted into Evelina ward, under Mr. Howse, on November 17th, 1877, for rachitic curvature of the tibiæ. One tibia was divided antiseptically on December 13th, and all went well till December 29th, when a sudden rise of temperature occurred from 98° to 102·6°. The urine was like porter, and contained half of its bulk of albumen.

January 1st.—The hæmaturia still continues, and there is now œdema of the lungs.

2nd.—The urine contains blood-corpuscles, epithelium, and a few hyaline casts.

4th.—There is now pneumonia of the upper lobe of the left lung. The urine contains no albumen to-day. The scrotum is œdematous. The child died suddenly on January 10th.

The heart is said to have been normal. The left pleural cavity was filled with fluid, the lung being compressed and solid at the base. Right side healthy. The kidneys were found half as large again as normal, and of an abnormally red colour.

Source of infection.—Case 16 (?). He underwent an operation on the 13th, and on the 15th and 17th cases of scarlatina occurred in the hospital. He was not attacked till the 29th.

CASE 18.—A girl, æt. 1 year and 8 months, was admitted on December 4th, 1877, into Meyer-Amschel Ward with fracture of the left femur in its middle third. She developed scarlatina and was removed to the fever ward on December 15th, and was discharged well on January 18th, 1878. The notes are imperfect concerning the scarlatina.

Source of infection.—Case 16 (?).

CASE 19.—A boy, æt. 3 years, was admitted, under Mr. Howse, into Charlotte Ward, on December 12th, 1877, for angular curvature of the spine. There was neither sore nor operation. The notes of this case are very imperfect, but the boy is said to have had a slight attack of scarlatina on December 17th, and he died on December 19th.

Source of infection.—Case 16 (?). To the history of these four cases it must be added that two medical cases, one of phthisis and one of laryngitis, developed scarlatina in the Hospital on January 10th and 11th respectively. They occurred as follows:—

A. The case of phthisis in Lionel Ward, with Case 16.

B. The laryngeal case in Evelina Ward, with Case 17.

A was discharged January 25th, 1878.

B was discharged February 25th, 1878.

CASE 20.—A girl, æt. $2\frac{1}{2}$ years, was admitted, under Mr. Marrant Baker, into Lionel Ward, on January 17th, 1878, with acute vaginitis. On January 28th the body was covered with a well-marked scarlet rash associated with redness and swelling of the fauces. There was no albuminuria in this case. She was discharged well on March 13th.

Sources of infection.—The two medical cases noted above.

CASE 21.—A boy, æt. 6 years, was admitted under Mr. Marrant Baker into Lionel Ward, on April 30th, 1878, with disease of the hip-joint. No sinus existed and no operation was performed. On June 12th, his temperature in the evening was 101° , and a rash like that of scarlatina appeared over the face and thighs. There is a note to the effect that the eruption was not so bright as a typical scarlatina rash, but the tonsils were swollen though not ulcerated. There was no enlargement of the cervical glands.

He was removed to the fever ward.

17th.—The rash has disappeared. There is slight desquamation of the face only. No albumen in the urine.

24th.—Some desquamation still upon the nose and also on one hand.

Sources of infection.—See below, after Case 22.

CASE 22.—A girl, æt. 6 years, was admitted into Evelina Ward, under Mr. Howse, on May 8th, 1878, suffering from pulpy disease of the right elbow. The joint was excised on June 13th, with antiseptic precautions. On June 15th the child's temperature was $103\cdot8^{\circ}$; the tongue was furred and the skin was covered more or less universally with a rash like that of scarlatina. The face, however, was the least affected. The throat was not sore.

24th.—No desquamation.

27th.—No albumen in the urine.

Sources of infection—No scarlatina can be traced, except possibly from Case 20. But both these cases developed a rash very closely, the one after the other, and supposing, which is

of course quite possible, that 22 was infected from 21, then comes the question of the origin of Case 21, and here is the peculiar interest of these cases. Measles, not scarlatina, was rife in the hospital at this time. On April 27th, a child was admitted, with laryngitis, into Lionel Ward, and developed well-marked measles the next day. It was discharged May 27th. On May 22nd a child was admitted into Evelina Ward,¹ with lumbar abscess, and on May 28th had well-marked measles. It had no wound at the time; and on June 12th a child suffering from disease of the cervical spine, who also had no wound at that time or previously, and who had been in the hospital nearly five months, had well-marked measles.

Under these circumstances is it possible that the infection of measles may have become modified and appeared as a scarlatina-like rash in Cases 21 and 22? An epidemic of measles which will be described presently does not support such a view, as all the cases, seven in number, bred true.

CASE 23.—A boy, *æt.* 4 years, was admitted into Evelina Ward, under Mr. Howse, with morbus coxæ and abscess round the hip, on September 21st, 1878. The abscess was opened antiseptically on September 23rd, and all went well till October 6th, when the evening temperature rose to 103·4°.

October 8th.—Temp. 103°; pulse 156; Resp. 44; Face flushed, but no rash. He was now transferred to a separate ward with Cases 24 and 25. The fever ward was already filled with cases of scarlatinal dropsy &c. There is no note of any abnormal state of the wound.

9th.—Tongue red with prominent papillæ; fauces red; body and extremities now covered with a pinkish dotted rash.

10th.—Rash still well marked.

12th.—Rash gone; tongue dry. There is still swelling of the submaxillary glands.

23rd.—There is now a branny desquamation of the face and soles of the feet.

November 5th.—Desquamating freely. No albumen in the urine.

9th.—Going on well.

15th.—Abscess forming in the groin.

¹ Both this Case and Case 22 died of meningitis.

December 7th.—Much discharge through the original wound ; has wasted considerably ; no albumen.

17th.—Still desquamating ; temperature high ; œdema of hands and feet. The child died in an attack of convulsions exactly resembling those of uræmia. The urine was examined, but contained no albumen throughout.

Permission for an inspection was refused.

CASE 24.—A boy, æt. $4\frac{1}{2}$ years, was admitted into Evelina Ward under Mr. Howse, on October 3rd, 1878, for calculus vesicæ. Lithotomy was performed on October 5th (the day before the previous patient became ill). The temperature remained normal till the 7th, when it rose in the evening to $102\cdot4^{\circ}$. No sore throat. Skin pinkish.

On the 8th a universal well-marked scarlet rash came out. Still no sore throat. He was transferred to a separate ward.

October 9th.—Temp. $98\cdot3^{\circ}$. Rash only slight.

10th.—Temp. $98\cdot4^{\circ}$. Skin only tinged.

11th.—Doing well. Urine passed by the urethra.

18th.—Urine has albumen in it. Temp. 97° .

24th.—Temp. has risen since the 22nd. It is to-day $102\cdot8^{\circ}$. More urine comes now through the wound.

26th.—Temp. $101\cdot4^{\circ}$. Urine still albuminous.

On the 29th desquamation is noted as occurring.

November 1st.—The urine still contained a trace of albumen, and it was passed entirely by the urethra.

18th.—Desquamation has now ceased. He went out well on December 5th.

CASE 25.—A boy, æt. 4 years, was admitted into Charlotte Ward under Mr. Marrant Baker, on September 24th, 1878, also for calculus vesicæ. He also was operated upon on October 5th, and following much the same course as the other, had a temperature of $103\cdot6^{\circ}$ on the evening of October 7th, and on the 8th the body was covered with a red rash. He had no sore throat, and the wound is described as healing.

October 9th.—Temp. $98\cdot4^{\circ}$. Slight rash.

10th.—Temp. 98° . Skin tinged.

11th.—Urine comes by the urethra.

18th.—Temp. $98\cdot2^{\circ}$. Wound looks well.

November 1st.—Temp. 99°. Since the 18th there has been slight desquamation about the lips.

On November 5th he is noted to be desquamating in fine scales. Urine all passed by the urethra.

Whether he had albuminuria or not is uncertain, as he had cystitis and an excess of phosphates in the urine.

Sources of infection.—These three cases are certainly all one series. The sources of infection for all three may therefore be considered as the same. Of these there are several which seem possible.

1. A case of scarlatinal dropsy and albuminuria was admitted in the stage of desquamation on August 30th, and went out on October 9th.

2. A similar case, also desquamating, was admitted on August 31st, and was discharged September 23rd.

3. The brother of No. 2 was admitted desquamating on August 6th, and was discharged September 23rd.

4. A case admitted while desquamating on October 8th, was discharged on January 1st, 1879.

5. A child admitted on September 26th, with general œdema and albuminuria, died on September 29th, 1878, with large white kidneys.

These cases moreover go to show not only that there was a source of infection within the hospital, but, coming as they do from four different places, that epidemic influence was probably at work also.

(2.) *Notes of some outbreaks of measles in surgical cases.*

CASE 1.—A patient was admitted with double genu valgum on October 19th, 1878. Ogston's operation was performed on one side on October 24th, on the other on November 21st. The wounds were all healed by December 11th. Antiseptic dressings were used throughout. Measles appeared on January 4th, 1879.

CASE 2.—A child was admitted with rachitic curvature of both the tibiæ on October 16th, 1878. Osteotomy was performed on the right side on October 17th, and on the left side on November 14th. Antiseptic dressings were used, and the

second wound had healed on December 25th. Measles appeared on January 6th.

CASE 3.—A child with pleuritic effusion was admitted on December 13th, 1878. It was tapped with Potain's aspirator on December 15th. It had measles on January 6th.

CASE 4.—A child (Case 16 in previous notes of scarlatina cases) admitted on November 21st, 1877, had still an open sinus after resection of the hip which had been performed on April 30th, 1878. Measles appeared on January 8th, 1879.

CASE 5.—A child with pulpy disease of the left elbow was admitted on October 23rd, 1878. Resection of the joint was performed on October 24th, antiseptically. The spray and gauze were omitted on December 6th, but the wound was still open. Measles appeared on January 8th.

CASE 6.—Admitted with an abscess in the sole of the foot, on December 6th, 1878. This was opened without the spray on January 6th, and on January 18th, the wound still discharging, measles appeared.

CASE 7.—Admitted on November 19th, 1878, with disease of the hip-joint and great pain on movement, but no sinus, developed measles on January 20th. An abscess in connection with the hip-joint appeared during the course of the measles.

CASE 8.—Admitted for talipes varus on November 9th, 1878. Measles appeared on January 5th. No operation had been performed. There was no wound and the child appeared to be in good health.

Mr. Paley adds, that six of these eight cases had undergone an operation of some sort at no very distant period; one had hip-joint disease with probable suppuration, and one only was free from any adverse influence. The outbreak was traced to a nurse, in whom the disease showed itself clearly on December 26th, and *no other cases than these occurred among some fifty children.*

Another series of cases which occurred in 1869 bears also, though not quite so strongly, in the same direction. Here are the notes:

CASE 1.—A boy, æt. $2\frac{3}{4}$ years, was admitted on July 15th, 1869, with "fits" evidently due to measles which appeared within a few hours of his admission, and which appears to have been the source of infection for the other cases.

CASE 2.—A boy, æt. $3\frac{3}{4}$ years, was admitted on June 24th, 1869, with phthisis; some form of eruption is described as coming and going from July 14th. But on July 26th he is found to have measles.

CASE 3.—A boy, æt. $5\frac{1}{2}$ years, was admitted on June 29th, 1869, with necrosis of the carpus and abscess. The abscess was opened on July 6th without antiseptics, and on July 14th some pieces of necrosed bone were removed. Measles appeared on July 28th.

CASE 4.—A boy, æt. $2\frac{1}{2}$ years, was admitted with pustular corneitis and eczema capitis on July 5th, 1869. A seton was inserted in the right temple on July 7th. Measles occurred on August 2nd, and was followed by well-marked diphtheria of the throat and conjunctiva from which the child died.

CASE 5.—A boy, æt. $3\frac{1}{2}$ years, was admitted on September 22nd, 1869, with calculus vesicæ. On September 25th, lateral lithotomy was performed, and on October 17th he had measles.

No other cases than these occurred in the hospital at this time, and all four were cases in which there were the local sources of inflammation which I shall presently discuss.

Facts are wanted rather than opinions concerning such intricate subjects as the workings of the various exanthemata, so that having given notes of all our cases there will be but little more to say except to point out by way of summary some of the bearings which, collectively or individually, they suggest. That this may be the more easily done, I have drawn out a table of the twenty-five cases of scarlatina with information in it upon the following points:

1st. The relation of the cases to each other in time.

2nd. The surgical disease for which they were under treatment.

3rd. The presence or absence of wound or operation.

4th. The dressing of any wound present.

5th. The relation, if any, between the operation and the onset of the scarlet rash.

6th. Whether there were obvious sources of infection.

These seem to me the more important points to consider in relation to the pathology and etiology of scarlatina in surgical cases.

No.	Sex.	Age.	Disease.	Open wound or operation.	Dressing.	Date of operation.	Date of attack.	Infection.
{ 1	F.	2	Hip-joint	Abscess opened	Non-antiseptic	Aug. 18	Sept. 16, 1869	Probable
{ 2	F.	6	Genu valgum	Abscess opened ?	None	None	Sept. 14, 1869	" Yes
{ 3	M.	8	Hip-joint	Excision	Antiseptic	July 6	Sept. 27, 1872	None
{ 4	M.	7	Encysted hydrocele	Incision	"	Jan. 4	Jan. 8, 1873	Case 4
{ 5	M.	9	Psoas abscess	"	"	Jan. 11	Jan. 15, 1873	None
{ 6	M.	3	Scald on chest	Yes	Non-antiseptic	Aug. 7	Aug. 10, 1873	Several
{ 7	M.	5	Spinal abscess	Incision	Antiseptic	Aug. 20	Sept. 5, 1874	Probable
{ 8	M.	9	Hip-joint	Abscess opened	"	April 4	April 10, 1875	"
{ 9	M.	4	Hernia	Radical cure	"	July 2	July 25, 1875	"
{ 10	F.	11½	Hip ?	Sinus over trochanter	None	None	Nov. 6, 1876	"
{ 11	F.	6	Spinal	None	"	—	Jan. 30, 1877	"
{ 12	F.	3¾	Rachitis	Osteotomy	Antiseptic	Feb. 19	Feb. 26, 1877	"
{ 13	F.	5¾	Spinal	Abscess opened	"	Feb. 19	Feb. 25, 1877	"
{ 14	M.	3	Talipes	Tenotomy	"	Feb. 28	March 16, 1877	"
{ 15	M.	6	Spinal	Abscess opened	"	March 19	March 23, 1877	"
{ 16	M.	3½	Abscess of thigh	None	"	—	Nov. 26, 1877	None
{ 17	M.	3	Rachitis	Osteotomy	Antiseptic	Dec. 13	Dec. 29, 1877	Case 16 ?
{ 18	F.	1¾	Fracture of femur	None	"	—	Dec. 15, 1877	"
{ 19	M.	3	Spinal curvature	None	"	—	Dec. 17, 1877	"
{ 20	F.	2½	Acute vaginitis	None	"	—	Jan. 28, 1878	Two medical cases
{ 21	M.	6	Hip-joint	None	"	—	June 12, 1878	? Measles
{ 22	F.	6	Diseased elbow	Excision	Antiseptic	June 13	June 15, 1878	"
{ 23	M.	4	Diseased hip	Abscess opened	"	Sept. 23	Oct. 6, 1878	Several
{ 24	M.	4½	Calculus vesicæ	Lithotomy	None	Oct. 5	Oct. 7, 1878	"
{ 25	M.	4	"	"	None	Oct. 5	Oct. 7, 1878	"

Now in the first place, is the disease Scarlatina? I started by saying that, seeing it from time to time in isolated cases, I had formed the impression that it was not so; that it was determined by some intrinsic condition of the patient in states of traumatic fever. A review of these twenty-five cases necessitates the abandonment of such impressions. They leave no room for doubt that scarlet rashes after operations at the Evelina Hospital have mostly been veritable scarlatina, and they thus are in conformity with the opinions which have been expressed by previous writers already alluded to. This is evident from the table, where the cases are placed in the order of their occurrence and are bracketed in groups in their relation to each other. No less than six groups can be made, including nineteen out of the twenty-five cases. The first two cases occurred within two days of each other. Another pair are connected by only a week's interval. Then follows a series of five cases, another series of five, then of two, and lastly of three. Of the remaining six all save one show possible sources of infection. So that the evidence is as strong as it can well be in this direction. Add to this that almost all the cases were removed to the fever ward, and there is no instance of any one of them becoming affected afterwards with any other febrile attack like scarlatina, that some of them got dropsy and others temporary albuminuria; and there can be, I say, no doubt whatever that scarlatina is the disease with which we have had to deal in the majority of the cases.

But I am far from admitting notwithstanding that we should put all red rashes down as scarlatinal solely on the ground of former experience. Experience shows that they are mostly scarlatinal at any rate, and therefore such cases should at once be isolated, and all precautions taken for the security of surrounding patients; but it is hard to believe that an eruption which presents so few distinguishing characteristics may not sometimes be produced by other causes just as the rash of measles is very closely simulated by that produced by copaiba and other substances; and indeed scarlatina is known to be closely followed in the appearances occasionally produced by belladonna poisoning, shell fish, &c. What, moreover, is one to say with regard to the case already alluded to of a soldier in India who was accidentally burnt by a gunpowder explosion, and within a day or two developed

what all the doctors considered to be scarlatina? Case 6 in our table is a parallel case, but in this country scarlatina is endemic and one is never free from the suspicion that some previous infection, which has eluded us, has been the cause. The case is, however, quite otherwise in India, where the disease is most rare. There can be no doubt of this. Sir Joseph Fayrer, whose experience in Indian practice is unequalled, has very kindly given me full information on this point. He writes: "Scarlatina is so rare in India, in Europeans and natives, that many say it is not there at all. This I do not believe, but I know the soil must be most uncongenial, for it is so very seldom seen. I have seen two cases in European children, very mild, and they were clearly traceable to a box of infected clothes out of a recently arrived steamer. Rötheln is common; roseola frequent enough; measles most rare, many of large experience have never seen it in India at all." Dr. Morehead is of the same opinion, and others, of whom I may mention Mr. J. E. Batho, who has kindly supplied me with information on this point. Under circumstances such as those narrated, other alternatives have, at any rate, equal plausibility with that which can only attribute the symptoms to scarlatina by supposing that the poison had been lurking about in the atmosphere for years, doing no harm to any one till this unfortunate soldier suffered from an accident. These other alternatives are, that the disease though simulating scarlatina was not really of that nature; and that it was scarlatina which developed spontaneously as the result of the injury.

But if such other alternatives require, as I say they do, serious consideration out in India, they do so at home also. And this case seems to me to derive its especial interest from the suggestion which it gives, that it is perhaps possible to over-rate the importance of sources of infection, to attribute more to them than really belongs to them. I am not speaking now in the least as a partisan for this view or that. I have confessed to being converted to the opinion that these cases are scarlatinal, but at the same time it is necessary to suggest that when once an infectious disease is endemic—as scarlatina may be said to be—the sources of infection seem sufficiently all pervading to account satisfactorily for an outbreak here or there without going to the trouble of considering the possibility of other

causes ; and yet it is possible that we may be wrong in attributing such an effect always and solely to such a cause.

It is quite true that scarlatina and measles, smallpox, and the like, reproduce themselves, and nothing but themselves, in a large number, perhaps the great majority, of cases ; that they are protective against themselves but not against each other. These are rules good for teaching purposes, and as lines to work upon, but are they anything more than provisional statements? Take their actual working in the case of scarlatina. Surely scarlatina is as often wanting in one or more of its characteristics as not ; this patient has no rash, that one no sore throat, that one no albuminuria, and so on. Then, again, is it protective against itself? It is against its *typical* self in most cases, no doubt, but it is a matter of common observation that in scarlatina epidemics those who have previously suffered are subject to sore throats equally with those who have not, which is the same thing as saying it reappears in a modified form. So that all one can say is that, under ordinary circumstances, it runs a definite course with a fair amount of regularity, and that it protects against its reappearance in a typical form. But we have no right to assume that if we alter the conditions of cultivation the same rules will apply. Nor do I know that there is any reason for supposing, except in the isolated case of variola, that a modified form of disease must necessarily be protective against the occurrence of the parent type. The rash is not the essence of the scarlatina, nor is the sore throat, nor the renal affection ; any one of them may be absent. They are no more than the expression of how the poison works under fairly constant conditions, but the essence of the disease is behind, and quite independent of any of them, and that is really the problem which these cases raise for solution. How do these poisons act when the conditions under which they are cultivated become altered? Will it not be necessary to take count under such circumstances, of some law of variation, and hold all opinions as still open to revision when we shall have more exact knowledge of its working? It has been too much the custom of late years to be dogmatic upon these points and then to treat them as closed questions. Take diphtheria, for example. This is a disease, say many, due to bad drainage. It is of no use to reply, that it occurs after

typhoid fever, after erysipelas, after scarlatina, after measles, and so on; that difficulty is overcome very easily by saying—what is unfortunately only too true—that most drainage is defective, and therefore diphtheria is always at hand ready to complicate other diseases. But diphtheria for them is always the same specific disease produced by bad drainage, and only accidentally superadded to others. It appears to me, however, that there are strong grounds for believing that diphtheria is the direct outcome of several diseases, and is not a thing specific in itself. Being prepared to admit this in the case of one form of disease which possesses the specific attribute of propagating its own likeness by infection, I see no great heresy in believing in the possibility of the production of scarlatina by other means than that of the introduction into the body of its own fomites. I admit the balance of evidence to be the other way, but since we, at present, know nothing of the poison itself, the question is not by any means settled. I think this ought to be carefully considered for Case 6, for the outbreak which commenced with Case 16, and for which no cause could be discovered, and also for Cases 21 and 22, when measles was certainly an infective element then present, while of the presence of scarlatina there was no evidence whatever. The last two cases are certainly suggestive. There was an outbreak of measles in the hospital, and two surgical cases, the one after an operation, the other not, fell ill with what appears to have been scarlatina subject only to certain slight eccentricities of development which are common in the disease when it attacks operation cases. Was it really scarlatina or was it modified measles? Was it r \ddot{o} theln? whether that is a hybrid between scarlatina and measles, as some consider, or, as others think, a specific exanthem which runs its own course and is quite distinct from both the one and the other? I express no positive opinion myself upon the question. I merely open up the suggestions which occur to me, and ask that they shall not be condemned as wild because experience has hitherto decided differently.

And here I may pass on to another subject of cognate interest, viz. the relation of these eruptions to the operations of surgery. The facts derivable from the twenty-five cases are these—seventeen had been subjected to some or other operation, the majority of which were comparatively trifling, viz. the

incision of abscesses and so forth. I need not enter into this more fully here as the nature of each is stated in the table. Seven had neither operation nor other wound, but one of these was a case of acute vaginitis; one had a sinus only.

After operation	17
With old sinus	1
Without any wound	7
	<hr style="width: 10%; margin: 0 auto;"/>
	25

Of the seventeen operated upon, three contracted the disease in two days, one in three days, three in four days, two in six days, the remainder after various longer periods.

Of the seventeen operated upon, in thirteen the wounds were treated antiseptically after Lister's method.

These figures show deviations in two important particulars from the statement of Sir James Paget's experience. Firstly, it is to be noted that the eruption did not attack the patients so uniformly at such an early date after the operation; and secondly, a third of the whole number had not been operated upon at all.

That the outbreak should have been delayed in many of the cases beyond the first week is worthy of mention, because such delay is in direct opposition to the majority of the hitherto recorded cases. It is not easy either to offer any explanation of this, but I think it not at all improbable that the antiseptic method of dressing wounds applied to so many of these cases may afford a clue to the discrepancy. It is certainly not a little remarkable that, in three of the cases in which the disease appeared early, viz., in the first three days, antiseptic dressings were *not* used. One of these was an extensive burn, the other two were cases of lithotomy.¹

There is some difference of opinion also as to whether the disease is or is not confined chiefly to operation cases. Sir James Paget writes, "By some these cases may be supposed

¹ It would appear, however, that the operation of lithotomy in children is exceptionally liable to scarlatina-like sequelæ—more so than other operations—and some might suppose that this tells in favour of some cause incidental to this particular procedure. I do not think so. But the fact is a strong one for the scarlatinal nature of these cases, because no similar rash, that I am aware of, occurs after lithotomy in the adult, and, if not, a strong presumption is afforded that this disease is one of the infantile exanthemata.

to have been only casual coincidences of scarlatina with surgical diseases, but if they were so, we ought to find a proportionate number of cases among surgical cases not operated on. But this does not happen." The facts recorded here point quite the other way, and I have been much impressed with the uniformity with which not only scarlatina, but measles also has dropped upon and confined itself to surgical cases, many of which have not even had a wound. In this they confirm an observation of Henoch's.¹ But they have almost invariably been cases where some local inflammation existed, and in the few instances where medical cases have been attacked, they have been examples of allied disease in the way of local inflammation, such as laryngitis and phthisis. It is upon the strength of this observation that I venture to suggest a wider hypothesis for the mode of origin of the scarlatina in these cases. Sir James Paget offers two explanations, "Either the condition induced in a patient by a surgical operation is one that gives a peculiar liability to the reception of an epidemic or contagious morbid poison, or else those who suffer with scarlatina within a few days after operations had previously imbibed the poison, but would not have manifested its effects so soon, if at all, unless their health had been exhausted or disturbed." But if I am correct in drawing the conclusion from the figures I have given, that scarlatina affects *all* surgical cases, not indifferently, but operation cases most, yet by no means exclusively, and if, while extending the area of attack, I am correct in limiting it to cases of local inflammation, then the latter explanation does not apply to several of the cases, and some other must be found. The first explanation of the two seems to me the more applicable to all cases, and I should only ask leave to amplify it. That the condition induced by a surgical operation is one that gives a peculiar liability to the reception of an epidemic or contagious morbid poison is quite borne out by the facts; but, to limit the liability to conditions induced by surgical operation leaves out of account altogether a certain number of cases which are in themselves highly suggestive. What seems to me to be probable, and what is, moreover, quite in accord with the doctrines concerning these febrile diseases in vogue at the present day, is that the presence of any local inflammation in

¹ *Loc. cit.*

any part furnishes a bed for the cultivation of the poison, and that this is probably imbibed by the ordinary channels of infection, and not through the wound. The fact of an operation I conceive to play quite a secondary, though an important, part in the production of the disease. The inflammatory process is the essential, and an operation would supply that as well, though not necessarily better, than a spinal abscess or some local cellulitis, &c. But in proportion as operations establish severe local inflammation and fever, so I apprehend do they render the "cultivation" of any epidemic poison more certain by increasing the forcing action of the hotbed which they thus furnish.

Now this hypothesis seems to me to harmonise with the facts of these cases as we now know them. It accounts for the greater frequency of scarlatina after operations; it explains its occurrence in other surgical cases, such as those included in the twenty-five here given. It accounts for the short incubation after many operations; for the *delayed* incubation where means are adopted by antiseptic dressings of wounds, &c., to avert the intensity of local inflammation; for the various erratic manifestations of the poison, which may naturally be expected to vary in its type according to the greater or less activity of cultivation; and lastly, we can understand on some such view, why antiseptics fail to destroy altogether the risk of infection.

This question of antiseptic influence has, I believe, a most important bearing upon the etiology and pathology of the infection of the exanthemata. It is, I think, quite a new observation which these twenty-five cases bring to light, that thirteen of the patients attacked were under antiseptic treatment. And in remarking upon this fact I may disarm a criticism which might be made, did I not do so, by paying a tribute which all who have seen his practice will know is well deserved, to the thoroughness with which my colleague, Mr. Howse has carried out the antiseptic method of dressing wounds, from its earliest introduction by Mr. Lister. I can state from personal and critical observation during the two years in which I was surgical registrar at Guy's Hospital, now some years ago, that antiseptic dressing is practised by him in its strictest details. I have reason also to know that the same applies to all operations performed by him at the Evelina Hospital, and these have, in the large majority of cases, been

dressed subsequently by Mr. Paley; so that it may be taken as a fact that the system has failed entirely in warding off scarlatina from those operated upon. I can also say on the other hand, that antiseptics have banished almost without exception, septicæmia, pyæmia, and erysipelas—conditions which certainly obtain much of their hold on the body by means of external wounds. One only of two conclusions seems to me to be possible under these circumstances, either that the scarlatina and measles poisons are of a much more subtle nature than those that have been kept out by treatment; are more finely divided; are possessed of more vitality or indestructibility than they; or that they have not obtained an entrance by means of the wound. The latter view seems to me to be far the more likely. The poison, taken in by the lungs and other channels, and thence distributed to all parts of the body alike, is destroyed or rendered inert in healthy tissues, or finds no place for its successful propagation; but deposited in foci of inflammatory fever, it there germinates to abort or sport or grow according as its complex surroundings let it do, to eventuate in one of the multiple phenomena we know as the varied phases of this many sided disease.

Let it be quite understood that I do not deny the possibility of the exanthem poison entering by the wound; of course it may do so if the wound is unprotected. But that it did not operate so in these cases I take to be proved because it is in the highest degree improbable that protection should be entirely successful in keeping out some kinds of poison and fail completely for others.

It is further to be noted with regard to the wounds that they did not by any means uniformly assume an unhealthy appearance during the progress of the fever. This is not quite in accord with what others have found. Henoch expressly states that scarlatina has a very unfavorable influence upon wounds. In some of these cases the wound looked healthy, but I am unable to attach any precise significance to this difference between some cases and others.

One word with regard to the two epidemics of measles, of which short notes are given at the end of the scarlatinal cases. A distinction has been drawn by Mr. Howard Marsh between the two exanthems, to the effect that while scarlatina is prone to

seize upon operation cases, measles is not. The notes given here seem to me to deprive that distinction of all its force, and I suspect that we are only wanting a larger experience to find that measles has the same tendencies as scarlatina though its activity is less. It is certain that measles is far less widely spread, and less active in its infective properties than scarlatina, and hence we must expect that outbreaks of this kind will be rarer for it than for scarlatina, but the difference appears to me to be more one of degree than of kind; and two series of cases, which were mainly surgical, or rather, I should say, associated, with one exception, with local inflammation, and of which two-thirds had undergone recent operations, constitute evidence enough to prove this. Such an occurrence could not be accidental.

The main feature of interest about the first series of cases is that unlike scarlatina the poison derived from a single and well ascertained source had a fairly definite period of incubation in five of the eight cases. In the remaining three it was perhaps considerably delayed, but I think it more probable that these were infected, not from the primary source, but from the five who first took the disease from it. Three of them had been treated antiseptically, but the wounds had healed or the spray had been discontinued prior to infection, so that they do not add anything to our knowledge on this head. In all other respects they are quite consistent with the foregoing observations upon the cases of scarlatina, and the remarks I have made upon the cultivation of the poison in that case seem equally applicable here.

I have already alluded so freely to Sir James Paget's article, that I should hesitate to do so any further were it not that he concludes it with a very important suggestion, which agrees with what has long been my own idea, that "deaths occurring with obscure symptoms, within two or three days after operations, have been due to the scarlet fever poison hindered in some way from its usual progress." Mr. Paley has supplied me with notes of a case occurring at the Evelina Hospital which most strikingly corroborates this view.

A girl, *æt.* 3 years, was admitted into Evelina Ward on October 17th, 1878, with double internal strabismus; she was in good health on the date of admission, and had been to

school on the previous day. There is no history of any cerebral trouble in any of the family. She was markedly hypermetropic. On October 19th, under chloroform, both internal recti muscles were divided, and the eyes were bandaged up with a cold compress after the operation, which was performed at 1 p.m. *She rallied completely from the chloroform*, and shortly went to sleep. About 6 p.m. she was sick, and complained of thirst; until 8 p.m. she was restless, but then slept quietly throughout the night.

October 20th.—She could not be made to swallow or speak. On examination of the eyes nothing could be detected; there had been scarcely any hæmorrhage. There were no symptoms of any cerebral irritation, no tache, loss of power, or muscular twitchings. The face was not flushed, and there was no sore throat. Between 12 and 1 she was sick once: at 12.30 her temperature was found to be 102.1° , and her pulse 200. At 3 p.m. muscular twitchings occurred on both sides of the face, and in the arms and hands. The respiration was very hurried and shallow. At 7.45 p.m. the twitchings were more marked for a short time, and she died.

The temperatures taken were as follows:—

12.30 p.m.	.	.	.	.	102.4°
1	„	.	.	.	103°
4	„	.	.	.	104.4°
After sponging	.	.	.	.	102.8°
6 p.m.	,	.	.	.	104.6°
After sponging	.	.	.	.	102.1°

Inspection, October 21st (16 $\frac{1}{4}$ hours after death):—

Rigor mortis absent, body well nourished; marked evidence of rickets; anterior fontanelle not closed; no subconjunctival ecchymosis, except very slightly at the seat of the operation. The brain was carefully examined, and nothing whatever was found. The orbits were dissected out; no hæmorrhage was found. The attachment of the tendon to the sclerotic was found, and the severed end lying close to it on each side. There was no injury to any other part.

The thoracic viscera, liver, kidneys, &c., were all examined, and nothing whatever was found. The spleen was neither large nor soft.

This patient can hardly be said to have died of shock, for, apart

from the trivial nature of the operation, she rallied completely after the chloroform. The time was surely too short for any inflammatory action to have extended back to the brain, and this too is negatived by the post-mortem evidence, the brain being absolutely healthy. The temperature was not taken on the day of the operation, but there was no evidence that the child was not in its usual good health. But we find that the ward in which this occurred was the same from which, at the date before-mentioned, viz., October 8th, nine days before, cases 23 and 24 were removed with what we now consider to have been a scarlatinal rash.

This case forms a valuable ending to the paper. I cannot but think that the readers of the 'Guy's Hospital Reports' will feel much indebted to my surgical colleagues at the Evelina Hospital for the readiness with which they complied with my request that their cases should be tabulated and published, and to Mr. Paley for the labour he has expended in the collection of the facts, some of which I think are new, and all are pregnant with suggestion. They would furnish material for many more remarks than those I have ventured to make, but the cases themselves are so valuable that I have hesitated to make them less so, as I should probably do by burying them in more extraneous matter.

