SCARLATINA CHIRURGICA.

A HISTORICAL, CLINICAL AND BACTERIOLOGIC STUDY

BY

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M.D. 1935

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C O N T E N T S.

I. INTRODUCTION.

During the past 70 years the attention of surgeons and physicians has been frequently called to the fact that recent wounds, both surgical and traumatic, are liable to be followed by an eruption which closely resembles the exanthem of scarlet fever. This association led to the belief that in some way the eruptions were caused by the trauma, but as to the nature of the eruptions, there has been much difference of opinion. In the seventies and eighties of last century when the subject enjoyed a season of popularity, the preponderance of opinion was in favour of a scarlatinal origin and the condition came to be recognised as "surgical scarlatina," a term which has persisted in the literature. It must be admitted that there is no universal agreement as to the scarlatinal origin. Certain anomalies and variations in the eruption and in the constitutional symptoms have raised doubts in the minds of certain observers and the whole question still rests on very debatable ground.

The position is distinctly unsatisfactory and the urgent need is to determine the intrinsic nature of those enanthemata. This can be done by the application of modern methods of investigations. Bacteriological and serological weapons have been employed to such a limited extent that it is impossible to reach any conclusions. The main object of

the study embodied in this thesis, is to supplement and amplify the investigations already made and to bring the socalled "surgical scarlatina" into line with acknowledged scientific facts and thereby demonstrate its intrinsic nature.

II. HISTORICAL REVIEW OF SURGICAL SCARLATINA.

Among the earliest references to post operative and post traumatic eruptions are those of two French writers, Civiale and Germain Sée, who in 1858 reported two cases of scarlatiniform rash following operation. The rash resembled that of scarlet fever but neither believed that it actually was that condition. Sir James Paget was the first to describe the condition known as surgical scarlatina and to introduce the subject to the medical world. In a clinical lecture delivered at St. Bart's Hospital in 1863 he drew attention to the fact that scarlet fever sometimes followed an operation. He related the case of a boy who had the operation of lithotomy performed: two days after the operation a scarlet eruption appeared on his body, accompanied by constitutional disturbance: in two days the rash began to fade and a few days later had disappeared. About one month later the boy complained of pain on micturition and haematuria and two days later sore throat and scarlet eruption appeared; later he desquamated. Paget considered this case to be true scarlatina. In the same year Mander reported a case of scarlatiniform eruption following operation for stone in the bladder.

In 1878 Paget described 10 cases of surgical scarlatina in his Clinical Lectures. He offers two possible explanations of the part played by the wound - first, that the wound may be the port of entry of the "epidemic or contagious morbid

poison" or, second, that the poison was absorbed previous to the operation and remained latent till the patient's resistance had been lowered by the operation. He considered the second explanation the more probable. In the Appendix to Paget's "Clinical Lectures," Marsh adds 8 cases of scarlet fever following operations, taken from the records of the Hospital for Sick Children. The majority were seen during the prevalence of scarlet fever in the city. Marsh shares the views of Paget in regard to the connection between the operation and the onset of scarlet fever. He also adds that Thomas Smith had performed lithotomy on 43 children under ten years and of these 7 developed scarlatina.

Following on the publication of Paget's "Lectures," numerous cases of surgical scarlatina were reported in London and all over the country. Goodhart and Paley gave an account of a number of cases following surgical operations, which occurred at the Evelina Hospital; in the same volume of Guy's Hospital Reports (1879) Howse described a small epidemic of surgical scarlatina which broke out in the Astley Cooper Ward in 1878. There are only 4 cases in the series. In the same year (1879) Stirling described 39 cases of surgical scarlatina, 31 taken from the records of the Children's Hospital and 8 from St.George's Hospital. Stirling believed there was some definite connection between the operation and the disease. "Some peculiar disposition to infection is caused by the state

induced by the operation."

Paget's publications also aroused interest in French medical circles. In 1868 Verneuil described post-operative rashes which he considered pyaemic; in 1870 Tremblay also reported similar eruptions. Henoch in 1876 mentions the case of a boy who developed a scarlatiniform eruption with pyrexia and sore throat, following incision of a large pectoral abscess: ten days later there was copious desquamation. He considered the case to be scarlet fever. Sanné regarded post operative scarlatina as a mere coincidence.

In the British Medical Journal during 1878-79 there were numerous communications on post-operative skin eruptions. May, Braxton Hicks, Dobbin, Cheadle, Lea, Moore and others reported cases which they regarded as surgical scarlatina. At the International Medical Congress in London in 1881 the subject was brought up for discussion and notable contributions were made by Marsh and Riedinger. Marsh strongly supported Paget's views "that there was something in the consequences of an operation which rendered a patient peculiarly liable to scarlet fever." Riedinger described 4 cases of surgical scarlatina, in which there was no obvious source of infection Trélat gave particulars of three cases in children following operations; he explained this occurrence as an illustration of intercurrent infection.

In 1885 Browne reported 4 cases of surgical scarlatina all of which could be traced to some source of infection. In 1887 Murray reported an outbreak of scarlet fever in the Children's Hospital, Pendlebury; there were 18 surgical cases in the ward and of these 6 contracted scarlet fever. The case records are unsatisfactory in that important clinical features are omitted. Hoffa (1887) published a severe critique of the whole subject. He reviewed the cases published, accepted the condition described as surgical scarlatina but rejected a considerable number of the records. He classified the eruptions described, by placing them in four categories:- (1) those due to vassomotor disturbance (2) pyaemic rashes (3) drug rashes, and (4) the true exanthem of scarlet fever.

In 1892 Koch made an important contribution to the subject in publishing cases of scarlatiniform eruption following wounds and tracheotomies in children. In all, he reported 31 cases, 15 of which followed tracheotomy. He considered the latter very susceptible to scarlet fever.

The writings of Ricochon in 1894 open up a new avenue of thought. He did not regard surgical scarlatina as a distinct entity but as one manifestation of an infectious agent, which under certain circumstances might produce erysipelas, lymphangitis, etc. Brunner takes up a similar line of argument and quotes Ricochon in support of his theory that the same

infectious agent can give rise to conditions clinically dissimilar. Numerous attempts have been made to produce scarlet fever by experimental innoculation and among these may be mentioned the work of Ashmead and Stickler, the American Physicians. Stickler obtained mucus from the throat of a scarlet fever patient, treated it with Ac. carbol. 1-600 and injected it subcutaneously into the arms of 10 healthy children. He claims to have produced scarlet fever in all.

In 1902 de Bovis published a comprehensive review of "la scarlatine traumatique." He collected 150 cases from the literature, all of which he is not prepared to accept. Two years later Alice Hamilton made a similar contribution to the literature on this subject. Her study is of a very excellent character. She reckoned there were 174 cases of surgical scarlatina in the literature (1904) and to these she added 10 cases which came under her own observation. Her attitude is severely critical and her final statement is "that there is as yet no convincing proof in the literature that surgical scarlatina is anything more than scarlet fever in the wounded." This was the last outstanding review of the subject.

After this we enter a period in which the study of surgical scarlatina was maintained with varying interest. The most important contributions come from Germany, America and England, with a few from Russia. The frequent association

of nasopharyngical operations and scarlet fever attracted more than ordinary attention. In 1902 Washbourn published a short paper in which he commented on this association. Goodall studied the form of scarlet fever following burns and published some interesting figures from the records of Guy's Hospital from which he concludes that patients with burns are more liable to be attacked with scarlet fever than those with other surgical diseases. Ker believed that many cases following burns and surgical operations were genuine scarlet fever.

Turning to American literature we find a number of interesting references to the subject. Lovell published 13 cases following nasopharyngical operations and Roberts 3 following operations for cleft palate. Weaver and Greenhill occupy a distinguished place in the history and development of this subject. In 1925 Weaver reported on 27 cases of surgical scarlatina. He thought it was definitely proved that scarlet fever was more readily contracted by persons with wounds than by others. In the same year Greenhill made an excellent contribution in which he reviewed all the cases of scarlet fever following abdominal operations reported in the literature. He collected 32 cases and to these he added 8 of his own which followed abdominal operations.

On the continent and especially in Germany, a number of writers reported cases following all kinds of operations and accidental wounds. The cases of Davidovitsch (1908) are

well known. At a later date, Bloch (1921). Port (1922), Günther (1924), Jurinac (1925), Floris (1927), Rivaroli (1927), Viksler (1932) and Rodi (1933) all published cases following various operations and injuries. In 1929 Winter reported a very unusual case following Caesarian section. Two German writers Leiner and Ellenbeck have reported their observations with the use of the Schultz Charlton test (Auslösch-phänomen) in "wound" and "burn" scarlet fever.

During an epidemic of scarlet fever in Moscow, in the years 1926-28 Minkewitsch has described what he calls "entrabuccal" scarlatina. In the Children's Hospital in Moscow during that period there were 166 cases of burns, 30 of which developed scarlet fever. In a similar epidemic in Moscow in 1929-30, the incidence of scarlet fever complicating burns was as high as 35% as shown by Minkewitsch's figures, also taken from the Children's Hospital.

In recent years, School Medical Officers in England and especially in the Metropolitan area, have drawn attention to the fact that in certain cases of scarlet fever the onset of the disease followed closely the operation of tonsillectomy. In 1931 the London County Council instituted an inquiry among the Fever Hospitals in their area and the result is incorporated in the Annual Report for that year. Ronaldson, Rolleston (J.D.), Byles and Joe reported on cases following

nasopharyngeal operations. Ronaldson also mentions 4 cases of scarlet fever following burns. Joe has added interest to the inquiry by an article on post-tonsillectomy scarlatina, in which he reviews a series of cases observed at his own Hospital during 1930-31 and remarks on the mechanism of infection.

III. SERIES OF ILLUSTRATIVE CASES.

We now come to a detailed study of a number of surgical and traumatic conditions complicated by scarlatina. The cases about to be described were observed and investigated in a number of the London Fever Hospitals, the Willesden Municipal Hospital, the South Eastern Hospital and the Muswell Hill Isolation Hospital. The majority were transferred from General Institutions where the operations had been performed, the remainder including a number of traumatic wounds and burns were sent from their own homes. One small epidemic arising from a case of "burn" scarlet fever, occurred in the Children's ward of a special hospital and is described in detail with a diagram of the ward.

The surgical conditions which have produced or contributed to the development of scarlatina are classified according to the sites of occurrence. Clinical data and methods of investigation including bacteriological findings are described in full, the more important being arranged in tabular form and appended at the end of this section.

A total of 74 cases have been studied: 38 associated with ear, nose, and throat operations: 2 with cervical operations: 9 with abdominal operations: 5 with plastic operations: 7 with wounds in various parts of the body and 13 with burns. This series is the result of a careful selection, doubtful

cases having been excluded. Any cases regarded as coincidental or arising from some known source of infection will be discussed in the appropriate place. Modern methods of investigation have been limited to a large extent by delay in receipt of cases and on occasion by the transient nature of the rashes.

I. (1) (POST TONSILLECTOMY) R.S. MALE. 5½ YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 18.12.33.
Headache and vomiting 20.12.33.
Scarlet Eruption 21.12.33.

ADMITTED: 22.12.33. Temp. 99·4° F P = 110.

A well marked punctate erythematous rash on trunk and limbs. Malar flush and circumoral pallor. Tongue was of the "strawberry" variety. Fauces were acutely inflamed and the Tonsillar fossae filled with sloughs. The submaxillary and posterior cervical glands were slightly enlarged. No discharges.

General condition moderately good.

Given scarlatinal antitoxin 10 c.c.

24.12.33. (5th day) Temp. and pulse normal. Rash faded. Throat very sore and still covered with sloughs. Haemolytic streptococci isolated from nose and throat.

28.12.33. (9th day) Throat cleaner. Tongue stripped. Glands subsided.

30.12.33. (11th day) Desquamation seen on face, later on chest, arms and hands. Throat clean and healed.

7. 1.34. (19th day) Developed measles, which had got into the ward about one fortnight previous. Convalescence from measles was free from complications.

I. (2) (POST TONSILLECTOMY). J.H. FEMALE. 2 8/12 YEARS.

HISTORY AND SYMPTONS: Tonsillectomy 6. 4.31.
Flushed, feverish 9. 4.31.
Sc. eruption 10. 4.31.

ADMITTED: 10.4.31. Temp. 100·6° F P = 120.

A moderate punctate erythematous rash on trunk and extremities. Face flushed. Tongue furred and stripping anteriorly. Fauces acutely inflamed, Tonsillar fossae filled with sloughs and débris. Post-pharyngical wall also covered with sloughs. Tonsillar glands enlarged (r. and l.) Profuse rhinitis.

General condition good.

11.4.31. (3rd day) Temp. and pulse normal. Rash faded. Tongue stripping.

16.4.31. (8th day) Slight desquamation starting on face and neck. Rhinitis very much less. Haemolytic streptococci isolated from nose and throat.

25.4.31. (17th day) Temp. 101·° F P = 108. Cervical glands, submaxillary and post cervical (r. and l.) enlarged and tender. Nasal discharge stopped.

Apart from Cervical Adenitis convalescence was quite uneventful. Discharged 21.5.27. (43rd day) well and fit.

I. (3). (POST TONSILLECTOMY S.F.) R.R. MALE. 5½ YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 3.11.33.
Vomiting 4.11.33.
Sc. eruption 5.11.33. on neck and chest. Temp. 103° F. P. = 140 per min.

ADMITTED: 5.11.33. General condition very poor. Semi-conscious - restless. Pulse was rapid, irregular and poor tension. Temp. 102° F. P. = 162. A well marked punctate erythematous rash on trunk, arms and legs. Malar flush and circumoral pallor. Conjunctivae infected. Tongue heavily furred and peeling at tip and edges. Fauces acutely inflamed and T. fossae filled with sloughs and débris. Post pharyngeal wall also covered with sloughs. T. glands (r. & l. palpable tender. Urine contained Acetone + + . No albuminurea.

Given 10 c.c. Sc. F. antitoxin . Diet:-fluids with sufficient Glucose.

6.11.33. (3rd day). General condition slightly improved. Vomited frequently.

Urine loaded with acetone. Rash still present. Fauces and tongue as before. Haemolytic streptococci in nose and throat cultures.

9.11.33. (6th day) Developed rt. otitis media.

10.11.33.(7th day) Still temp. and pulse. Tongue stripped. Fauces cleaner. Rash faded and desquamation started on ears and face.

13.11.33.(10th day) Sharp rise of temperature to 101° F. P. = 128. Patient complained of headache, stiffness of neck.

12.11.33.(14th day). A fluctuating swelling found just below the occipatal protuberance; Incised and drained: Pus of streptococcal origin. Tongue and fauces were clean and the latter healed. Desquamation on trunk.

20.11.33.(17th day). Wound on back of scalp discharging freely. Developed left otitis media with otorrhea. Urine still contained acetone but less in amount.

14.12.33.(42nd day). Scalp wound healed. Still discharge from left ear: tenderness and oedema over mastoid.

15.12.33. Acute mastoiditis (left) - operated on and drained. The remainder of convalescence was uninterrupted.

26.1.34. Mastoid and scalp wound healed. No discharge from ears. Discharged well.

I. (4). (POST TONSILLECTOMY). V. M. FEMALE. 17 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 19.11.30.

Malaise sore throat, headache 20.11.30.

Sore throat. Sc. eruption 21.11.30.

(Tonsillitis 6 weeks before).

ADMITTED: 21.11.30. Temp. 104° F. P. = 160. A well developed punctate erythematous rash all over trunk and limbs. Malar flush and slight circumoral pallor. Lips dry, tongue furred. Fauces acutely inflamed and tonsillar fossae and posterior pharyngeal wall covered with yellow sloughs. Submaxillary and post cervical glands (r. and l.) enlarged and tender. No discharges. Chest examination showed signs of bronchial catarrh. No albuminurea.

Patient was moderately ill.

20 c.c. Scarlatina antitoxin administered.

23.11.30. (4th day) Temp. 100° F. P. = 100. General condition improved. Rash fading on trunk and limbs. Tongue still heavily coated but commencing to strip anteriorly. Tonsillar fossae still filled with sloughs. Haemolytic streptococci isolated from throat.

25.11.30. (6th day) Temperature and pulse normal. Rash faded. Tongue clean. Fauces cleaner and healing. Chest condition improved.

29.11.30. (10th day). Throat clean, healed. Desquamation on chest and arms. Cervical glands subsided.

Desquamation was practically finished by the 24th day.

20.12.30.(29th day). Discharged from Hospital well.

I. (5). (POST TONSILLECTOMY S.F.) M.D. FEMALE. 5 7/12 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 18. 1.34.
Sickness 19. 1.34.
Sc. Eruption 20. 1.34.

On 20.1.34. rise of Temperature 102° F. P. = 120 per min. and rash seen on neck and trunk.

ADMITTED: 22.1.34. Temp. 99° F. P. = 120 per min,

A vivid punctate erythematous rash on trunk and extremities. Malar flush and slight circumoral pallor. Tongue was heavily coated and stripping at edges and tip. Fauces were acutely congested and Tonsillar fossae filled with sloughs. Nil seen on post pharyngeal wall except a little débris. Tonsillar glands (r. and l.) were enlarged and tender. No discharges. General condition good.

INVESTIGATIONS (1) (DICK TEST = faintly positive in 12 - 16 hrs. (less than 3 cms)
(CONTROL = nil.

(2) SCHULTZ CHARLTON TEST (a) Arm = 16 hrs. area of blanching about 20 m/ms.

(b) Abdomen = ill defined blanching.

(3) CULTURES FROM THROAT AND NOSE = haemolytic streptococci.

23.1.34. (5th day) Temp. and pulse normal. Rash completely faded. Tongue stripping. Throat as before.

29.1.34. (11th day) Throat quiet. Tonsillar fossae clean. Tongue stripped. Desquamation on face and ears.

The remainder of convalescence was completely uneventful. Desquamation was moderate.

Dick Test on 14.2.34. (27th day of illness) = definitely negative.

Discharged 16.2.34. (29th day) well and fit.

I. (6). (POST TONSILLECTOMY). M.D. FEMALE. 6 YEARS.

HISTORY AND SYMPTOMS: Ts. and As. removed 22.12.30.
Sore throat, sickness 23.12.30.
Sc. eruption on chest 24.12.30.

ADMITTED: 24.12.30. Temperature 99° F. P. = 114.

A fine, scanty, punctate erythematous rash on sides of trunk, Medial aspects of both arms, abdomen and thighs. Malar flush and circumoral pallor were marked. Tongue heavily furred and peeling at tip and sides. Pillars of fauces, soft palate acutely inflamed ; tonsillar fossae and posterior pharyngeal wall covered with sloughs and débris.

General condition was good.

10 c.c. of Scarlatina antitoxin administered.

25.12.30. (3rd day). Temp. and pulse normal. Rash still present. Tongue stripping. Haemolytic streptococci in cultures from nose and throat.

30.12.30. (8th day). Throat healed and clean. Tongue stripped, "raspberry" type. Rash faded. No albuminurea.

1. 1. 31. (10th day). Desquamation started on ears and forehead. later appeared on trunk and hands.

22. 1.31. (31st day). Discharged from Hospital well.

I. (7). (POST TONSILLECTOMY). A.B. MALE 3 4/12 YEARS.

HISTORY AND SYMPTONS: Tonsillectomy performed 14. 3.33.
Vomiting, sore throat 16. 3.33.
17. 3.33.

ADMITTED TO S.E.H. 17. 3.33. Temp. 102° F. P. - 128.

Skin eruption in the form of a moderate, dull, punctate erythema, on trunk and limbs. Malar flush and very marked circumoral pallor. Tongue stripping anteriorly and papillae enlarged. Fauces acutely inflamed and tonsillar beds filled with exudate and sloughs. Tonsillar and post-cervical glands enlarged and tender. No discharges. General condition good.

40 c.c. Scarlatina antitoxin administered.

18.3.33. (3rd day). Temp. 100° F. P. = 120. Fauces as above. Rash beginning to fade. Tongue stripping. Haemolytic streptococci found in nose and throat.

21.3.33. (6th day). Temp. still unsettled. Tonsillar fossae filled with soft purulent sloughs. Tongue clean. Cervical glands enlarged and tender.

27.3.33. (12th day). Rt. otorrhoea and tenderness over mastoid. Temp. swinging from 99° F. - 101° F. Pulse 108 - 120 per min.

2. 4.33. (18th day). Left otitis media with purulent discharge. Temp. and pulse beginning to settle.

4. 4.33. (20th day). Desquamation on trunk: a few days later on hands and feet.

18.4.33. (34th day). Otorrhoea (r. and l.) much less.

21.4.33. (37th day). Submental, submaxillary, post cervical glands (r. and l.) enlarged and tender. Profuse rhinitis.

The two latter complications persisted for over a month. Cultures from nose showed numerous haemolytic streptococci .

1. 6.33. Adenitis subsided and rhinitis less.

16.6.33. (83rd day). Discharged from Hospital well.

I. (8). (POST TONSILLECTOMY). D.T. FEMALE. 3½ YEARS.

HISTORY AND SYMPTONS: Tonsillectomy performed 21.6.33.

Sore throat, nasal discharge 22.6.33.

Cervical adenitis and Sc. eruption 23. 6.33.

ADMITTED: 23. 6. 33. Temp. 100.4° F. P. = 120 per min.

A vivid punctate erythematous rash on trunk and extremities. Malar flush: no circumoral pallor.

Acute faucial angina: tonsillar fossae filled with sloughs and débris. Tongue typical "strawberry." Slight rhinitis. Submaxillary and post-cervical glands enlarged.

40 c.c. Scarlatina antitoxin administered.

Mouth and throat swabbed with antiseptics.

24.6.33. (3rd day). Temp. and pulse normal. Rash fading. Tongue peeling. Fauces as above.

Cultures from throat and nose = haemolytic streptococci

28.6.33. (7th day). General condition much better. Fauces cleaner, and commencing to heal. Tongue completely stripped.

3. 7.33. (13th day). Throat clean and healed, cervical glands subsided.

31.7.33. (41st day). Discharged from Hospital well.

I. (9). (POST TONSILLECTOMY). J.H. FEMALE. 5 3/12 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy performed 23. 2.33.
Sore throat and vomiting 23. 2.33.
Scarlet eruption 25. 2.33.

ADMITTED TO S.E.H. 25. 2.33. Temp. 101° F. P. = 120 per min.

A well developed, dusky, punctate erythema on trunk and extremities. No malar flush nor circumoral pallor. Tongue heavily furred. Acute faucial angina and Tonsillar fossae filled with exudate and sloughs. Tonsillar and submaxillary glands enlarged and tender.

26. 2.33. (4th day). Temp. and pulse normal. Rash fading. Cervical glands still enlarged and tender. Fauces acutely inflamed.

8. 3.33. (14th day). Fauces clean apart from a small patch of slough in rt. Tonsillar bed.

9. 3.33. (15th day). Serum rash present: urticaria.

16. 3.33. (22ndday). Fauces clean: tongue stripped. Desquamation on trunk and fingers. Profuse rhinitis.

12. 4.33. (49th day). Rhinitis stopped. Discharged from Hospital well.

I. (10). (POST TONSILLECTOMY). J. McK. MALE. 4 YEARS.

HISTORY AND SYMPTONS: Tonsillectomy performed at H.P.H.) 7. 2.33.

Vomiting 8. 2.33.

Scarlet eruption. 9. 2.33.

ADMITTED TO S.E.H. 9. 2. 33. Temp. 99° F. P. = 100.

A bright punctate erythematous rash on trunk and limbs. Face flushed; tongue coated and peeling at tip and sides. Fauces acutely inflamed and Tonsillar fossae filled with yellow sloughs and débris. Tonsillar and post-cervical glands palpable. No discharges from nose nor ears. General condition good.

40 c.c. Scarlatina antitoxin administered.

10. 2.33. (3rd day). Temp. 101° F. P. = 108 per min. Rash fading. "Strawberry" tongue. Fauces still acutely inflamed and sloughs in tonsillar beds.

13. 2.33. (6th day). Fauces quieter and beginning to heal.

20. 2.33. (13th day). Serum rash present: erythema multiforme with patches of urticaria. Fauces clean and healed.

6. 3.33. (26th day). No desquamation seen. Discharged from Hospital well.

I. (11). (POST TONSILLECTOMY). I.L. FEMALE. 3 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 4. 1.33.

Sore throat and
Scarlet eruption 7. 1.33.

ADMITTED: 7.1.33. Temp. 99.6° F. P. = 132.

Skin eruption was a vivid punctate erythema, covering trunk and extremities. Malar flush. Tongue heavily coated and peeling at tip and sides. Acute faucial angina: Tonsillar beds and post pharyngeal wall covered with sloughs, debris and exudates. Tonsillar and post-cervical glands were enlarged and tender. No discharges. General condition good.

20 c.c. of Scarlatina antitoxin administered.

8. 1.33. (2nd day). Temperature and pulse normal. Tongue stripping. Rash still present: faded during the next two days.

14.1.33. (8th day). Fauces quiet: still some sloughs in Tonsillar fossae. No albuminurea.

18. 1.33. (12th day). Tonsillar fossae clean and healing. Tongue completely stripped.

24.1.33. (18th day). Desquamation on trunk, later on hands and feet.

27.1.33. (21st day). Left otitis media with moderate discharge. Otorrhoea was very troublesome and continued off and

on for about one month. Desquamation continued for about a fortnight.

21.3.33. (74th day). General condition good. No discharges. Discharged from Hospital.

I. (12). (POST TONSILLECTOMY). R.R. MALE. 5 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy performed 28.11.30.

Sore throat and headache 30.11.30.

Scarlet eruption 1.12.30.

ADMITTED; 1.12.30. Temp. 102° F. P. = 120.

Trunk and extremities covered with a bright punctate erythema. No malar flush nor circumoral pallor. Tongue heavily furred posterior and stripping anteriorly and at sides. Acute faucial angina: Tonsillar fossae and posterior pharyngeal wall covered with sloughs and débris. Throat very painful. Tonsillar and post-cervical glands enlarged. No discharges. General condition good.

3.12.30. (4th day). Temperature and pulse normal. Tongue stripping - (typical scarlatina tongue). Fauces quieter and cleaner. Rash beginning to fade.

7.12.30. (8th day). Tongue "raspberry" type. Fauces clean and healing.

20.12.30. (21st day). Fauces and tongue clean. No desquamation noticed.

2. 1.31. (34th day). Discharged from hospital well.

I. (13). (POST TONSILLECTOMY). P.P. FEMALE. 5 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 29.7.32.
Vomiting 30.7.32.
Scarlet eruption 1.8.32.

ADMITTED: 2.8.32. Temp. 100° F. P. = 120 per min.

A vivid punctate erythema on trunk and limbs. Slight Malar flush but no circumoral pallor. Tongue was furred and stripping anteriorly. Fauces were acutely inflamed, inflammation spreading on to hard palate: Tonsillar fossae filled with sloughs and débris. Tonsillar glands (r. and l.) palpable. No discharges from nose nor ears. No albuminurea. General condition good.

10 c.c. Scarlatina antitoxin administered.

3.8.32. (5th day). Temp. and pulse normal. Rash faded. Tongue stripping. Fauces still as before.

10.8.32. (12th day). Fauces quiet. Tonsillar beds clean and commencing to heal. Desquamation on hands and feet.

18.8.32. (20th day). Still desquamating on hands and feet. Convalescence was entirely uneventful.

1.9.32. (34th day). Stopped desquamating. Discharged from Hospital.

I. (14). (POST TONSILLECTOMY). F.S. MALE. 19 YEARS.

HISTORY AND SYMPTOMS: Admitted to E.N.T.H. on 1.1.33.
Tonsillectomy performed 2.1.33.
Sore throat 3.1.33.
Malaise, Scarlet eruption 10.1.33.

ADMITTED: 11.1.33. Temp. 100° F. P. = 104 per min.

Skin eruption was a dull punctate erythema covering trunk and limbs. Face mildly flushed: no circumoral pallor. "Strawberry" tongue. Fauces acutely hyperaemic, covered with exudate, and a small slough in each Tonsillar fossa. Tonsillar and post-cervical glands palpable. No discharges. No albuminurea. General condition good.

12.1.33. (3rd day). Temp. 99°6° F. P. = 100 per min. Fauces still acutely inflamed. Tongue stripping at tip and sides. Rash still present.

(1) (DICK TEST = in 24 hours positive, less than 3 cms.
(CONTROL = nil.

(2) SCHULTZ-CHARLTON TEST = in 24 hrs. positive ($\frac{1}{2}$").

(3) CULTURES FROM NOSE AND THROAT = haemolytic streptococci.

20.1.33. (11th day). Fauces much cleaner and starting to heal. Tongue completely stripped:papillae enlarged.

31.1.33. (22nd day). Rise of Temp. 101° F. P. = 110 per min. Headache and malaise and nausea. Blood and albumen in urine. Later frequency of micturition.

6.2.33. (28th day). Still some headache and malaise. Fauces infected: tongue furred. Blood and albumen in urine

as before. Nephritis continued for over two months.

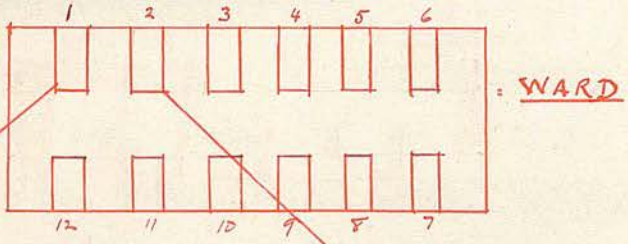
17.2.33. (39th day). Trace of blood and albumen in urine. Desquamation on trunk, hands and feet. Fauces quiet. Tongue clean.

18.3.33. (68th day - over 9 weeks). Patient still slight albuminurea, otherwise well. Discharged from Hospital.

DICK TEST = negative.

Source of infection

Diagram.



(1) Bed of F.S. Male 19 years.

(2) Bed of Mr. X. Male 18 years.

Admitted to Bed (1) 1.1.33.

Tonsillectomy 2.1.33.

Sore throat 3.1.33.

Mr. X. was placed in bed next to F.S. History of sore throat 3 weeks previous: now desquamating freely on fingers and elsewhere. Obviously a case of "Missed Scarlatina."

7.1.33. Admitted to Bed (2)

Probably incubating scarlatina — 8.1.33. — 8.1.33. Tonsillectomy performed.

9.1.33.

Malaise, Sc. eruption 10.1.33.

over

CONCLUSIONS. (1) F.S. obviously infected by Mr. X.

(2) Incubation period not more than 48 hours, probably less.

(3) Case upholds "Carrier theory" referred to later.

I. (15). (POST TONSILLECTOMY). J.Y. FEMALE. 7 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy performed 7. 5. 30.
Sore throat and sickness 8. 5. 30.
Sc. eruption 9. 5. 30.

ADMITTED: 9.5.30. Temp. 103° F. P. = 116. A vivid punctate erythema on trunk and extremities. Malar flush and slight circumoral pallor. Acute faucial angina: Tonsillar fossae and post-pharyngeal wall covered with sloughs. Submaxillary and post-cervical glands palpable. No albuminurea.

10.5.30. (3rd day). Temp. 102° F. P. = 126. Rash fading. Tongue commencing to strip. Throat still very ulcerated.

11.5.30. (4th day). Rash faded. Tongue stripping. Fauces quieter and less slough present.

25.5.30. (18th day). Fauces quiet and completely healed. Tongue clean. Slight desquamation on face and trunk.

1.6.30. (25th day). No desquamation. No complications.

5.6.30. (29th day). Discharged from Hospital well.

I. (16). (POST TONSILLECTOMY). A.Y. FEMALE. 4 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy performed 7.5.30.
Sickness 8.5.30.
Scarlet eruption 9.5.30.

ADMITTED: 9.5.30. Temp. 101°6° F. P. = 124. A moderate, rather dull, punctate erythema on neck, trunk and limbs. Slight Malar flush. Tongue heavily coated posteriorly, stripped and papillae enlarged anteriorly. Fauces acutely inflamed and tonsillar fossae filled with sloughs. A few palpable cervical glands. No discharges. No albuminurea.

10.5.30. (3rd day). Temp. 102° F. P. = 130. Rash still present. Tongue peeling: fauces as above.

11.5.30. (4th day). Fauces quieter and less slough present. Temperature settled.

17.5.30. (10th day). Fauces quiet and healing.

25.5.30. (18th day). Fauces normal. Desquamation on face and trunk. No complications.

5.6.30. (29th day). Discharged from Hospital well.

I. (17). (POST TONSILLECTOMY). R.G. FEMALE. 9 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 4. 9.30.

Left otalgia evening of 5. 9.30.

Scarlet eruption on chest and back 6. 9.30.

ADMITTED: 8.9.30. (4th day). Temp. 100° F. P. = 104.

A faint but definite punctate erythema on trunk, upper parts of arms and legs. Tongue furred and stripping anteriorly. Acute faucial angina with sloughs in both tonsillar fossae. No enlarged glands. No discharges. No albuminurea.

10.c.c. Scarlatina antitoxin administered.

10.9.30. (6th day). Temp. and pulse normal. Tongue stripping. Fauces clean but still inflamed. Rash faded.

13.9.30. (9th day). Fauces healing. Moderate desquamation on face and trunk.

18.9.30. (14th day). Throat normal. Still desquamating. Pain in left ear: on examination injection of drum but no bulging.

19.9.30. (15th day). Tympanic membrane lustreless but no injection.

26.9.30. (22nd day). No earache. No complications. Stopped desquamating.

7.10.30. (33rd day). Discharged from Hospital well.

I. (18). (POST TONSILLECTOMY). G.P. MALE. 5 7/12 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 23.10.30.
Sickness 25.10.30.
Scarlet eruption 26.10.30.

ADMITTED: 26.10.30. (2nd day).

A vivid punctate erythema on neck, trunk and extremities. Malar flush and circumoral pallor. "Strawberry" tongue. Fauces acutely inflamed and ulcerated. Tonsillar glands (r. and l.) palpable. No discharges. No albuminurea. Temperature 103° F. P. = 140 per min.

10 c.c. Scarlatina antitoxin administered.

27.10.30. (3rd day. Temp. 101° F. P. = 120 per min. Fauces acutely inflamed with sloughs in tonsillar fossae. Rash still present.

28.10.30. (4th day). Temp. and pulse settled. Fauces quieter. Tongue peeling.

30.10.30. (6th day). Fauces quieter and commencing to heal.

31.10.30. (7th day). Temp. 100° F. P. = 120 per min. Fauces more infected. Cervical adenitis. Desquamation on neck, trunk and fingers.

7.11.30. (14th day). Fauces quiet and healed. Desquamation on fingers. No complications.

22.11.30. (29th day). Discharged from Hospital well.

I. (19). (POST TONSILLECTOMY). D.E. MALE. 3 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 27.10.30.
Sickness 29.10.30.
Scarlet eruption 30.10.30.

ADMITTED: 30.10.30. (2nd day).

Typical scarlatinal rash on trunk and extremities. Face flushed. "Strawberry" tongue. Acute faucial angina with ulceration and sloughing in tonsillar fossae. Cervical glands palpable. No discharges. No albuminurea.

Temperature 103° F. P. = 138 per min. General condition fairly good.

10 c.c. of Scarlatina antitoxin administered.

31.10.30. (3rd day). Temp. 102° F. P. = 132 per min. Rash still present. Throat very angry, ulcerated and sloughing.

3.11.30. (6th day). Throat a little quieter. Rash faded. Tongue clean.

11.11.30. (14th day). Throat healing but still ulcerated. Slight desquamation on fingers.

13.11.30. (16th day). Fauces quiet and clean, not quite healed.

22.11.30. (25th day). Heart normal. No desquamation. No complications.

6.12.30. (39th day). Discharged from Hospital well.

I. (18). (POST TONSILLECTOMY). G.P. MALE. 5 7/12 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 23.10.30.
Sickness 25.10.30.
Scarlet eruption 26.10.30.

ADMITTED: 26.10.30. (2nd day).

A vivid punctate erythema on neck, trunk and extremities. Malar flush and circumoral pallor. "Strawberry" tongue. Fauces acutely inflamed and ulcerated. Tonsillar glands (r. and l.) palpable. No discharges. No albuminurea. Temperature 103° F. P. = 140 per min.

10 c.c. Scarlatina antitoxin administered.

27.10.30. (3rd day. Temp. 101° F. P. = 120 per min. Fauces acutely inflamed with sloughs in tonsillar fossae. Rash still present.

28.10.30. (4th day). Temp. and pulse settled. Fauces quieter. Tongue peeling.

30.10.30. (6th day). Fauces quieter and commencing to heal.

31.10.30. (7th day). Temp. 100° F. P. = 120 per min. Fauces more infected. Cervical adenitis. Desquamation on neck, trunk and fingers.

7.11.30. (14th day). Fauces quiet and healed. Desquamation on fingers. No complications.

22.11.30. (29th day). Discharged from Hospital well.

I. (21). (POST TONSILLECTOMY). W.H. MALE. 5 6/12 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 5.8.33.
Sore throat and headache 7.8.33.
Scarlet eruption 8.8.33.

ADMITTED: 9.8.33. (3rd day). Temp. 103° F. P. = 132 per min. Skin eruption was a dull, moderately intense, punctate erythema covering trunk and limbs: commencing to fade on arms and legs. "Strawberry" tongue. Acute faucial angina: rt. Tonsillar fossae ulcerated and covered with patches of slough. Cervical glands (submaxillary, post-cervical) enlarged and tender. No discharges. Slight albuminurea.

10 c.c. of Scarlatina antitoxin administered.

11.8.33. (5th day). Temp. 100° F. P. = 110 per min. Rash faded. Fauces acutely inflamed. Tongue stripping. Cervical adenitis. Albuminurea.

13.8.33. (7th day). Temperature intermittent. Fauces quieter: large rt. Tonsil remain which is sloughing.

20.8.33. (14th day). Heart normal. Post-pharyngeal wall red and oedematous. Desquamation on face and trunk. No albuminurea.

29.8.33. (21st day). Throat quiet and healed. No complications.

10.9.33. (35th day). Still desquamating on hands. Otherwise well. Discharged from Hospital.

I. (22). (POST TONSILLECTOMY). J.B. FEMALE. 15 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy performed 28.10.33.

Sore throat and Scarlet eruption 2.11.33.

ADMITTED: 2.11.33. (1st day). Temp. 99.4° F. P. = 88 per min.

Skin eruption was a moderate punctate erythema on neck, trunk and upper parts of arms and legs. Face very flushed. No circumoral pallor. Tongue peeling. Fauces acutely inflamed and ulcerated. Submaxillary glands enlarged. No albuminurea.

10 c.c. Scarlatina antitoxin administered.

4.11.33. (3rd day). Temperature and pulse settled. Fauces quieter: still small sloughs in tonsillar fossae. Rash fading.

7.11.33. (6th day). Fauces quiet and healing. Rash faded. No albuminurea.

9.11.33. (8th day). Urticarial serum rash

15.11.33. (14th day). Lamellar desquamation on ears, neck and chest. No complications.

25.11.33. (24th day). Still desquamating on hands and feet.

28.11.33. (27 th day). Discharged from Hospital well.

I. (23). (POST TONSILLECTOMY). L.W.. MALE. 15 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy performed 22.4.33.
Headache and Sickness 23.4.33.
Scarlet eruption 24.4.33.

ADMITTED: 24.4.33. (2nd day). Temperature 103° F. P. = 112 per min.

A vivid, heavy, punctate erythema on neck, trunk, inner aspects of arms and legs. Face mildly flushed. "Strawberry" tongue. Acute faucial angina with large sloughs in both tonsillar fossae and post-pharyngeal wall. Submaxillary and post-cervical glands palpable. No discharges. No albuminurea.

10 c.c. of Scarlatina antitoxin administered.

25.4.33. (3rd day). Temp. 99° F. P. = 80 per min. Rash still present. Fauces as above.

29.4.33. (7th day). Fauces quiet, clean, healing. Rash faded.

3.5.33. (11th day). Complains left earache: fauces red and oedematous, small slough left side. Rt. cervical adenitis.

6.5.33. (14th day). Fauces quieter and glands subsiding.

30.5.33. (38th day). Still some enlarged cervical glands. Fauces normal.

9.6.33. (48th day). A few enlarged cervical glands. Otherwise well. Discharged from Hospital.

I. (24). (POST TONSILLECTOMY). J.E. MALE. 6 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy performed 23.4.33.
Headache and sore throat 25.4.33.
Sore throat, vomiting, Sc. eruption. 28.4.33.

ADMITTED: 28.4.33. (4th day). Temp. 99.6° F. Pulse 108 per min
A very scanty, dull, punctate erythema on chest, sides of trunk, arms and thighs. Fauces acutely inflamed and ulcerated. "Strawberry" tongue. Cervical glands palpable. No discharges. No albuminurea. General condition fairly good.
10 c.c. Scarlatina antitoxin administered.

29.4.33. (5th day). Condition as above.

30.4.33. (6th day). Temp. 103° F. P. = 120 Rash more pronounced
Tongue peeling: fauces still very ulcerated and small sloughs in each tonsillar fossa.

1.5.33. (7th day). Fauces still very ulcerated. Slight cervical adenitis. Desquamation on ears and face.

5.5.33. (11th day). Several sloughs coming away from throat. Desquamation on trunk.

12.5.33. (18th day). Fauces quieter and healing. Cervical glands subsiding. Profuse desquamation.

26.5.33. (32nd day). Desquamation on hands and feet.
Discharged from Hospital well.

I. (25) (POST TONSILLECTOMY). C.M. FEMALE. 5 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 12.5.31.
Headache and Sickness 14.5.31.
Sore throat and Sc. eruption 15.5.31.

ADMITTED: 15.5.31. (2nd day). Temp. 100.4° F. P. = 120 per min.

A bright scarlatina rash on neck, trunk and extremities Slight malar flush and circumoral pallor. Tongue furred posteriorly and stripping at tip and sides. Acute faucial angina with ulceration and sloughing in both tonsillar fossae. No enlarged glands. No discharges. Heart normal. No albuminurea.

10 c.c. Scarlatina antitoxin administered.

19.5.31. (6th day). Rash faded. Fauces quiet: sloughs coming away.

28.5.31. (14th day). Fauces quiet, healed. Tongue clean. No complications. No desquamation.

8.6.31. (25th day). No desquamation. Discharged from Hospital well.

I. (26). (POST TONSILLECTOMY). R.H. FEMALE. 6 YEARS.

HISTORY AND SYMPTONS: Tonsillectomy 1.6.31.

Sickness and Scarlet eruption 3.6.31.

ADMITTED: 4.6.31. (2nd day). Temp. 101·6° F. P. = 112 per min.

A typical and profuse punctate erythema on trunk and extremities. Face slightly flushed. Fauces inflamed and ulcerated, tonsillar fossae filled with sloughs. "Strawberry" tongue. No enlarged glands. No discharges. No albuminurea.

10 c.c. Scarlatina antitoxin administered.

6.6.31. (4th day). Fauces less infected: sloughs coming away. Rash fading. Heart normal.

14.6.31. (12th day). Fauces quiet and healing: tongue clean. Septic sores on lips. No desquamation.

12.7.31. (40th day). No desquamation: no complications. Sores better.

28.7.31. (56th day). Discharged from Hospital well.

I. (27). (POST TONSILLECTOMY). E.R. FEMALE. 26 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 11.2.33.

Sickness and Sc. eruption 14.2.33.

ADMITTED: 17.2.33. (4th day). Temp. 99° F. P. = 90 per min.

Skin eruption was a dull punctate erythema on trunk and extremities: definitely fading on limbs. No malar flush. "Strawberry" tongue. Fauces acutely inflamed and ulcerated: small sloughs in both Tonsillar fossae. Submaxillary and post-cervical glands enlarged and tender. No discharges. No albuminurea.

10 c.c. Scarlatina antitoxin administered.

20.2.33. (7th day). Fauces less congested and cleaner. Rash faded and slight desquamation on ears and face.

27.2.33. (15th day). Throat almost healed. Desquamation on trunk. No complications.

9.3.33. (30th day). Throat normal. Stopped desquamating. General condition good. Discharged from Hospital.

I. (28). (POST TONSILLECTOMY). J.W. MALE. 4 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 20.7.33.

Sickness and rash 21.7.33.

ADMITTED: 24.7.33. (4th day). Temp. 99° F. P. = 138 per min.

A moderate punctate erythema on trunk, upper parts of arms and inner sides of thighs: rash rapidly fading. Slight malar flush and circumoral pallor. Acute faucial angina with ulceration and sloughing of both tonsillar fossae. Tongue furred and commencing to strip. Cervical glands palpable. No discharges: no albuminurea.

10 c.c. Scarlatina antitoxin administered.

25.7.33. (5th day). Temp. 99° F. P. = 106 per min. Rash faded. Fauces still very ulcerated. Tongue peeling.

27.7.33. (7th day). Fauces quieter: fairly extensive ulceration.

3.8.33. (14th day). Throat very much better. No complications.

10.8.33. (21st day). Slight desquamation on trunk and fingers.

18.8.33. (29th day). Discharged from Hospital well.

I. (29). (POST TONSILLECTOMY). R.S. MALE. 6 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 14.7.33.
Headache and Sickness 16.7.33.
Scarlet eruption 18.7.33.

ADMITTED: 18.7.33. (3rd day). Temp. 100·6° F. P. = 120 per min.

A very typical punctate erythema on trunk and extremities. Malar flush and slight circumoral pallor. Fauces acutely inflamed and Tonsillar fossae covered with sloughs. "Strawberry" tongue. Slight rhinitis. No albuminurea.

10 c.c. Scarlatina antitoxin administered.

19.7.33. (4th day). Rash still present. Fauces as above. Tongue stripping. Heart normal.

22.7.33. (7th day). Fauces quiet and much cleaner. Tongue completely stripped. Rash faded.

29.7.33. (14th day). Fauces healed. Desquamation on trunk and fingers.

5.8.33. (21st day). Desquamation on fingers and toes.

10.8.33. (26th day). Discharged from Hospital well.

I. (30). (POST TONSILLECTOMY). A.G. MALE. 3 11/12 YEARS

HISTORY AND SYMPTOMS: Tonsillectomy 2.11.33.
Headache and Sickness 4.11.33.
Sore throat and Sc. eruption 5.11.33.

ADMITTED: 5.11.33. (2nd day). Temp. 103° F. P. = 124 per min.

A vivid, intense punctate erythema covering neck; trunk, upper parts of arms and legs. Face flushed. Fauces acutely inflamed and ulcerated. Oedema of fauces. Tongue typical "Strawberry" appearance. Submaxillary and post-cervical glands palpable. No discharges. No albuminurea.

10 c.c. Scarlatina antitoxin administered.

6.11.33. (3rd day). Temp. 99·6° F. P. = 120 per min. Rash still present and fauces as above.

8.11.33. (5th day). Fauces quieter: small sloughs in both tonsillar fossae. Rash faded.

10.11.33. (7th day). Desquamation on face and neck. Fauces as above.

17.11.33. (14th day). Desquamation (typical) on trunk and fingers. Fauces healing. No complications.

27.11.33. (27th day). Still slight desquamation. Fauces healed. Discharged from Hospital.

I. (31). (POST TONSILLECTOMY). D.B. FEMALE. 5 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 8.9.33.
Headache and Sickness 10.9.33.
Sore throat and Sc. eruption 11.9.33.

ADMITTED: 12.9.33. (3rd day). Temp. 101.8° F. P. = 128 per min.

A very marked and heavy punctate erythema covering neck, trunk and extremities. Face flushed and slight circumoral pallor. Tongue furred and stripping anteriorly. Acute faucial angina with ulceration and sloughing of both tonsillar fossae. Slight rhinitis. Submaxillary glands enlarged and tender. No albuminurea. Heart and chest normal.

10 c.c. Scarlatina antitoxin administered.

15.9.33. (6th day). Temp. and pulse normal. Rash faded. Tongue peeling. Fauces quieter, sloughs coming away.

19.9.33. (10th day). Tonsillar fossae still ulcerated. General condition better.

23.9.33. (14th day). Fauces clean but still some ulceration. Desquamation on face and trunk.

2.10.33. (23rd day). Throat healed. Desquamation on hands and trunk.

6.10.33. (27th day). Slight desquamation on hands. Discharged from Hospital well.

I. (32). (POST TONSILLECTOMY). A.B. MALE. 17 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 13.6.34.
Sore throat and sickness 14.6.34.
Scarlet eruption 15.6.34.

ADMITTED: 15.6.34. Temp. 101°4° F. P. = 110.

A moderate punctate erythema on trunk and limbs. Face flushed. Tongue furred, papillae enlarged at tip. Fauces acutely inflamed and oedematous; sloughs in both tonsillar fossae.

16.6.34. (3rd day). Still temp. and pulse. Tongue stripping. Fauces as above. Rash still bright.

(DICK TEST = Positive
(SCHULTZ CHARLTON TEST= Positive
(THROAT AND NOSE = Positive for haemolytic streptococci..

19.6.34. (6th day). Rash fading. Tongue clean, raw. Fauces quieter - still sloughs in tonsillar fossae.

21.6.34. (8th day). Fauces much cleaner.

23.6.34. (10th day). Fauces clean and healed. No desquamation.

2.7.34. (21st day). Fauces normal. No desquamation. No complications.

(DICK TEST = negative.
(NOSE AND THROAT = negative for haemolytic streptococci.

I. (33). (POST TONSILLECTOMY). J.S. FEMALE. 7 YEARS.

HISTORY AND SYMPTOMS: Tonsillectomy 13.6.34.
Sore throat, vomiting 14.6.34.
Scarlet eruption 15.6.34.

ADMITTED: 15.6.34. (2nd day). Temp. 101·6° F. P. = 130 per min.

A vivid punctiform erythematous rash on trunk and extremities. Face flushed. Typical "Strawberry" tongue. Acute faucial angina with sloughs in tonsillar fossae. Cervical glands (r. and l.) enlarged and tender. General condition fair.

(DICK TEST = mildly positive in 24 hours.
(
(SCHULTZ CHARLTON TEST = 20 mm. blanching in 20 hours.
(
(CULTURES FROM THROAT AND NOSE = positive for haemolytic streptococci.

16.6.34. (3rd day). Tongue stripping. Fauces as above. Rash bright.

19.6.34. (6th day). Tongue still ulcerated and sloughing. Tongue clean, raw. Rash fading.

21.6.34. (8th day). Fauces clean and healing.

28.6.34. (15th day). Rise of temperature and pulse. Headache, sore throat. Fauces acutely inflamed, covered with exudate. Cervical adenitis. Profuse growth of haemolytic streptococci from fauces.

2.7.34. (19th day). Fauces quieter. Cervical glands still enlarged and tender. Desquamation on hands.

6.7.34. (23rd day). Fauces healed. Cervical glands subsiding, Still desquamation on hands and feet.

14.7.34. (31st day). Glands subsided. General condition good.

27.7.34. (44th day). Discharged from Hospital well.

DICK TEST = negative.

I. (34). (POST ADENOIDECTOMY). E.T. MALE. 7 YEARS.

HISTORY AND SYMPTOMS: Adenoidectomy 8.2.34.
Headache and sickness 9.2.34.
Scarlet eruption 10.2.34.

ADMITTED: 10.2.34. Temp. 100° F. P. = 124 per min.

A moderate punctate erythema on neck, trunk and extremities: vivid on abdomen. Bright malar flush. Tongue of typical "White Strawberry" variety. Fauces acutely inflamed, covered with exudate: sloughs and débris on post-pharyngeal wall. Cervical glands enlarged and tender. Rhinitis and rt. otorrhoea.

INVESTIGATIONS. (1) (DICK TEST = in 12 and 24 hrs. mildly positive (area 3 cms.)
(" CONTROL = nil.

(2) SCHULTZ CHARLTON TEST = in 15 hrs. positive (area of blanching 40 mm.)

(3) CULTURES FROM
(a) THROAT = profuse growth of haemolytic streptococci.
(b) NOSE = negative for haemolytic streptococci.
(c) RIGHT EAR = a few haemolytic streptococci.

12.2.34. (4th day). Temp. 99·6° F. P. = 110 per min. Rash fading. Tongue stripping: papillae enlarged. Fauces quieter: still sloughs on post pharyngeal wall. Profuse discharge from right ear.

14.2.34. (6th day). Tongue completely stripped. Post-pharyngeal wall cleaner. Less otorrhoea.

16.2.34. (8th day). Desquamation on ears and neck.

19.2.34. (11th day). Desquamating freely on trunk. Left otitis media. Post cervical and submaxillary glands (r. and l.) enlarged.

22.2.34. (14th day). Fauces quiet: post-pharyngeal wall clean. Desquamation on hands and trunk.

Otorrhoea (r. and l.) continued for almost 4 weeks.

27.2.34. (48th day). No discharges. Discharged from Hospital well.

INVESTIGATIONS: (1) ON ADMISSION:

(a) DICK TEST = positive

(b) SCHULTZ CHARLTON TEST = positive.

(c) CULTURES FROM
(1) THROAT = haemolytic streptococci.
(2) NOSE = negative for haemolytic streptococci.
(3) EAR (RT) = a few haemolytic streptococci.

(2) 3rd WEEK.
(a) CULTURES FROM
(1) THROAT = haemolytic streptococci.
(2) NOSE = negative for haemolytic streptococci.
(3) EAR (RT) = haemolytic streptococci.

(3) ON DISCHARGE:-

(7th week). (1) DICK TEST = negative.

(2) CULTURES FROM

(a) THROAT = negative for streptococci.

(b) NOSE = negative for streptococci.

I. (35). (POST CLEFT PALATE). E.B. FEMALE. 18 YEARS.

HISTORY AND SYMPTOMS: Thiersch inlay graft to cleft palate. 25.2.30.

Malaise, headache. Sore throat. 27.2.30.

Scarlet eruption 28.2.30.

ADMITTED: 1.3.30. Temp. 100° F. P. = 120.

A vivid scarlatiniform rash on neck, trunk and to a lesser extent on arms and legs. Face flushed. Tongue heavily coated and stripping.

Palate at site of operation and around was acutely inflamed: fauces were in a similar state, and slight exudate on both tonsils. Tonsillar glands and post-cervical chains (r. and l.) were palpable. Slight watery nasal discharge.

Wound on arm from which graft had been taken was quite clean. No albuminurea. Patient was moderately ill.

3.3.30. (5th day). Temp. and pulse normal. Palate throat still acutely inflamed. Tongue stripping. Rash faded.

8.3.30. (10th day). Palate and fauces quiet. Tongue clean. No sign of desquamation.

18.3.30. (20th day). Palate moderately clean and commencing to heal. Desquamation on face and chest - less marked on fingers.

26.3.30. (28th day). No further desquamation. Palate not com- completely healed. Discharged from Hospital.

I. (36). (POST MASTOIDECTOMY). P.S. FEMALE. 12 YEARS.

HISTORY AND SYMPTOMS: Left Mastoidectomy 16.4.31.

Malaise, sore throat, headache, sickness 26.4.31.

Scarlet eruption 27.4.31.

ADMITTED: 27.4.31. W.F.H. Temp. 102·6° F. P. = 150.

A dull scarlatiniform rash on neck, trunk, arms and inner aspects of both legs. Malar flush and well marked circumoral pallor. Tongue heavily coated with fur and stripping anteriorly. Fauces acutely congested and slight exudate on both Tonsils. Tonsillar gland (l.) and post-cervical chain (l) enlarged. No rhinitis.

Wound over left mastoid inflamed and discharging thin pus freely. Stitches had been removed. General condition was fair.

10. c.c. scarlatinal antitoxin administered.

29.4.31. (3rd day). Temp. and pulse settled. Fauces quieter. Tongue resembled the classical "Strawberry." Mastoid wound still discharging. Treated with H_2 O_2, Spirits Vini rect. 50%, dry dressing.

6.5.31. (10th day). Desquamation noticed on chest and hands: became much more marked throughout the 3rd week. Wound much quieter but copious discharge. Tongue still stripping - papillae enlarged and prominent.

20.5.31. (24th day). Tongue clean. Fauces quiet. Mastoid wound still discharging - commencing to heal at top.

29.5.31. (33rd day). Wound almost healed. No discharge. General condition very good. No complications. Left Hospital next day.

I. (37). (POST MASTOIDECTOMY). B.W. FEMALE. 3 YEARS.

HISTORY AND SYMPTOMS: Rt. Mastoidectomy 10.10.32.
Headache and sore throat 13.10.32.
Vomiting - Sc. eruption on chest. 14.10.32.

ADMITTED: 14.10.33. Temp. 103° F. P. = 150.

A bright punctate erythematous rash on trunk, upper parts of arms and legs. Malar flush and circumoral pallor. Moderate faucial angina. Tongue coated posterior, clean anterior and palillae enlarged. Right Tonsillar and post-cervical glands enlarged.

Right Mastoid wound was moderately clean : 2 small tubes at lower end draining thin pus. General condition fairly good.

10 c.c. Scarlatina antitoxin administered.

Cultures from wound (Mastoid) = Haemolytic Streptococci.

16.10.33. (4th day). Rash fading. Fauces quiet. Tongue peeling. Right cervical glands enlarged and tender. Mastoid as before.

21.10.33. (8th day). Tongue clean. Serum rash present. Still rt. Cervical Adenitis. Mastoid wound healing, less discharge.

26.10.33. (13th day). Desquamation seen on ears, neck and fingers: very scanty and continued for about 10 days.

14.11.33. (32nd day). Discharged from Hospital at parents' request. Mastoid wound still discharging at lower end. Otherwise very well.

I. (38). (POST MASTOIDECTOMY). L.J. MALE. 10 YEARS.

HISTORY AND SYMPTOMS: Left Mastoidectomy 19.12.32.

Sore throat and headache. 20.12.32.

Scarlet eruption 21.12.32.

ADMITTED: (to S.E.H) 21.12.32. Temp. 100° F. P. = 118.

A well developed punctate erythema covering trunk and limbs. Face flushed. Tongue coated posteriorly, stripping anteriorly and at edges: papillae prominent at tip. Mild faucial angina: no exudate seen. A certain amount of retronasal mucopurulent discharge.

No enlarged glands. No albuminurea. General condition good.

Recent wound over left Mastoid moderately clean except at lower end, where there were a few septic spots and a small amount of thin pus coming away.

30 c.c. of Scarlatina antitoxin administered.

Mastoid dressed with H_2 O_2 and Spirits vini rect. 50%. Culture from wound produced a streptococcus, variety not mentioned.

22.12.34. (3rd day). Temperature and pulse normal. Rash faded. Tongue conformed to the classical "White Strawberry". Fauces quiet.

28.12.32. (9th day). Stiches removed from Mastoid wound: still slightly septic at lower end: discharge less.

6.1.32. (18th day). Fauces quiet. Tongue completely stripped. Desquamation on trunk and hands. Wound clean and healing.

12.1.32. (24th day). Mastoid wound healed. No discharge from meatus. Desquamation still marked on fingers.

17.1.32. (29th day). Desquamation stopped. Discharged from Hospital well.

II. (1). (POST-CERVICAL ABSCESS). B.S. MALE. 8 YEARS.

HISTORY AND SYMPTOMS: Abscess of neck incised 4.6.32.
No complaint of sore throat
Generalised Sc. eruption 11.6.32.

ADMITTED: 11.6.32. Temp. 100° F. P. = 120.
A vivid punctate erythematous rash on trunk, extremities, back of hands and dorsum of feet. Face flushed. No c.o. pallor. Tongue heavily coated. Fauces inflamed. No discharges.
Large mass of glands on left side of neck: incision about 2" long over glands - draining thin streptococcal pus. 2 stitches in wound.

14.6.32. (4th day). Pulse and temp. normal. Tongue stripping, fauces quiet. Rash faded. Desquamation on trunk. Wound discharging less and moderately clean.

20.6.32. (10th day). Stitches removed from wound - clean and healing. Still large mass of glands in neck.

26.6.32. (16th day). Desquamation on toes. No albuminurea.

30.6.32. (20th day). Discharged well.

II. (2). (POST-CERVICAL ABSCESS). R.S. MALE. 6 YEARS.

HISTORY AND SYMPTOMS: Abscess incised 12.12.32.
Sickness and headache 15.12.32.
Sore throat and Sc. eruption 16.12.32.

ADMITTED: to W.F.H. 17.12.32. Temp. 100·4° F. P. = 132.

A moderate, dull, punctate erythema on trunk and extremities. No Malar flush nor circumoral pallor. Mild faucial angina. Ts. enlarged, no exudate seen. Tongue heavily furred and stripping anteriorly, papillae enlarged.

A large mass of glands in rt. side of neck with abscess which had been recently incised. Wound looked angry and was discharging thin pus. On left side Tonsillar and post-cervical glands enlarged. Small patch of impetigo on the scalp.

Heart. A soft blowing systolic murmur in the mitral area. General condition fairly good.

10 c.c. Scarlatinal antitoxin administered.

Culture from wound = moderate growth of haemolytic streptococci.

Cultures also taken from nose and throat.

19.12.32. (5th day). Rash faded. Fauces quiet. Tongue still peeling. Temp. 99° - 100° F. and Pulse 90 - 110 per min. for about a fortnight. Profuse discharge from wound on neck. Wound itself looked quieter.

6.1.32. (23rd day). Mass of glands much reduced in size.

Wound quiet and beginning to heal. Discharge practically nil. Temperature and pulse normal. Typical desquamation on neck, trunk and hands, later feet: very profuse: lasted about 14 days.

30.1.32. (47th day). Wound healed. Still some enlarged glands. Otherwise well. Discharged from Hospital.

III. (1). (POST APPENDICECTOMY). G.A. FEMALE. 17 YEARS.

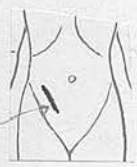
HISTORY AND SYMPTOMS: Appendicectomy 16.4.34.

Scarlet eruption 22.4.34.

ADMITTED: 22.4.34. Temp. 100° F. P. = 100.

A bright punctate erythema on trunk and extremities. Face slightly flushed. No circumoral pallor. Tongue furred and stripping at tip and edges. Fauces acutely inflamed: no exudate. Punctation on soft palate. Post-cervical glands (r. and l.) enlarged.

ABDOMEN: Recent appendix wound, septic at upper end and discharging thin pus fairly profusely.



INVESTIGATIONS:

(1) (DICK TEST = in 24 hrs. doubtful positive.
(
(" CONTROL = nil.

(2) SCHULTZ-CHARLTON TEST = in 20 hrs. definitely positive.

(3) CULTURES FROM -

(a) Throat = negative for haemolytic streptococci.

(b) Nose = a few non-haemolytic streptococci.

(c) Wound = moderate growth of haemolytic streptococci.

23.4.34. (3rd day). Temperature falling. Rash still bright. Tongue stripping. Fauces quieter. Wound still discharging profusely: treated with Eusol dressings.

24.4.34. (4th day) Rash fading. Tongue stripped clean.

30.4.34. (10th day). Rash faded. No desquamation. Wound discharging very freely and treated with fomentations.

24.5.34. (33rd day). Wound still discharging freely. Otherwise well.

30.5.34. (39th day). Wound discharging profusely. General condition good. Re-admitted to Hospital where operation was performed.

INVESTIGATIONS:

(1) ON ADMISSION (a) Dick Test = doubtful positive.

(b) Schultz-Charlton Test = positive

(c) Cultures:-

(i) Throat = negative for haemolytic streptococci.

(ii) Nose = few non-haemolytic streptococci.

(iii) Wound = moderate growth of haemolytic streptococci.

(2) 3RD WEEK. CULTURES:-

(i) Throat = negative for haemolytic streptococci.

(ii) Nose = negative for haemolytic streptococci.

(iii) Wound = negative for haemolytic streptococci.

(3) ON DISCHARGE. (5th week). (a) Dick Test = negative

(b) Cultures:-

(i) Throat = negative for haemolytic streptococci.

(ii) Nose = negative for haemolytic streptococci.

(iii) Wound = negative for haemolytic streptococci.

III. (2) (POST APPENDICECTOMY). P.G. FEMALE. 7 YEARS.

HISTORY AND SYMPTOMS: Appendicectomy 21.3.34.

Headache, malaise, sickness 24.3.34.

Sc. eruption 25.3.34.

ADMITTED: 25.3.34. Temp. 100° F. P. = 124 per min.

A vivid punctate erythema on trunk and extremities. Malar flush and circumoral pallor. Tongue furred and commencing to strip at tip and sides. Fauces inflamed and slight exudate on both tonsils. A recent wound (Gridiron incision) in rt. lower abdomen, clean, healing. Slightly moist at upper end.

INVESTIGATIONS: (DICK TEST = in 24 hrs. mildly positive (3 cms.)

(1) (DICK CONTROL = nil.

(2) SCHULTZ-CHARLTON TEST = in 16 hrs. positive (area about ½").

(3) CULTURES FROM:-

(a) Wound = a few haemolytic streptococci.

(b) Throat = moderate growth of haemolytic streptococci.

(c) Nose = moderate growth of haemolytic streptococci.

27.3.34. (4th day). Temperature normal. Pulse = 100 per min. Rash commencing to fade. Tongue completely stripped (typical). Fauces quieter. Abdominal wound clean and healing: dry dressing applied.

29.3.34. (6th day). Rash fading. Fauces quiet. Wound as before.

5.4.34. (13th day). Wound healed. Slight desquamation on neck and trunk.

20.4.34. (28th day). Wound completely healed. No desquamation: discharged from Hospital well.

INVESTIGATIONS:-

(1) ON ADMISSION. (a) Dick Test = positive

(b) Schultz-Charlton Test = positive

(c) Cultures:-

(i) Wound = a few haemolytic streptococci

(ii) Throat = moderate growth of haemolytic streptococci.

(iii) Nose = moderate growth of haemolytic streptococci.

(2) ON DISCHARGE (28th day).

(a) Dick Text = negative.

(b) Cultures:-

(i) Throat = moderate growth of haemolytic streptococci.

(ii) Nose = moderate growth of haemolytic streptococci.

III. (3). (POST APPENDICECTOMY). J.G. FEMALE. 10 YEARS.

HISTORY AND SYMPTOMS: Appendicectomy 11.3.31.

Scarlet Eruption 15.4.31.

ADMITTED: 15.4.31. Temp. 102° F. P. = 126.

A well-marked punctate erythematous rash on trunk and limbs. Malar flush and circumoral pallor present. Tongue furred and peeling anteriorly. Fauces mildly inflamed. Abdominal wound clean and healing.

16.4.31. (2nd day). Rash still present. Fauces quiet. Tongue stripping. Wound clean, healing.

24.4.31. (10th day). Throat and tongue clean. No desquamation. Wound healed.

30.4.31. (16th day). Serum rash, patches of urticaria. Desquamation seen on fingers of both hands.

No complications in convalescence. Discharged from Hospital 14.5.31. (30th day) well and fit.

III.(4). (POST APPENDIX ABSCESS). G.F. FEMALE. 12 YEARS.

HISTORY AND SYMPTOMS: Appendix abscess drained 10.11.30.
Generalised Scarlet eruption 17.11.30.

ADMITTED: 17.11.30. Temp. 104.4° F. P. = 150.

A dull punctate erythema on trunk and extremities. Face was flushed and a certain amount of circumoral pallor. Tongue was of the "Strawberry" variety. Fauces were only slightly infected. No tonsillitis. No enlarged cervical glands. No discharges.

ABDOMEN: Rt. gridiron incision, very septic and pouring with thin pus from the lower end. Rash was intense on abdomen. Patient was moderately ill.

10 c.c. Scarlatina antitoxin administered.

Cultures from the wound yielded a profuse growth of streptococci (haemolytic).

19.11.30. (3rd day). Temperature 100° F. P. = 104-120 per min. Marked constitutional upset. Pulse very rapid at times. Wound discharging profusely. Throat quiet. Tongue stripping.

20.11.30. (4th day). Rash faded. General condition improved.

27.11.30. (11th day). Wound cleaner and discharge less. Desquamation of the lamellar type on chest and fingers. Continued throughout the 2nd and 3rd weeks of illness.

6.12.30. (20th day). Discharge from wound considerably diminished and wound healing.

16.12.30. (30th day). Wound covered with dry scab and almost healed. Discharged from Hospital well.

III.(5). (POST OÖPHORECTOMY). E.R. FEMALE. 33 YEARS.

HISTORY AND SYMPTOMS: Abdominal operation 21.10.32.

Sore throat and Scarlet eruption. 27.10.32.

ADMITTED: 27.10.32. Patient feeling ill generally.

Temperature 102° F. P. = 140.

A bright punctate erythematous rash on trunk and extremities. Face flushed. Tongue heavily coated with white fur and stripping at edges. Fauces mildly inflamed. No albuminurea Recent incision, midline, lower abdomen: no obvious sign of sepsis.

30.10.32. (3rd day). Temperature and pulse normal. Rash faded. Tongue still furred and stripping. Fauces quiet and clean. Moderately comfortable.

3.11.32. (7th day). Tongue clean. Desquamation starting on chest and hand. Wound healed.

7.11.32 (11th day). Transferred to Willesden Fever Hospital. Throat and tongue clean. Cervical glands not palpable. Desquamation on hands and trunk. Wound healed. No albuminurea. General condition good.

9.11.32. (13th day). Difficulty with micturition amounting to retention at times. Relieved by application of hot packs to abdomen.

20.11.32. (24th day). For the past 2-3 days has complained of pains in shoulder joints and back. Occasional pains

in chest. Continued for about 1 fortnight. Relieved by Na Salicylate.

1.12.32. (35th day). Rheumatic pains easier. Desquamation on feet.

26.12.32. Discharged from Hospital well.

III.(6). (POST HERNIOTOMY). J.B. MALE. 25 YEARS.

HISTORY AND SYMPTOMS: Operation for left Inguinal Hernia 11.1.31.

Sickness 18.1.31.

Sore throat, headache, vomiting, Sc. eruption 19.1.31.

ADMITTED: 19.1.31. Temp. 100·6° F. P. = 120 per min.

A fine punctate erythematous rash on chest and neck and abdomen. Face was flushed. No circumoral pallor. Tongue heavily coated and stripping anteriorly. Fauces were acutely inflamed: no exudate seen.

There was a wound over the left Inguinal canal from which stitches had been removed the same morning. Wound was septic in parts: no pus was seen. Rash was moderate around area of wound. Cough was a little troublesome.

CHEST: Apart from a few sibilent rhonchi chest was clear.

General condition good.

20.1.31. (3rd day). Rash was more marked on trunk and extremities. Tongue was stripping at the edges. Wound still septic.

26.1.31. (9th day). Fauces quiet. Tongue completely stripped. Desquamation noticed on ears, face and neck. Wound on abdomen quiet and commencing to heal.

A few days later desquamation was evident all over trunk and arms.

6.2.31. (20th day). Fauces were slightly congested and

Tonsillar glands palpable. Patient had a mild attack of Tonsillitis. In about a week the throat was quiet.

23.2.31. (37th day). Desquamation profuse on hands and feet. Wound completely healed.

5.3.31. Discharged well.

III.(7). (POST INCISION OF INGUINAL ABSCESS). W.K.

MALE. 10 YEARS.

HISTORY AND SYMPTOMS: Admitted to Hospital on 13.12.32. with mass of inflamed glands in the rt. inguinal region. Temperature rose to 103° F. with 2° remission for the next 5 days. On 19.12.32. incision was made over this inflamed mass and small amount of thin pus drained away. Large mass of glands posteriorly which extended up towards the right kidney.

On 21.12.32. Temperature rose to 103° F. P. = 120. and a well marked punctate erythematous rash was noticed on the trunk and buttocks and later on legs and arms. It was vivid on the buttocks and around the wound. Tongue was furred. Fauces were mildly infected. No albumin in urine. General condition fairly good. Cultures from the wound revealed haemolytic streptococci.

22.12.32. (2nd day). Temp. 102° F. P. = 120. Tongue commencing to strip.anteriorly. Rash still present. Wound very inflamed. For the next 6 days Temperature was swinging between 99° F. and 103° F.

28.12.32. (5th day). Wound started to pour with pus. Temperature and pulse settled. Rash faded. Tongue stripped. No albuminurea.

6.1.33. (14th day). Profuse desquamation on trunk and later on

hands. Wound still discharging.

10.1.33. (18th day). Profuse desquamation on feet and hands.

20.1.33. (28th day). Transferred to Willesden Fever Hospital. Temperature 99° F. P. = 94. Still profuse desquamation on feet and hands. Wound discharging thin pus and general condition good.

26.1.33. (34th day). Wound is cleaner and commencing to heal.

9.2.33. (48th day). Desquamation finished. Wound healing; slight discharge.

22.2.33. (61st day). Wound healed. Discharged from Hospital well.

III. (8). (POST CIRCUMCISION). J.P. MALE. 1 5/12 YEARS.

HISTORY AND SYMPTOMS: Circumcision 11.12.33.

Loss of appetite, vomiting and Sc. eruption on trunk. 13.12.33.

ADMITTED: 14.12.33. Temp. 99° F. P. = 128 per min. General condition good.

A moderate punctate erythema on trunk, arms and legs. Rash was intense on sides of trunk and abdomen. Slight Malar flush. Tongue was of the typical "Strawberry" variety. Marked faucial angina. Tonsils (r. and l.) enlarged.

CIRCUMCISION WOUND: Slightly septic. A few shotty inguinal glands. Rash on penis was of same character as elsewhere.

10 c.c. Scarlatinal antitoxin administered.

15.12.33. (3rd day). Temp. 99° F. P. = 126. Tongue peeling. Fauces quieter. Rash still present. Wound as before: sterile liquid paraffin dressing applied.

18.12.33. (6th day). Rash faded. Fauces quiet. Tongue stripping. Circumcision wound slightly cleaner. Same dressing applied.

22.12.33. (10th day). Wound cleaner and commencing to heal. Desquamation of the lamellar type on ears and neck.

27.12.33. (15th day). Left otitis media with slight discharge.

30.12.33. (18th day). Temperature 103° F. P. = 140. Loss of (evening) appetite, vomiting, increased respirations, pulse rapid and thready. Tongue furred and fauces acutely inflamed.

31.12.33. (19th day). Temperature 100° F. P. = 158 per min. Child extremely ill: vomiting frequently. Trunk and extremities covered with a vivid, intense punctate erythematous rash. Malar flush and circumoral pallor. Tongue heavily furred: acute faucial angina. Anterior and post-cervical glands markedly enlarged. Axillary and inguinal glands palpable. In the evening, respirations became very rapid: chest showed definite signs of Br. Pneumonia.

10 c.c. Sc. Fever antitoxin was administered.

Condition became progressively worse and child died 1.1.34.

III. (9). (POST-UTERINE CURETTAGE). M.D. FEMALE. 26 YEARS.

HISTORY AND SYMPTOMS: Curettage of uterus (probably for Incomplete Abortion) 12.4.34.

Headache, sore throat and sickness 17.4.34.

Scarlet eruption 18.4.34.

ADMITTED: 18.4.34. Temp. 103° F. P. = 124 per min.

A heavy, dusky, punctate erythema on neck, trunk and extremities: intense eruption on abdomen and legs. Face slightly flushed. Tongue furred, papillae enlarged. Acute faucial angina with some exudate on post-pharyngeal wall. Tonsillar glands enlarged and tender.

UTERUS: Slight vaginal discharge, brown in colour and offensive. Cervix closed, uterus anteverted and normal in size.

INVESTIGATIONS: (1) (DICK TEST = in 24 hrs. positive - (3-4 cms).
(" CONTROL = nil.

(2) SCHULTZ-CHARLTON TEST = in 20 hours markedly positive ($\frac{1}{2}$" - $\frac{3}{4}$" blanching).

(3) CULTURES:
(a) Throat = Haemolytic Streptococci + +
(b) Nose = Negative for Streptococci.
(c) Cervix and Uterus = a few haemolytic Streptococci.

(4) URINE. No organisms.

20.4.34. (4th day). Temperature 100·4° F. P. = 118. Still very heavy rash. Fauces acutely inflamed. Tongue stripping. Vaginal discharge as before.

21.4.34. (5th day). Temperature normal.. Rash commencing to fade. Tongue stripping.

24.4.34. (8th day). Tongue clean. Fauces quiet. Rash faded.

26.4.34. (10th day). Follicular Tonsillitis. Still slight vaginal discharge.

3. 5.34. (17th day). Fauces quiet. Desquamation on trunk and hands.

18.5.34. (32nd day). Stopped desquamating. Slight vaginal discharge. Discharged from Hospital.

INVESTIGATIONS: (1) ON ADMISSION.

(a) Dick Test = positive

(b) Schultz-Charlton Test = positive

(c) Cultures from:-

(i) Throat = Haemolytic Streptococci positive.

(ii) Nose = Negative.

(iii) Cervix and Uterus = a few haemolytic streptococci.

(d) Urine = no organisms.

(2) ON DISCHARGE. (5th week).

(a) Dick Test = Negative

(b) Cultures from :-

(i) Throat = Negative for Streptococci

((ii) Nose - Negative for Streptococci.
(
((iii)Uterus and Cervix - Negative for Streptococci.

IV.(1). (POST PEDICLE GRAFT TO FACE AND NECK). P.T. MALE. 19 YEARS.

HISTORY AND SYMPTOMS: Pedicle graft to face 4.2.31.
Headache. 4.2.31.
Sc. eruption 5.2.31.

ADMITTED: 5.2.31. Temperature 103·3° F. P. = 140.

A definite punctate erythematous rash on neck, trunk and limbs. Face was markedly flushed. Tongue heavily coated and peeling at tip. No complaint of sore throat and fauces mildly infected. Cervical glands not enlarged. No discharges.

Pedicle graft lifted from chest and applied to the site of an old burn on left side of face and neck. Edges of bed of graft were blood stained but appeared to be clean. Rash was marked on the pedicle and the surrounding area.

Patient was moderately ill, restless, noisy. Was given 10 c.c. of Scarlet Fever antitoxin.

Next day temperature was 104° F. P. = 138. Condition was still serious. Rash well marked. Another 10 c.c. Scarlet Fever antitoxin was administered.

8.2.31. (5th day). Temperature and pulse were normal. General condition had improved. Rash faded; tongue stripped. Wound was clean: pedicle flap on face and neck was discoloured and was stretched from time to time.

14.2.31. (11th day). Pedicle graft separated from face and neck. Bed appeared to be quite clean. Liquid paraffin dressing applied to neck and pedicle wrapped in gauze soaked in saline.

23.2.31. (20th day). Wounds clean. Desquamation on chest and arms.

2.3.31. (27th day). Wounds clean and healing. General condition good. Still desquamating on trunk and extremities.

16.3.31. (41st day). Discharged well. Wounds clean but not quite healed.

IV.(2). (POST PEDICLE GRAFT FROM BREAST). D.C. FEMALE.
29 YEARS.

HISTORY AND SYMPTOMS: Pedicle graft from left breast, 1st stage 8.11.33.

Malaise, sore throat, headache. 10.11.33.

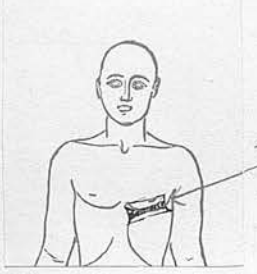
Scarlet eruption 11.11.33.

ADMITTED: 12.11.33. Temp. 100° F. P. = 100.

A dusky punctate erythematous rash on trunk, arms and inner aspects of thighs. The rash most pronounced on abdomen and front of chest. Malar flush and slight circumoral pallor. Tongue heavily coated and peeling at tip and edges. Fauces and tonsils acutely inflamed - no exudate seen. No discharges and no enlarged glands.

SITE OF OPERATION: At 5 years of age had a burn on chin and neck.

Plastic operation:- A tube pedicle of skin was formed at lower part of left breast: both ends still attached. Wound moderately healthy - septic at outer edge from which there was slight discharge of thin pus. Cultures from wound = haemolytic streptococci. Some old blood clot also coming away. General condition fairly good. No albuminurea.



13.11.33. (4th day). Temp. 99° F. P. = 100. Throat still acutely inflamed. Tongue stripped clean.

15.11.33. (6th day). Throat quiet. Wound much cleaner: saline dressing: pedicle healthy.

18.11.33. (9th day). Profuse desquamation of the lamellar type on face and chest. Continued throughout 2nd and 3rd weeks.

1.12.33. (21st day). Wound healing.

8.12.33. (29th day). Wound healed. No albuminurea. Desquamation stopped. Discharged well.

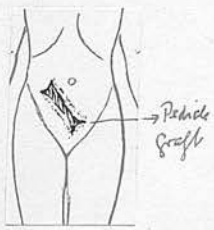
IV. (3). (POST PEDICLE GRAFT FROM ABDOMEN). P.K. MALE.
2 6/12 YEARS.

HISTORY AND SYMPTOMS: 1st Stage of Pedicle graft from Abdomen. 16.1.32.
Feverish and fretful 22.1.32.
Sore throat and scarlet eruption 23.1.32.

ADMITTED: 23.1.32. Temp. 99° F. P. = 118 per min.

A vivid punctate erythematous rash on trunk and extremities. Malar flush and circumoral pallor. Tongue coated and papillae prominent. Fauces mildly inflamed. Cervical glands not palpable.

PEDICLE GRAFT about 6" long, which had been lifted from abdominal wall and still attached at both ends. Wound and pedicle both septic and looked angry in parts. Rash was moderate around wound. General condition good.



Wound was irrigated with saline and dressed with Eusol.

26.1.32. (5th day). Temperature and pulse normal. Fauces quiet, tongue stripped. Rash faded. Wound and pedicle still septic.

4.2.32. (14th day). Wound slightly cleaner. Haemolytic streptococci in culture.

10.2.32. (20th day). Wound much cleaner. Desquamation noticed on ears and fingers.

25.2.32. (33rd day). Pedicle and wound much cleaner. Patient has developed profuse rhinorrhoea. Desquamation more marked on trunk.

8.3.32. (46th day). Rhinorrhoea had completely stopped.

9.3.32. (47th day). Patient discharged and wound clean but not completely healed.

IV.(4). (POST PEDICLE GRAFT). C.W. MALE. 15 YEARS.

HISTORY AND SYMPTOMS: Operation - pedicle graft 1st stage 13.7.33.

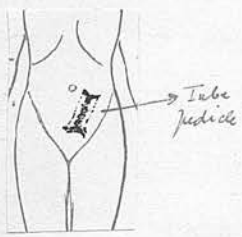
Headache, vomiting 21.7.33.

Scarlet eruption 22.7.33.

ADMITTED: 22.7.33. (2nd day). Temperature 102° F. P. = 150.

A bright punctate erythematous rash particularly heavy on trunk and to a lesser extent on arms and legs. Slight Malar flush and circumoral pallor. Tongue coated and stripping anteriorly. Fauces mildly infected. No discharges, no enlarged glands.

ABDOMEN: Recent operation - 1st stage of Pedicle Graft, attached at both ends, left lower abdomen. Wound very septic and discharging thin pus, which was found to be of streptococcal origin (haemolytic streptococci).



ALBUMINUREA: General condition very poor. Tachycardia.

10 c.c. Scarlatinal antitoxin administered.

SCHULTZ-CHARLTON TEST = blanching about 6 cms. in 20 hours.

23.7.33. (3rd day). Temp. 101° F. P. = 120. General condition improved. Rash still present. Tongue stripping. Wound as before.

25.7.33. (5th day). Rash faded. Temperature and pulse settled. Abdominal wound cleaner. Still albuminurea. Tongue clean.

30.7.33. (10th day). Desquamation on face and chest - very profuse in 3rd week. Urine clear. Fauces quiet. Wound still discharging and pedicle discoloured.

10.8.33. (21st day). Wound still septic. Eusol dressing applied. Desquamation on fingers.

4.9.33. (46th day). Wound healed and patient discharged from Hospital well.

IV.(5). (POST THIERSCH GRAFT ON FOOT). H.S. MALE. 20 YEARS.

HISTORY AND SYMPTOMS: Burn of left foot two months previous. Now granulating surface. Thiersch graft taken from the left thigh and applied to foot on a "Stent" mould = 3.12.31.

Slight sore throat and headache 8.12.31.

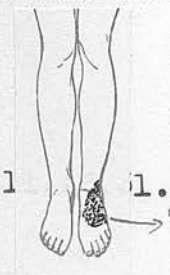
Sickness and Sc. eruption on trunk 9.12.31.

"Stent" mould removed 10.12.31.

ADMITTED: 10.12.31. Temp. 101° F. P. = 120 per min.

A dull, punctate erythematous rash on trunk, legs, inner aspects of arms. Slight Malar flush. Tongue heavily coated and papillae enlarged at tip and edges. Mild faucial angina: Tonsils (r. and l.) enlarged and slight exudate on left T. gland (l) palpable. No discharges.

Rash bright on legs. Thiersch graft on dorsum of left foot appeared to have taken in parts: discoloured at centre and red towards periphery. The edges of the burn (bed of graft) were also red but did not suggest sepsis. Wound on thigh was clean and healing.



No albuminurea. Patient was moderately ill.

20 c.c. Scarlatina antitoxin administered.

11.12.31. (4th day). General condition slightly improved. Rash still well marked.

13.12.31. (6th day). Temperature and pulse normal. Throat

almost completely stripped. Rash faded. Area of redness at periphery of burn and graft almost disappeared. Discoloration at centre as before.

19.12.31. (12th day). Intense serum rash with severe irritation. Graft quiet and appeared to be taking.

24.12.31. (17th day). Desquamation of the lamellar type on face, chest and hands: continued moderately profuse during 3rd and 4th weeks.

12.1.32. (36th day). Desquamation completed. Graft entirely healed. Wound on thigh healed.

17.1.32. (41st day). Discharged from Hospital well.

V.(1). (POST WOUND OF THUMB). B.M. FEMALE. 15 YEARS.

HISTORY AND SYMPTOMS: Injury to right thumb with fork on 7.2.34.

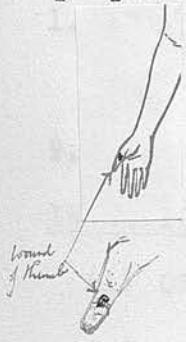
Wound septic with lines of lymphangitis on flexor aspect of arm 9.2.34.

Malaise, headache, sickness, sore throat 10.2.34.

Scarlet eruption 11.2.34

ADMITTED: 11.2.34. Temperature 100.2° F. P. = 140.

Skin eruption was an intensely vivid punctate erythema covering neck, trunk and limbs. Malar flush and circumoral pallor. "Strawberry" tongue: acute faucial angina with slight exudate on both Tonsils. Submaxillary and post-cervical glands palpable. No discharges. No albuminurea.



A small septic wound on palmar surface of right thumb, with lines of lymphangitis passing up forearm, which could just be seen through the punctate erythema. Epitrochlear and auxillary glands palpable. Patient was moderately ill.

3 p.m. (1) (DICK TEST = in 16 hrs. strongly positive, area 1-2".
(CONTROL = nil.

(2) SCHULTZ-CHARLTON TEST = in 18 hrs. positive, area 50 m.m.

(3) CULTURES TAKEN FROM:
(a) Wound = Haemolytic Streptococci.

(b) Throat= Haemolytic Streptococci.

(c) Nose = Negative

Wound treated with fomentations.

12.2.34. (3rd day). Temperature 100.4° F. P. = 138. Still feeling ill: Rash marked. Fauces as before. Tongue stripping; papillae enlarged. Dick Test fading.

13.2.34. (4th day). Temperature 99° F. P. = 153. Rash commencing to fade. Throat quieter. Tongue stripping. Wound clean and lines of lymphangitis fading. Axillary glands palpable.

17.2.34. (8th day). Temperature and pulse settled. Wound quiet and healing. Rash completely faded. Fauces quiet. Tongue clean.

20.2.34. (11th day). Typical desquamation on face, trunk and hands. No albuminurea.

1.3.34. (20th day). Desquamation stopped. Wound healed. No palpable axillary glands.

9.3.34. (28th day). Discharged from Hospital well.

INVESTIGATIONS:

(1) ON ADMISSION: (a) Dick Test = positive

(b) Schultz-Charlton Test = positive.

(c) Cultures:-

(i) Wound = haemolytic streptococci.

(ii) Throat = " "

(iii) Nose = negative.

(2) 25TH DAY OF ILLNESS: (a) Dick Test = negative

(b) Cultures:-

(i) Throat = haemolytic streptococci.

(ii) Nose = negative.

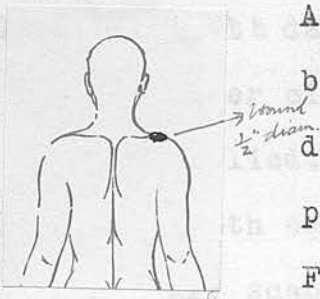
V.(2). (POST WOUND OF SHOULDER). J.N. MALE. 10 YEARS.

HISTORY AND SYMPTOMS: Wound of rt. shoulder not dressed: became very septic. 20.1.34.

Complained of severe headache and persistent vomiting 27.1.34.

Well developed Sc. eruption all over body 28.1.34.

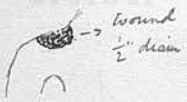
ADMITTED: 28.1.34. Temperature 100·4° F. P. = 110.



A coarse, dusky punctate erythema around neck, both arms, sides of trunk and abdomen, and better developed on legs. Face flushed - no circumoral pallor. Tongue furred and stripping anteriorly. Fauces mildly infected. No palpable glands.

A circular wound, with punched out edges, about ½" in diameter over the right acromion process. Base was sloughing and edges undermined. General condition good.

29.1.34. (3rd day). Temp. 99° F. P. = 110. Rash still present mainly on limbs. Typical scarlet tongue.



(DICK TEST = mildly positive in 12 hrs.- area less than 3 cms.

(" CONTROL = nil.

SCHULTZ-CHARLTON TEST = blanching of about 1½ cms. in 24 hrs.

(1) CULTURES FROM:- (Wound = negative.

(Throat = "

(Nose = "

30.1.34. (2) Culture from Wound = moderate growth of haemolytic streptococci.

1.2.34. (6th day). Rash faded. Tongue stripped clean. Wound on shoulder treated with fomentations and slightly cleaner. No erythema around wound.

7.2.34. (12th day). Tongue of "raspberry" variety. Base of ulcer cleaner. Typical desquamation on ears and forehead.

12.2.34. (17th day). Profuse desquamation on fingers. Ulcer clean: foments discontinued and Pulv-dermatol applied.

19.2.34. (24th day). Ulcer healing rapidly - covered with dry scab. Still desquamating on fingers.

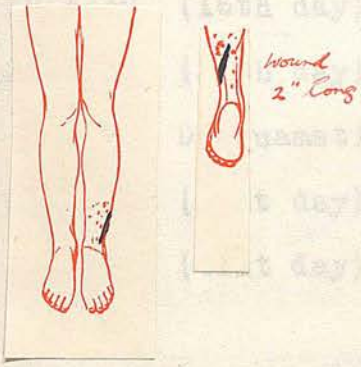
20.2.34. (25th day). Culture from wound = negative.

3.3.34. (36th day). Ulcer healed. Still slight desquamation on fingers and toes. Discharged from Hospital.

6.3.34. (O.P.) (DICK TEST AT 2 p.m. = negative.
(" CONTROL 2 p.m. = nil.

V.(3). (POST WOUND OF LEG). W.C. FEMALE. 17 YEARS.

HISTORY AND SYMPTOMS: Fell and injured left leg 21.2.30.



Wound septic and area of redness around 22.2.30.

(Malaise, slight sore throat 23.2.30.

(Wound angry, red and oedematous around

(Headache, sore throat, pains in

(limbs and Sc. eruption on chest 24.2.30.

ADMITTED: 25.2.30. (3rd day). Temp. 100° F. P. = 120.

A vivid, punctate erythematous rash on trunk and limbs. Wound above left ankle about 2" long, septic, oedema of ankle and dorsum of foot. No red lymphatics seen on leg as rash well marked. A few shotty glands in left groin.

Malar flush but no circumoral pallor.

Tongue heavily furred and desquamating at tip and edges. Fauces mildly infected. No exudate seen. Heart and chest normal. No albuminurea. General condition fairly good.

10 c.c. Scarlatina antitoxin administered.

Wound treated with fomentations. Cultures taken from wound and throat.

28.2.30. (6th day). Rash faded. Temperature and pulse normal. Fauces clean. Tongue stripped, raw. Wound cleaner, oedema less.

9.3.30. (15th day). Tongue clean ("Raspberry"). Wound improv-

ing. Desquamation of the lamellar type on face and chest.

10.3.30. (16th day). Wound more inflamed: no actual pus seen.

18.3.30. (24th day). Wound clean and definitely healing. Desquamation still seen on trunk.

25.3.30. (31st day). Wound almost healed. No complications.

5.4.30. (41st day). Discharged from Hospital well.

V.(4). (POST WOUND OF WRIST). J.D. FEMALE. 10 YEARS.

HISTORY AND SYMPTOMS: Injury to left wrist 1.7.33.
Headache and vomiting 3.7.33.
Scarlet eruption 3.7.33.

ADMITTED: 4.7.33. Temperature 102° F. P. = 130.

A bright, punctate erythema on trunk, arms and legs. Slight Malar flush. Fauces mildly inflamed. Tongue was of the typical "Strawberry" variety. No palpable glands. No discharges.

On anterior aspect of left wrist, a septic wound about ½" long, from which there was discharge of sero-pus. The scarlet eruption was no more pronounced around the wound than elsewhere on the arm. There were no visible lines of lymphangitis running up the arm. The epitrochlear and axillary glands were palpable. No albuminurea.

General condition was fair.

10 c.c. of Scarlatina antitoxin administered.

Fomentations were applied to wound for about a week.

7.7.33. (5th day). Temperature intermittent, swinging between 100° - 101° F. Wound still septic but quieter. Fauces quiet: tongue stripped. Rash fading. Culture from wound grew haemolytic streptococci.

21.7.33.(19th day). Temperature and pulse slightly irregular for the past week. Sharp rise to 102° F. P. = 124. Left wrist painful and swollen. A counter incision

was made and small amount of pus escaped. Both wounds drained, and fomented. Axillary glands more palpable and slightly tender. Temperature and pulse remained unsettled for the next week. During this time wrist was discharging fairly well.

23.7.33. (21st day). Typical (pinhole) desquamation on face, chest and hands: continued for about one fortnight.

3.8.33. (32nd day). Temperature and pulse settled. Wrist discharging anteriorly and posteriorly. Still desquamating.

20.8.33. (49th day). Wounds quiet and healing.

25.8.33. (54th day). Wounds healed. No palpable glands. Stopped desquamation. Discharged from Hospital, well.

V.(5). (POST WOUND OF KNEE). W.H. MALE. 24 YEARS.

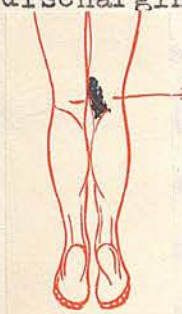
HISTORY AND SYMPTOMS: Injury to right Knee 23.3.32.

Headache, shivering and sore throat 29.3.32.

Vomiting and Scarlet eruption. 31.3.32.

ADMITTED: 1.4.32. Temperature 101° F. P. = 110.

A bright, intense punctate erythema covering trunk and extremities. Malar flush and slight circumoral pallor. Tongue heavily furred and stripping at tip and sides. Acute faucial angina with exudate on both Tonsils. Eyes red and discharging. Submaxillary and post-cervical glands palpable.



RIGHT KNEE: A large, penetrating, septic wound on medial aspect of right knee. Patient was obviously very ill.

TREATMENT: Wound cleaned up: pieces of sloughing tissue removed: Eusol dressing applied.

40 c.c. Scarlatina antitoxin administered.

(1) SCHULTZ-CHARLTON TEXT = positive

(2) CULTURES FROM WOUND AND THROAT yielded a growth of haemolytic streptococci.

2.4.32. (5th day). Temperature swinging between 99° F. - 104° F. P. = 110 - 120 per min. Restless and delirious at times. Required sedative (Morphine etc.)

Rash fading. Eyes quieter. Fauces acutely inflamed. Tongue stripping. 60 c.c. of Scarlatina antitoxin intramuscularily.

4.4.32. (7th day). Temperature coming down. General condition improved. Fauces quieter. Cervical glands subsiding. Desquamation on forehead and cheeks. Wound on right knee much cleaner. Still dressed with Eusol.

7.4.32. (10th day). Sharp rise of temperature 103° F.

P. = 110: tenderness and swelling in the right lower quadrant of the abdomen, around the site of the injection of the serum: obviously a cellulitis of the abdominal wall.

9.4.32. (12th day). Swelling incised under local anaesthetic and about ℥iii. - iv. of thin streptococcal pus let out. A drain was inserted. Wound discharged for almost a fortnight.

17.4.32. (20th day). General condition considerably improved. Temperature much lower. Fauces and tongue clean. Abdominal wound quieter. Wound on knee progressing satisfactorily. Still desquamating very freely on trunk, hands, etc.

25.4.32. (28th day). Temperature and pulse normal. Developed rheumatic pains in wrists and ankles, which passed off in a few days.

10.5.32. (43rd day). Abdominal wound healing. Knee quiet, wound granulating.

Remainder of convalescence was uneventful.

23.5.32. (56th day). Wound healed. Discharged from Hospital well.

V.(6) (POST WOUND OF AXILLA). G.R. MALE. 24 YEARS.

HISTORY AND SYMPTOMS: Injury to right axilla 1.2.34.
Infected - septic 2.2.34.
Sickness, headache 6.2.34.
Scarlet eruption 9.2.34.

ADMITTED: 9.2.34. Temperature 101·6° F. P. = 120 per min. Headache, vomiting and pains in limbs. A bright punctate erythema on trunk and extremities. Malar flush and marked circumoral pallor. Tongue stripping, papillae enlarged and oedematous. Acute faucial angina, no exudate on fauces. Post cervical glands (r. and l.) enlarged.

WOUND in right axilla about ½" long discharging thin pus. Axillary glands enlarged and tender.

(1) (DICK TEST = mildly positive in 24 hrs.
(" CONTROL = nil.

(2) SCHULTZ-CHARLTON TEST = ill-defined blanching in 20 hrs.

(3) CULTURES FROM (Wound = positive for haemolytic streptococci.
(Throat = positive for haemolytic streptococci.
(Nose = negative.

10.2.34. (5th day). Temperature 99° F. P. = 92 per min. Headache, pains in joints (left shoulder, elbow and neck). Rash fading. Tongue stripped clean. Fauces quieter. No albuminurea. Wound still discharging - fomented.

12.2.34. (7th day). Rheumatic pains. Fauces quiet.

16.2.34. (11th day). Rheumatic pains easier. Wound much cleaner. Typical pinhole desquamation on face and fingers. Desquamation profuse in 3rd and 4th weeks.

19.2.34. (14th day). Still discharge from wound. Culture from wound negative.

26.2.34. (21st day). Wound healed. Still enlarged axillary glands.

3.3.34. (27th day). Discharged from Hospital well.

6.3.34. (O.P.) (DICK TEST = negative
(CONTROL = nil.

V.(7). (POST PERINEAL WOUND). W.G. FEMALE. 32 YEARS.

HISTORY AND SYMPTOMS: 1st pregnancy; delivered by forceps; perineal tear 5.1.33.

Sickness and headache 6.1.33.

Temperature 103° F. P. = 150 and scarlet eruption on chest 7.1.33.

ADMITTED: 10.1.33. Temperature 102° F. P. = 148.

A vivid scarlatiniform rash on trunk and extremities - commencing to fade on arms and legs. Slight malar flush - no circumoral pallor. Tongue had stripped, appeared clean, papillae enlarged and prominent. Fauces mildly inflamed. No discharges. No enlarged glands.

Perineal tear of 2nd degree with lacerations extending in to the posterior vaginal wall. Also a cervical tear which was covered with sloughs. Uterus enlarged and bulky. Lochia offensive.

30 c.c. Scarlatinal antitoxin given intramuscularily.

(1) SCHULTZ-CHARLTON TEST = positive in 24 hrs. (slightly).

(2) CULTURES taken FROM WOUND

11.1.33. (6th day). Temperature 99° F. P. = 120. Rash fading. Tongue stripped.

CULTURES FROM PERINEUM) a profuse growth of
CERVIX) haemolytic streptococci

Uterine condition treated to glycerine, and yielded satisfactorily to ~~the~~ same.

13.1.33. (8th day). Desquamation of the typical pinhole variety noticed on ears, face and chest. During the next ten days this became very marked over chest and trunk, hands and feet. Convalescence was uneventful. No complications.

3.2.33. (29th day).Perineum clean and partly healed. No uterine discharge. Desquamation completed. Discharged from Hospital well.

VI.(1). (POST BURN OF CHEST). D.R. MALE. 2½ YEARS.

HISTORY AND SYMPTOMS: Accident with cup of tea, resulting in burn of chest 2.5.34.

Malaise and sickness 6.5.34.

Scarlet eruption 7.5.34.

ADMITTED: 7.5.34. Temperature 100° F. P. = 140 per min.

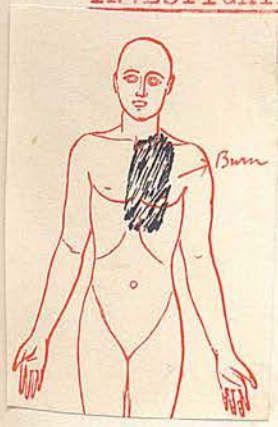
A large burn of the 2nd degree extending from the root of the neck to the level of the 6th rib, mainly on the left side of the chest: burn was very septic: covered with sloughs and pieces of dead skin.

Remainder of trunk and extremities covered with a moderate punctate erythema: more intense on extremities than on trunk. Face was flushed and circumoral pallor well marked. Tongue covered with white fur. Fauces were mildly inflamed: no exudate present. Post-cervical glands palpable. Heart and chest normal. No albuminurea.

INVESTIGATIONS: (1) (DICK TEST = in 24 hrs. mildly positive (less than 3 cms).
(" CONTROL = nil.

(2) SCHULTZ-CHARLTON TEST = in 24 hrs. positive (blanching about ½").

(3) CULTURES FROM:
(a) Burn = [redacted] haemolytic streptococci.
(b) Throat = negative for haemolytic "
(c) Nose = " " " "



(4) CULTURE FROM BURN REPEATED = profuse growth of haemolytic streptococci.

At a later date, the haemolytic streptococci were agglutinated by patient's serum in dilutions, 1-30, 1-50, 1-100.

8.5.34. (3rd day). Temperature 100° F. P. = 120. Rash still bright on trunk and limbs. Burn very septic, treated with boracic fomentations. Tongue stripping, papillae enlarged, oedematous. Fauces quiet.

9.5.34. (4th day). Temperature falling: pulse slower. Rash fading. Burn cleaner. Tongue completely stripped.

11.5.34. (6th day). Rash faded. Burn cleaner, granulating in parts.

18.5.34. (13th day). Surface of burn clean: lower part of burn healing rapidly: still moist on front of neck. No desquamation, apart from powdering on the face.

21.5.34. (16th day). Burn dry and almost healed. Culture from surface negative for streptococci. No desquamation.

4.6.34. (30th day). Burn completely healed. No desquamation. Discharged from Hospital.

(DICK TEST = in 24 hrs. negative.
(
(" CONTROL = nil.

VI.(2). (POST BURNS OF NECK AND THIGH). J.N. MALE.

1 6/12 YEARS.

HISTORY AND SYMPTONS: Burns of neck and thigh 19.12.33.

Malaise, sore throat, cough and rash on trunk 22.12.33.

ADMITTED: 22.12.33. Temperature 102·6° F. P. = 124.

A scanty scarlatiniform rash on trunk only. Slight Malar flush. No circumoral pallor. Tongue heavily furred and desquamating at tip. Fauces including Tonsils acutely inflamed and the latter covered with exudate. Tonsillar glands (r. and l.) enlarged and tender. No discharges.

2 burns of the 2nd degree, about 2" long and 1" broad, on outer side of right thigh: greater part of both covered with dry scabs, slightly moist at the edges. Third burn was on the back of neck, 2nd degree, about 3" long and 1" broad, definitely septic. Rash not well marked on neck.

Marked constitutional disturbance. No albuminurea.

DICK TEST = mildly positive.

CULTURES FROM SEPTIC BURN showed a few haemolytic streptococci.

24.12.33. (3rd day). Temperature and pulse normal. Fauces much cleaner. Tongue stripping. Tonsillar glands still palpable. Rash faded. No albuminurea. Burn septic and treated with fomentations.

27.12.33. (6th day). Temperature 100° F. P. = 102. No obvious cause for rise of temperature. Burn was slightly cleaner. No albuminurea.

29.12.33. (8th day). Temperature and pulse still unsettled. Otitis Media (rt.) with profuse otorrhoea. Burns on thigh covered with dry scabs. No desquamation seen.

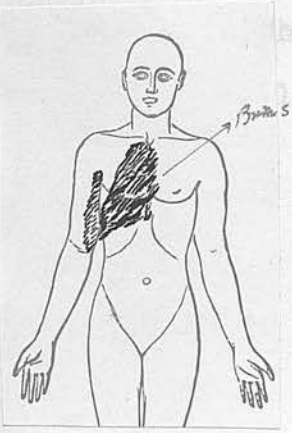
15.1.34. (25th day). Burn on neck healed. Otorrhoea stopped. Fine branny desquamation on arms.

19.1.34. (29th day). (DICK TEST = negative.
(" CONTROL = nil.

VI.(3). (POST BURNS OF CHEST). A.C. MALE. 1 8/12 YEARS.

HISTORY AND SYMPTOMS: Burns of chest and rt. arm 27.8.32.
Sickness and vomiting 1.9.32.
Scarlet eruption. 2.9.32.

ADMITTED: 2.9.32. Temperature 100° F. P. = 124 per min.



A fairly large area of burns, mainly of the 1st and 2nd degrees, on front of rt. side of chest, from level of manubrium sterni to the 6th intercostal space: and on the inner aspect of the right upper arm. Burns were not obviously septic: had been treated with Ac. Tannic compresses.

Trunk and limbs were covered with a bright punctate erythema. Appeared to be equally distributed. Face was flushed. Area of circumoral pallor. Tongue heavily coated and peeling at tip and edges. Fauces acutely inflamed and slight exudate present on both Tonsils. Anterior and post-cervical glands (r. and l.) were palpable. No albuminurea. Child was moderately ill.

10 c.c. Scarlatina antitoxin administered.

4.9.32. (4th day). Temperature and pulse normal. Fauces clean but still infected. Typical tongue. Rash still present. No albuminurea.

Areas of burns were quiet, moderately clean and healing in parts. Treated with 2½% Ac. Tannic compresses.

6.9.32. (6th day). Throat quiet. Tongue stripped. Rash faded. Burns progressing satisfactorily.

10.9.32. (10th day). Typical desquamation on face, trunk and hands: continued till about the 25th day.

14.9.32. (14th day). Areas of burns almost healed.

5.10.32. (35th day). Burns healed. Discharged from Hospital well.

VI.(4). (POST BURNS OF BUTTOCKS AND ARM). E.T. FEMALE. 3 YEARS.

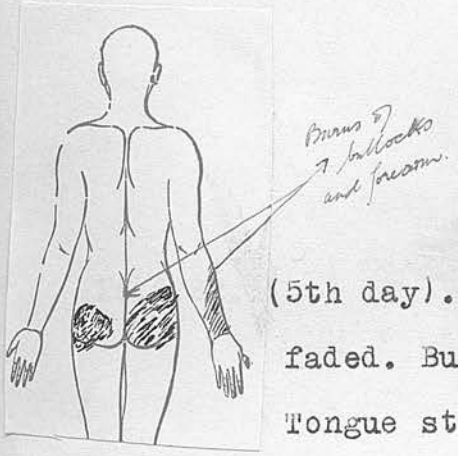
HISTORY AND SYMPTOMS: Scald on buttocks and right arm 9.6.32.

Rise of temperature and Scarlet eruption 12.6.32.

ADMITTED: 13.6.32. (2nd day). Temperature 101° F. P. = 128.

A typical punctate erythema on trunk and extremities. Malar flush and circumoral pallor. Tongue typical "red strawberry". Fauces mildly inflamed. No exudate seen. Cervical glands not enlarged. No discharges. No albuminurea.

3 areas of burns, one on each buttock and one on right forearm: all of 2nd degree and moderately septic. A few particles of dead skin around the edges were removed and antiseptic dressing applied.



(5th day). Temperature 99° F. P. = 138. Rash faded. Burns still septic. Fauces quiet and clean. Tongue stripped.

22.6.32. (11th day). Temperature and pulse settled. Tongue clean. Desquamation noticed on fingers. Burns beginning to look cleaner and healing in parts.

6.7.32. (25th day). Burns are now practically healed. A few septic spots noticed on right buttock. Desquamation on trunk.

14.7.32. (33rd day). Developed left cervical adenitis, which persisted for over a fortnight.

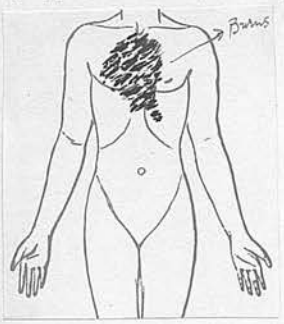
3.8.32. (53rd day). Cervical glands subsided. Burns healed. Finished desquamating. Discharged well.

VI.(5). (POST BURNS ON CHEST). A.P. MALE. 1½ YEARS.

HISTORY AND SYMPTOMS: Severe burns of chest 15.2.32.
Sickness and headache 20.2.32.
Scarlet eruption 21.2.32.

ADMITTED: 23.2.32. Temperature 101.2° F. P. = 140 per min.

A very coarse, punctate erythematous rash on trunk, arms and legs, also extending on to face. Face flushed. Fauces moderately infected - no exudate seen. Tongue was peeling, papillae enlarged and prominent. No palpable glands in neck nor



elsewhere. No discharges. A large area of burns, mainly of 2nd degree, septic in places, on front of chest, extending from about the level of the 2nd - 5th rib. The outer edges appeared red and oedematous.

No albuminurea. 20 c.c. Scarlatina antitoxin administered. Burns dressed with Ung. Eucalyptus.

26.2.32. (7th day). Rash faded. Fauces quiet. Tongue clean. Burns very unsatisfactory. Temperature and pulse normal.

1.3.32. (10th day) Typical lamellar desquamation on abdomen.

5.3.32. (14th day). Burns were still unsatisfactory: healing in parts but still large septic areas. Treated with fomentations. Improvement during the next few weeks very slow.

11.3.32. (20th day). Area of burn cleaner. Still desquamating.

25.3.32. (34th day). Developed rt. otitis media with moderate discharge. Continued for about three weeks.

24.4.32. (64th day). Burns healing slowly. Exuberant granulations in parts: treated Silver Nitrate stick. No otorrhoea.

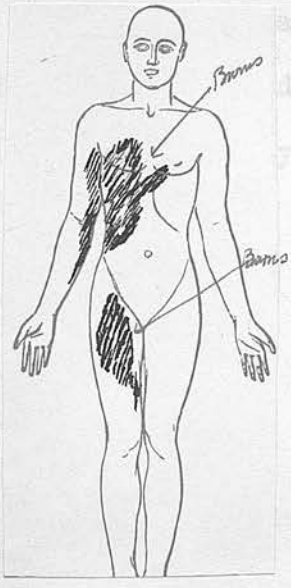
21.5.32. (91st day - 13 weeks). Burns healed. Discharged from Hospital well.

VI.(6). (POST BURNS OF CHEST AND LIMBS) R.C. MALE. 1 9/12 YRS.

HISTORY AND SYMPTOMS: Burns of chest, arm and leg 9.1.32.
Vomiting and sore throat 13.1.32.
Scarlet eruption 14.1.32.

ADMITTED: 14.1.32. Temperature 99° F. P. = 140 per min.

A faint, punctate erythema on sides of chest and abdomen, inner aspect of arms and thighs. Face slightly flushed. Tongue furred and stripping anteriorly. Mild faucial angina. No palpable glands. No discharges.



There were areas of severe burns, of the 2nd and 3rd degrees on right side of chest and abdomen, inner aspect of right arm and front of right thigh. Burns were covered with Ac. Picric dressings. Large areas very septic, especially around the edges and sloughs about to come away. Small amount of haemorrhage from ~~in~~ area on chest. No albuminurea. General condition fairly good.

TREATMENT: 40 c.c. of Scarlatina antitoxin administered. Burns dressed with Ac. Picric. Cultures taken from surface of burns.

16.1.32. (4th day). Temperature 99° F. P. = 120. Rash almost faded. Tongue stripped. Burns still septic especially area on chest. No albuminurea.

22.1.32. (10th day). 3 areas of burns were cleaner: a few sloughs had come away from chest: still very septic in parts. Temperature still irregular, varying from 98·6° F. - 100° F.

2.2.32. (21st day). Desquamation seen on hands and feet: became more profuse during the next week. Burns slowly healing. Area on right arm clean and almost healed: the other 2 areas more septic. Large sloughs came away and in the course of about 5 weeks healing was taking place all over.

23.3.32. (70th day - 10 weeks). 3 areas had healed satisfactorily. End result was severe scarring.

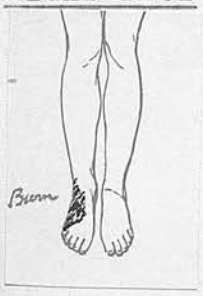
VI.(7). (POST BURN OF FOOT). C.M. MALE. 2 YEARS.

HISTORY AND SYMPTOMS: Burn on right foot 6.11.32.
Slight sore throat 11.11.32.
Vomiting and Scarlet eruption 12.11.32.

ADMITTED: 12.11.32. Temperature 101° F. P. = 126.

A scanty punctate erythema on trunk, upper part of arms and legs. Malar flush, no circumoral pallor. Moderate faucial angina: no exudate: Tonsils (r. and l.) enlarged. Tongue heavily coated and peeling at tip and sides. No discharges from nose nor ears, no enlarged glands. No albuminurea.

RIGHT FOOT: A fairly large area of burns of 2nd and 3rd degrees on dorsum and outer side of foot: moderately septic in areas with dead skin. Saline dressing applied. Cultures taken from fauces and burns.



13.11.32. (3rd day). Rash faded. Fauces quiet. Tongue peeling. Burn treated as a septic wound: fomentations applied: treatment continued for 10 days.

25.11.32. (13th day). Temperature and pulse normal for the past week. Burn very much cleaner and healing in parts. Eusol dressing applied.

3.12.32. (21st day). Burn healing rapidly. Desquamation of a powdery character on trunk: more typical desquamation

on hands and feet. Slight rhinitis which cleared up in a few days.

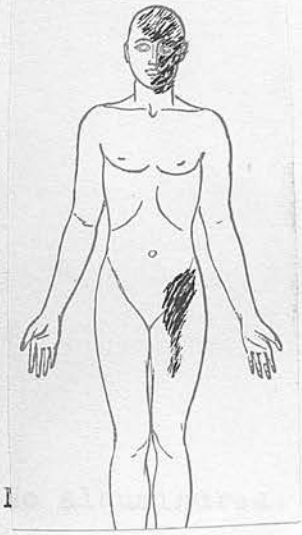
13.12.32. (31st day). Burn completely healed. Discharged from Hospital.

VI.(8). (POST BURNS OF FACE, SCALP AND LEG). P.T. FEMALE.
3½ YEARS.

HISTORY AND SYMPTOMS: Burns of face and thigh 31.10.33.
Malaise, headache, loss of appetite 3.11.33.
Scarlet eruption. 4.11.33.

ADMITTED: 5.11.33. Temperature 100·4° F. P. - 120.

A vivid, punctate erythema on trunk, arms, inner aspects of thighs. Face flushed. Tongue clean except for areas in centre and posterior: papillae enlarged and prominent. Fauces mildly infected: no exudate seen. Tonsils normal. Desquamation of the typical lamellar variety seen on face and upper part of chest. No discharges. No palpable glands.



(a) Extensive area of burns of 2nd degree involving the whole of left side of face, forehead and ear, definitely septic and discharging thin pus in parts.
(b) Another burn of 1st degree on left groin extending down thigh for about 3", almost healed.

General condition moderately serious.

TREATMENT: 10 c.c. Scarlatina antitoxin administered.

Burns were cleaned up, dead skin and septic matter removed and a dressing with Ung. Eucalyptus and Vaseline applied. Dry dressing applied to burn on groin. Cultures taken from

fauces and burns.

6.11.33. (4th day). Rash fading. Tongue stripped clean. Fauces quiet. Burns on face and scalp very septic, still suppurating.

9.11.33. (7th day). Face and scalp definitely cleaner. Rash faded.

14.11.33. (12th day). Burns clean and healing had commenced in parts. Typical desquamation seen on neck and trunk.

24.11.33. (22nd day). Burns on face and scalp healing rapidly. No albuminurea. Still desquamating. Transferred to another Hospital to complete convalescence.

VI.(9). (POST BURNS OF SHOULDER). I.P. FEMALE. 1 10/12 YRS.

HISTORY AND SYMPTOMS: Burns of shoulder, chest and arm 23.2.33.

Malaise, nausea and Scarlet eruption 25.2.33.

ADMITTED: 26.2.33. Temperature 103° F. P. = 140.

Trunk and limbs covered with a dusky, punctate erythema. Malar flush and slight circumoral pallor. Tongue coated and commencing to strip: moderate faucial angina: no exudate seen. No palpable cervical glands. No albuminurea.

A large area of burns, mainly of 2nd degree, on front of chest extending from manubrium sterni to level of 5th rib, left side, left shoulder and part of arm. Area covered with dead skin, blisters, débris and some oily substance. Definitely septic. Skin was red and oedematous around edges. Cultures taken from septic areas, also from throat. General condition fairly good. Burns were cleaned up, dead skin and débris removed. Dressing with Ung. Zinc and Ol. Ric. applied.

1.3.33. (5th day). Temperature normal for the first time. Pulse 99 per min. Rash faded. Burns were still very septic. Tongue stripped. Fauces normal.

10.3.33. (14th day). Fauces quiet. Tongue clean. Burns appeared much cleaner and healing in parts. Desquamation seen on hands and feet and to a lesser extent on

trunk. No albuminurea.

6.4.33. (41st day). Burns showed considerable improvement. Healing had taken place all over arm and shoulder: still a few moist areas on chest.
Sharp rise of temperature 102° F. P. = 120. Cervical glands enlarged and tender. No albuminurea. Desquamation on hands and feet.

18.4.33. (53rd day). Burns still progressing satisfactorily. Desquamation less.

27.4.33. (62nd day). Burns healed with considerable scarring. Discharged from Hospital well.

VI.(10). (POST BURN OF LEG). D.W. FEMALE. 3 YEARS.

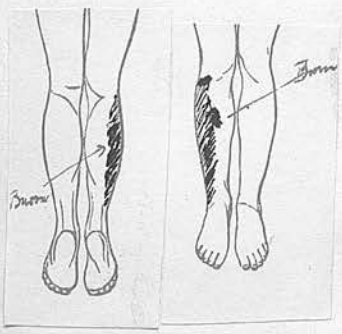
HISTORY AND SYMPTOMS: Burn of right leg 27.10.33.

Headache, vomiting and sore throat 30.10.33.

Scarlet eruption 31.10.33.

ADMITTED: 31.10.33. Temperature 104° F. P. = 132.

Skin eruption was a bright punctate erythema, covering neck, trunk and limbs. Malar flush but no circumoral pallor. Tongue furred posteriorly. Stripping anteriorly. Papillae enlarged at tip. Moderate faucial angina with exudate on both tonsils. No discharges. No palpable glands in neck, axillae, groins, etc.



Extensive burn of 2nd degree, over lateral aspect of right leg. Burn had been treated with Ac. Tannic compresses and appeared clean, except one or two small areas on outer margin. Rash was no more pronounced around burn than elsewhere. No albuminurea. Child was moderately ill.

TREATMENT: Tannic Ac. 2½% compresses continued.

40 c.c. Scarlatina antitoxin administered.

2.11.33. (4th day). Temperature coming down by lysis. Pulse 110 per min. General condition improved. Fauces infected, no exudate. Tongue stripping. Rash fading. Burn quiet.

8.11.33. (10th day). Throat quiet. Tongue clean and raw. Sudden rise of temperature 101° F; no cause found. Burn satisfactory. No albuminurea.

14.11.33. (16th day). Slight Jaundice: no tenderness over liver: urine clear: stools normal. Burns satisfactory, healing in parts.

28.11.33. (30th day). Jaundice cleared. Burn practically healed.

9.12.33. (41st day). Burn healed. No desquamation seen throughout illness. Discharged from Hospital well.

VI.(11). (POST BURN OF ELBOW). J.P. FEMALE. 8 10/12 YEARS.

HISTORY AND SYMPTOMS: Severe burn of elbow 6.6.33.

Malaise, headache, sore throat, vomiting 11.6.33.

Scarlet eruption 11.6.33.

ADMITTED: 12.6.33. Temperature 99° F. P. = 110.

Skin eruption was a fine punctate erythema, scanty on trunk, better developed on arms and legs. Face flushed. Tongue coated and stripping anteriorly. Fauces mildly infected: no exudate. A few palpable glands in right axilla. No discharges. No albuminurea.

A large burn of 2nd and 3rd degrees over the anterior surface of the right elbow, definitely septic. General condition good.

TREATMENT: Pieces of dead skin and debris removed from area of burn and fomentations applied.

SCHULTZ-CHARLTON TEST = 14 hrs. blanching about 2 cms.

13.6.33. (3rd day). Temperature and pulse settled. Rash fading on trunk, still present on limbs. Tongue peeling. Burn still very septic. Cultures from burn and throat showed haemolytic streptococci.

20.6.33. (10th day). Burn was definitely cleaner, but no healing. Still fomented.

28.6.33. (18th day). Burn clean and healing around margin. Desquamation on trunk and hands. No albuminurea.

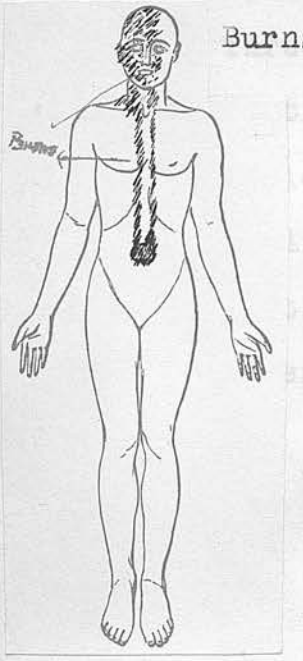
8.7.33. (28th day). Burn completely healed. Stopped desquamation. Discharged from Hospital well.

VI.(12). (POST BURNS OF FACE). A.R. MALE. 1 4/12 YEARS.

HISTORY AND SYMPTOMS: Severe burns of face 16.7.33.
Eyes swollen and discharging 19.7.33.
Malaise, Scarlet eruption 20.7.33.

ADMITTED: 20.7.33. Temperature 100·4° F. P. = 128.

A vivid punctate erythema on trunk and extremities. Malar flush interrupted by irregular areas of burns. Fauces mildly inflamed. "Strawberry" tongue. Submaxillary and post-cervical glands palpable. No discharges except from eyes.



Burns mainly of 1st and 2nd degrees covering front of face, eyelids, forehead, right ear and right side of neck, front of neck and 2 linear superficial burns extending from episternal notch to umbilicus, where there was a small ulcerated area. Both corneae were intact and the child could open both eyes. Burns on face were moist, septic, with particles of dead skin around edges. No albuminurea. General condition was fairly good.

TREATMENT: Burns were cleaned and a dressing with Ung. Boro-Zinc applied. Special attention to eyes: irrigated with Lotio A.B. frequently.

SCHULTZ-CHARLTON TEST RT. THIGH = in 19 hrs. indefinite and rash faded.

CULTURES FROM SEPTIC AREAS = haemolytic streptococci.

21.7.33. (2nd day). Rash faded. Fauces still infected. "Strawberry" tongue. Burns as previously described.

25.7.33. (6th day). Burns on face cleaner. Eyes quiet. Tongue stripping.

1.8.33. (13th day). Whole area of burns clean and healing taking place over Malar prominences and along linear burns and around umbilicus.

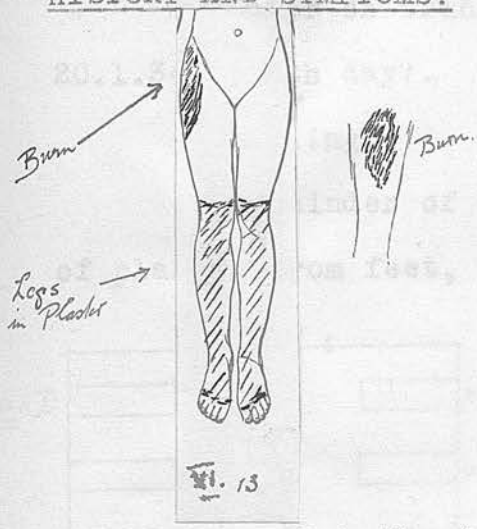
8.8.33. (20th day). Temperature 102° F. P. = 120. Hard swelling found above and to outer side of left knee. Three days later abscess incised.

16.8.33. (28th day). Burns very satisfactory: linear burns healed. Rapid healing on face. Wound above knee healing. Typical desquamation on hands and feet.

28.8.33. (40th day). Burns completely healed. Wound on leg covered with dry scab. Discharged from Hospital well.

VI.(13). (POST BURN OF LEG). T.T. MALE. 10 YEARS.

HISTORY AND SYMPTOMS:



Operation for lengthening tendo achilles (r. &l.) (Strict asepsis). Feet in plaster. 6.1.34.

Accidental burn right thigh, with hot water bottle 6.1.34.

Treated with Ac. Tannic compress.

Malaise, headache, rise of temp. 102° F. P. = 120 8.1.34.

Slight sore throat, vomiting and Scarlet eruption 9.1.34.

COURSE: 9.1.34. (2nd day). A bright punctate erythema covering trunk, arms and thighs: uniformly bright all over. Face flushed. Tongue heavily coated, stripping anteriorly. Fauces mildly infected. No exudate on tonsils. No enlarged glands. No albuminurea. Temperature 102·4° F. P. = 120.

LARGE BURN: of 2nd degree over right upper thigh and great trochanter still treated with Ac.Tannic compresses. Cultures from throat and burn.

10.1.34. (3rd day). Temperature 101° F. P. = 110. Rash still present. Burn clean. Tongue stripping. Fauces still infected.

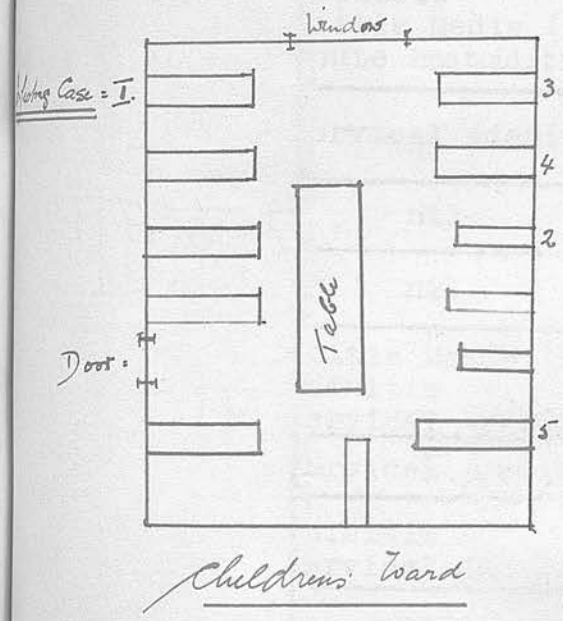
12.1.34. (5th day). Temperature 99° F. P. = 90. Rash faded. Typical "raw" tongue. Fauces quiet. Burn clean.

13.1.34. (6th day). Post-cervical glands (r. and l.) enlarged and tender.

15.1.34. (8th day). Desquamation on face, ears and neck. Later on trunk and hands. Burn clean and healing.

20.1.34. (13th day). Glands subsided. Desquamating. Burn healing.

Remainder of convalescence uneventful. On removal of plaster from feet, Wounds completely healed.



Propagation of Infection.

This case gave rise to 4 other cases of genuine Scarlet Fever in the Ward, occurring 3-8 days later. Ages of other children were 3, 5, 6 and 8 years: all were mild cases except one (No. 4). Dick Tests were not performed but children at susceptible age and no history of Scarlet Fever. all removed to Fever Hospital and remainder of children passively immunised. In case (3) a common cold preceded the onset of Scarlet Fever, for 2-3 days.

SUMMARY

TABLE SHOWING THE MORE IMPORTANT CLINICAL AND BACTERIOLOGICAL FEATURES OF THE FOREGOING CASES.

Section	Case	Sex	Age	Operation or site of injury	Contact with Sc. Fever	Incubation Period	Susceptible to Sc. Fever by Dick Test	Schultz Charlton Test	Haemolytic Streptococci			Complications	Relapse	Variety	Final Reaction to Dick Test
									Nose	Throat	Wound - Site of operation or infected surface				
1. Otorhino-Laryngo-logical Operations.	1	M	5	Tonsillectomy	No history	2 days			+	+	+	Cervical Adenitis	-	Mild	
	2	F	2 5/12	"	"	3 days			+	+	+	Cervical Adenitis Rhinitis	-	Mild	
	3	M	5½	"	"	24 hrs			+	+	+	Acidosis Otitis Media (r & l) Acute Mastoiditis (l)	-	Severe	
	4	F	17	"	"	24 hrs			-	+	+	Cervical Adenitis	-	Mild	
	5	F	5	"	"	24 hrs	+ve Mild	+ve	+	+	+	nil	-	Mild	-ve
	6	F	6	"	"	24 hrs			+	+	+	nil	-	Mild	
	7	M	3	"	"	2 days			+	+	+	Otitis Media (r & l) Rhinitis Cervical Adenitis	-	Severe	
	8	F	3½	"	"	24 hrs			+	+	+	Cervical Adenitis	-	Mild	
	9	F	5	"	"	24 hrs			+	+	+	Rhinitis Cervical Adenitis	-	Mild	
	10	M	4	"	"	24 hrs			-	+	+	nil	-	Mild	
	11	F	3	"	"	2 days			+	+	+	Otitis Media (l)	-	Mild	
	12	M	5	"	+	2 days			+	+	+	nil	-	Mild	

Section	Case	Sex	Age	Operation or site of injury	Contact with Sc. Fever	Incubation Period	Susceptible to Sc.Fever by Dick Test	Schultz Charlton Test	Haemolytic Streptococci			Complications	Relapse	Variety	Final Reaction to Dick Test
									Nose	Throat	Wound-site of operation or infected surface				
I. Oto-rhino-laryngo-logical Operations (Contd.)	13	F	5	Tonsillectomy	No history	2 days			+	+	+	nil	-	mild	
	14	M	19	"	Yes	? 2 days	+ve mild		+	+	+	(1) Acute Nephritis	-	severe	ve -
	15	F	7	"	No history	24 hrs.			-	+	+	nil	-	mild	
	16	F	4	"	"	24 hrs.			+	+	+	nil	-	mild	
	17	F	9	"	"	24 hrs.			-	+	+	(1) Otitis media(l)	-	mild	
	18	M	5	"	"	2 days			+	+	+	(1) Cervical adenitis	-	mild	
	19	M	3	"	"	2 days			+	+	+	nil	-	moder-ate.	
	20	F	44	"	"	2 days			-	+	+	(1) Albumin-urea	-	moder-ate.	
	21	M	5	"	"	2 days			+	+	+	(1) Cervical adenitis (2) Albumin-urea.	-	moder-ate.	
	22	F	15	"	"	4 days			-	+	+	nil	-	mild	
	23	M	15	"	"	24 hrs.			+	+	+	(1) Cervical adenitis	-	moder-ate.	
	24	M	6	"	"	4 days			+	+	+	(1) Cervical adenitis (2) Otitis media (t)	-	moder-ate.	
	25	F	5	"	"	2 days			+	++	++	nil	-	mild	
	26	F	6	"	"	24 hrs.			-	+	+	nil	-	mild	

Section	Case	Sex	Age	Operation or site of injury	Contact with Sc. Fever	Incubation Period	Susceptible to Sc.Fever by Dick Test	Schultz Charlton Test	Haemolytic Streptococci: Nose	Haemolytic Streptococci: Throat	Haemolytic Streptococci: Wound-site of operation or infected surface	Complications	Relapse	Variety	Final Reaction to Dick Test
I. Oto-rhino-laryngo-logical Opera-tions (Contd.)	27	F	26	Tonsillec-tomy	No history	2 days			+	+	+	nil	-	mild	
	28	M	4	"	"	24 hrs.			+	+	+	nil	-	mild	
	29	M	6	"	"	3 days			-	+	+	nil	-	mild	
	30	M	3	"	"	2 days			+	+	+	nil	-	mild	
	31	F	5	"	"	2 days			+	++	++	nil	-	mild	
	32	M	17	"	"	24 hrs.	ve +	ve +	+	+	+	nil	-	mild	ve -
	33	F	7	"	"	24 hrs.	ve +	ve +	+	+	+	(1) Sore throat (2) Cervical adenitis	-	moder-ate	ve -
	34	M	7	Adenoidec-tomy.	"	24 hrs.	ve +mild	ve +	-	++	++	(1) Rhinitis (2) Otitis media(r&l)	-	moder-ate.	ve -
	35	F	18	for Cleft Palate	"	2 days			-	+	+	nil	-	moder-ate.	
	36	F	12	Mastoidec-tomy	"	10 days					+	nil	-	moder-ate.	
	37	F	3	"	"	3 days			-	+	+	(1) Cervical adenitis	-	mild	
	38	M	10	"	"	24 hrs.			-	-	++	nil	-	mild	
II. Cervical Opera-tions.	1	M	8	Incision abscess of Neck	"	6 days			-	-	++	nil	-	mild	
	2	M	6	"	"	3 days				+	++	nil	-	moder-ate.	
III. Abdomin-al Opera-tions	1	F	17	Appendic-ectomy	"	5 days	ve + (doubt-ful)	+ve	-	-	+	nil	-	mild	ve -

Section	Case	Sex	Age	Operation or site of injury	Contact with Sc. Fever	Incubation Period	Susceptible to Sc.Fever by Dick Test	Schultz Charlton Test	Haemolytic Streptococci: Nose	Throat	Wound-site of operation or infected surface	Complications	Relapse	Variety	Final Reaction to Dick Test
III. Abdominal Operations (Contd)	2	F	7	Appendicectomy	No history	3 days	ve +	ve +	+	+	+	nil	-	mild	ve -
	3	F	10	"	"	3 days			-	-	-	nil	-	mild	
	4	F	12	For App. abscess	"	6 days					++	nil	-	moderate	
	5	F	33	Oöphorectomy	"	5 days				-	-	(1) Rheumatism	-	moderate	
	6	M	25	Herniotomy	"	7 days			-	+	+	(2) Tonsillitis	-	moderate	
	7	M	10	Incision Inguinal Abscess	Possible	24 hrs.			-	-	+	nil	-	moderate	
	8	M	1½	Circumcision	No history	24 hrs.					+	(1) Cervical adenitis (2) Otitis media (3) Bronch. Pneumonia.	Relapse fatal (18th day)	severe	
	9	F	26	Uterine curettage	"	5 days	ve +	ve +(marked)	-	++	+(few)	(1) Tonsillitis	-	moderate.	ve -
IV. Plastic Operations.	1	M	19	Graft to face and neck	"	24 hrs.			-	-	+(a few)	nil	-	moderate.	
	2	F	29	Graft from breast	"	2 days				+	+	nil	-	mild	
	3	M	2½	Graft from abdomen	"	6 days					+	(1) Rhinorrhoea	-	moderate	

Section	Case	Sex	Age	Operation or site of injury	Contact with Sc. Fever	Incubation Period	Susceptible to Sc.Fever by Dick Test	Schultz Charlton Test	Haemolytic Streptococci: Nose	Throat	Wound-site of operation or infected surface	Complications	Relapse	Variety	Final Reaction to Dick Test
IV. Plastic Operations (Contd.)	4	M	15	Graft from abdomen	No history	8 days		ve +(Marked)	-	-	+	(1) Albuminurea	-	moderate	
	5	M	20	Graft to foot	"	5 days			-	+	-	nil	-	moderate	
V. Wounds	1	F	15	Injury to thumb	"	3 days	ve +(Moderate)	ve +	-	+	+	nil	-	moderate.	ve -
	2	M	10	Wound of Shoulder	"	7 days	ve +(mild)	ve +	-	-	+	nil	-	mild	ve -
	3	F	17	Wound of leg	"	3 days			-	+	+	nil	-	mild	
	4	F	10	Wound of wrist	"	2 days					+	(1) Axillary adenitis	-	moderate	
	5	M	24	Wound of knee	"	7 days		ve +	+	+	++	(1) Rheumatism (2) Cervical adenitis (3) Cellulitis of Ab.wall	-	severe	
	6	M	24	Wound of axilla	"	7 days	ve +(mild)	ill-defined blanching	-	+	+	(1) Rheumatism (2) Cervical Adenitis	-	mild	ve -
	7	F	32	Perineal Wound	"	24 hrs.		ve +(slightly)	-	-	++	Nil		mild	

Section	Case	Sex	Age	Operation or site of injury	Contact with Sc. Fever	Incubation Period	Susceptible to Sc.Fever by Dick Test	Schultz Charlton Test	Haemolytic Streptococci: Nose	Haemolytic Streptococci: Throat	Haemolytic Streptococci: Wound-site of operation or infected surface	Complications	Relapse	Variety	Final Reaction to Dick Test
VI Burns	1	M	2½	Burn of Chest	No history	4 days	ve +(mild)	ve +	-	-	(Agglut-++inated by patient's serum)	nil	-	mild	ve -
	2	M	1½	Burns of neck and thigh	"	3 days	ve +(mild)		-	+	(A few haem strips) +	(1)Cervical adenitis (2)Otitis media(rt)	-	mild	ve -
	3	M	1 8/12	Burns of chest	"	5 days			-	-	+	nil	-	mild	
	4	F	3	Burns of buttocks and arms	"	3 days			-	+	-	(1)Cervical adenitis	-	moderate	
	5	M	1½	Burns of chest	"	5 days			-	+	++	(1)Otitis media(rt)	-	mild	
	6	M	1 9/12	Burns of chest and limbs	"	4 days			-	-	++	nil	-	mild	
	7	M	2	Burn of foot	"	5 days			-	+	++	(1)Rhinitis	-	mild	
	8	F	3½	Burns of face and leg	"	3 days			-	-	++	nil	-	mild	
	9	F	1 10/12	Burns of Shoulder and chest	"	24 hrs.			-	-	+	(1)Cervical adenitis	-	mild	
	10	F	3	Burn of leg	"	3 days			-	+	+(a few)	(1)Jaundice	-	mild	
	11	F	8	Burn of arm	"	4 days		ve +	-	-	+	nil	-	mild	

Section	Case	Sex	Age	Operation or site of injury	Contact with Sc. Fever	Incubation Period	Susceptible to Sc.Fever by Dick Test	Schultz Charlton Test	Haemolytic Streptococci			Complications	Relapse	Variety	Final Reaction to Dick Test
									Nose	Throat	Wound-site of operation or infected surface				
VI Burns (Contd)	12	M	$1\frac{4}{12}$	Burns of face	No history	3 days		Slightly +ve (indefinite)	-	-	++	(1)Abscess of leg	-	mild	
"	13	M	10	Burn of thigh	"	2 days			-	+	-	(1)Cervical adenitis	-	mild	

IV. DISCUSSION.

(1) DIFFERENTIAL DIAGNOSIS.

It has been said that more errors of diagnosis are made in connection with Scarlet Fever than with any other acute infectious disease. A typical case exhibiting the well-known syndrome, of sudden onset with headache and vomiting, pyrexia, diffuse punctiform erythema, angina, "strawberry" tongue, enlarged lymphatic glands, followed by albuminurea and desquamation, would present no difficulty. However, in the atypical and aberrant varieties the picture may be so altered as to raise doubt in the mind of the expert diagnostician. It is well to remember that no one symptom or sign is invariably present or characteristic in itself. Cases of scarlatina sine eruptione have been reported and diagnosed on the strength of desquamation and renal symptoms in convalescence. In regard to alteration in other cardinal features, absence of angina and pyrexia have been observed, Leichenstein has reported a case with marked delirium and intense eruption running an almost afebrile course. Schamberg also mentions an afebrile case. Henoch observed 4 cases out of 175 with normal morning temperature and evening evelation. Albuminurea may or may not be present, but its appearance is not an essential part of the disease. As for desquamation, it is frequently regarded as conclusive proof of the scarlatinal nature of the previous rash. We shall have occasion to show

at a later stage in this discussion that exfoliation of the epidermis is a well recognised feature of scarlatinoid erythema and is not confined to scarlet fever. Transmission of infection to another is regarded by Jürgensen and others, as being of great diagnostic importance.

In view of the fact that in many cases there is marked divergence from the normal type, it is obvious that the diagnosis cannot be made on any one or other symptom but on the grouping of these symptoms and the course of development and sequelae. Early diagnosis is made essentially on the greater intensity of constitutional symptoms and the presence of angina; later on, the greater persistence of the rash and fever, the development of aural, glandular and renal complications and the spread of contagion to others.

In considering the association of scarlatina with trauma and surgical procedure, difficulties of diagnosis are greatly increased. In this wider and more comprehensive consideration we must include all the possibilities connected with shock, drugs, anaesthesia, sepsis, etc., weigh them up and thereby isolate the true condition.

The early literature abounds with lengthy accounts of post-operative rashes described as scarlatina. The English School headed by Paget firmly believed that the post-operative eruptions which they described were true scarlatina, the operation being the direct predisposing cause of the

condition. In France the consensus of opinion was in the opposite direction. Tremblay, Terillon and Aulnas regarded the majority of those so-called scarlatinal eruptions, either of septicaemic or pyaemic origin. Aulnas included puerperal rashes in the same category. Verneuil described a number of pyaemic rashes and in these he mentions some which are of a scarlatiniform character. Hoffa is unsparing in his criticism and boldly states that the majority diagnosed as scarlatina are really pyaemic. And so the conflict raged. Taking up another line of attack, Sanné, Trélat, Batut and others held the view that the condition described as surgical scarlatina was an illustration of intercurrent infection, and would not accept any relationship between the operation and the disease.

In order to unravel from this mass of conflicting opinion the condition we regard as true surgical scarlatina, it will be necessary to refer briefly to the group of conditions known as the "scarlatinoides" or the "scarlatiniform eruptions." The literature on the subject reveals a most unusual and bewildering confusion of opinion on all their clinical characteristics. The only feature on which most writers agree is the non-contagiousness of the condition. A number of French authors including Féréol, Vidal, Besnier and Brocq have made a careful and detailed study of the condition. Féréol

reported a case resembling scarlet fever in which the outstanding feature was a tendency to relapse hence the designation "erythème scarlatiniforme récidivant." Besnier distinguished 2 different forms of this condition, the scarlatinoid erythema and the desquamating scarlatinoid erythema. The first closely resembled scarlet fever, occurring with sudden onset, pyrexia, slight sore throat and constitutional disturbance. The second variety was characterised by early and profuse desquamation and a tendency to recur. Besnier's distinction was shared by a number of French writers subsequently; but in America, England and elsewhere it was considered unnecessary to describe 2 distinct conditions and it is known now as "scarlatinoid erythema" or "erythema scarlatiniforme."

Dermatologists have a lot to say on the subject and their views are sometimes conflicting. It would appear that the main clinical features which distinguish this condition from scarlatina are, moderate pyrexia, mild angina, early and profuse desquamation which may continue long, a peculiar proneness to recur and absence of contagion. Desquamation may be so intense that epidermal casts like gloves and slippers are exfoliated. The etiology includes an infinite variety of pathogenic factors such as toxins, food, drugs, etc. Whitfield's classification is the most comprehensive and will be used here in reviewing and criticising cases in the literature; he divides them into 4 groups.

(1) Rashes of infections such as Diphtheria, Influenza, etc.

(2) Septic rashes following surgical operations and wounds.

(3) Drug rashes.

(4) Erythema scarlatinoid recurrens

(1) On reading through a number of the cases described as scarlatina following Tracheotomy (for Diphtheria), one is inclined to place them in this group. There are at least 5 or 6 described by Koch: 2 by Sörensen; and 2 or 3 by Davidovitsch. The eruptions in Koch's cases compare favourably with those described by Manning, which occurred in cases of Diphtheria and which he attributes to septic absorption. In Manning's cases the eruptions followed ulceration in the throat: in Koch's following secondary infection and suppuration in the tracheotomy wounds. Cases of tracheotomies with suppurating, sometimes sloughing wounds and skin eruptions are still seen occasionally. The rash is blotchy and irregular in character and distribution: pyogenic organisms and K.L.B. may be cultured from the wound. One such case has been excluded from the series which I have investigated.

(2) Before considering the post-operative rashes in which the wounds were definitely septic, mention must be made of a number closely following operations and probably caused by vasomotor disturbance due to irritation of the nervous system. McCarthy has given a very lucid description of this variety of erythema. In his cases the preceding

operations were all on parts abundantly supplied by sympathetic fibres; the eruptions appeared three or more days after operation and were characterised by lack of constitutional symptoms, by the presence of an erythematous or papular eruption, with severe itching and moderate pyrexia; there was no desquamation and no renal symptoms. Hoffa also recognised this type of post-operative eruption, in the form of erythema or urticaria. A large number of the rashes in the literature described as scarlatina, followed closely, operations on the pelvis and genito-urinary tract and were undoubtedly erythemata of this type; here we include Paget's case of lithotomy: Maunder's case of stone in the bladder: Thomas Smith's cases of lithotomy and a few reported by Davidovitsch. In the majority, the clinical features are the same as described by McCarthy.
It is surprising how many post-operative septic and pyaemic rashes have been confused with scarlet fever, especially when we remember that the physicians and syrgeons of the pre-Lister era must have been familiar with such lesions. We are in entire agreement with Tremblay's and Hoffa's views as to the frequent confusion of the two conditions. Occasionally a rapid and fatal septicaemia has been described as scarlatina, as for example in Brown's 1st and 2nd case. The first case requires no comment: the second was a man with lacerated wound of leg: in six hours he developed intense headache, pyrexia, vomiting and nine hours later he died: post mortema

a purpuric rash covered the chest and abdomen. Both cases were obviously fulminating septicaemias. Paget's cases of death with obscure symptoms 2-3 days after operation are probably the same.

In regard to pyaemic rashes, the clinical features upon which our differential diagnosis rests, are, the polymorphous nature of the rash, (erythema or urticaria) atypical tongue, slight angina, early and profuse desquamation usually more pronounced at the site of the suppurating wound. Profuse desquamation is noted in two cases of Riedinger's and intense desquamation at the site of the wound is noted in a case of Mayo's. Other examples are found in cases reported by Brown, Cheadle, Dobbin and Braxton Hicks. Passing reference must be made to the experiments of Ashmead and Stickler. In most of his cases desquamation was early and started at the site of innoculation: in the last four, abscesses developed at site of injection. All the eruptions are probably of a septic nature. Roberts thought that Stickler had produced scarlatina. Hektoen is doubtful if any of the alleged successful results in producing scarlet fever are scientifically acceptable prior to the work of the Dicks in 1923.

(3) Consideration of the drug, exanthemata, mainly those produced by Ac Carbol and Mercury is extremely important as so many of the operations were performed in the days of antiseptic surgery. Hoffa describes the eruption of Mercury

poisoning as a diffuse redness or isolated patches with comparatively clear intervals, involving body and extremities only. It appears without constitutional symptoms 24-48 hours after operation and disappears rapidly without desquamation. Browne was the first to mention drug rashes in a differential diagnosis. The cases reported by Howse and Goodhart were freely treated with Carbolic Acid and some of them were undoubtedly carbolic erythemata. In one of Howse's cases the operation was performed under the carbolic spray.

(4) Finally there is group of recurring scarlatinoid erythemata - usually of the desquamative type. The condition may recur as frequently as every 6 or 12 months. Page's case had two previous attacks of scarlet fever: in one of Schaffer's cases the patient had two attacks and angina was absent on both occasions.

After studying the frequency with which "scarlatinoid erythema" has been confused with surgical scarlatina, one is tempted to ask whether the true condition has actually been described. Scarlatina in the wounded such as we find in epidemic forms in surgical wards is an illustration of intercurrent infection and here we would include cases described by Koch, Goodhart, and Stirling.

Other cases of true scarlatina complicating trauma have undoubtedly occurred as a coincidence, infection having

taken place a little before or soon after operation as admitted by König, Treub and a few others. De Bovis thought this applied to the exceptions. He also pointed out that the so-called surgical scarlet fever had ceased to occur in epidemic form and the sporadic cases had become much less common and this he attributed to stricter isolation of infectious cases and the improvement in antiseptic methods. Hamilton shows that the same advances in the treatment of septic cases had diminished the frequency of post-operative eruptions. It would appear then that so many of the cases described in the early literature are examples of intercurrent infection or wrong diagnosis. However, there is still a residuum in which there is good reason to believe the onset of the disease is directly associated with the preceding operation or trauma.

In their very excellent critiques on this subject, de Bovis and Hamilton are widely divergent in their views, de Bovis accepted the relationship between operation and wound, regarding a state of trauma as predisposing to scarlet fever and has stated five points of difference between medical and surgical scarlatina:-

(1) The majority affected are adults.

(2) Incubation period is short.

(3) Mildness or absence of angina.

(4) Eruption starts near the wound and spreads like lymphangitis.

(5) Precocious desquamation.

Hamilton believed that surgical scarlet fever was simply scarlet fever in the wounded arising as a coincidence during operative convalescence or in association with a pre-existing wound. In regard to the points stated by de Bovis, she answers that they are characteristic features of scarlatinoid erythema, which of course is correct. However the observation of de Bovis are not entirely incorrect and deserve consideration. When we come to consider an actual series of cases it will be shown that certain of those clinical features may be present. There is so much smoke and dross in the early literature that it is difficult to avoid a severely critical and sceptical attitude to the subject. However if we look carefully in subsequent and recent literature we shall find the results of careful observations, interesting investigations, clear thinking, fine balancing and interpretation of facts. Roberts makes the following statement:- "Four cases of scarlatina proved to be such by experienced physicians in eruptive fevers, occurring in my surgical practice within recent years, have somewhat shaken my belief that scarlet fever in the course of surgical operations is a mere coincidence." A case of very great interest from our point of view was reported by Ffolliott of Peshawar. A private of the Fusiliers at Ali Musjid threw a lighted match on some gunpowder and was severely burned on

left hip and thigh, arms and face. Four days later he had considerable constitutional disturbance and a bright erythematous rash appeared all over his body. The eruption which was typically scarlatinal continued for five days and then subsided; later he desquamated and eventually made a good recovery. The writer adds that in twelve years' service in the Punjab he had never seen nor heard of a case of scarlet fever in native or European. If we admit the case to be genuine scarlet fever then we are forced to accept the casual relationship between the burn and the infection. It is this short incubating phase and the rapidity of onset, which has impressed so many independent workers and led them to regard the relationship of injury and disease as an established fact. Ronaldson goes so far as to speak of "the constancy of a short incubation period" in certain cases of surgical scarlatina. Another significant point noted by Paget many years ago and still true, is that scarlatina does not occur as a rule in patients who have not been subjected to operation or trauma; in other words; but for the injury, they would have escaped scarlet fever.

Accepting the view of those writers that the relationship is one of cause and effect, do we regard the associated condition, true scarlet fever? In reading through cases reported by Roberts, Greenhill, Weaver, Lovett, Jurinac, Günther, Davidovitsch and others, we cannot fail to accept the diagnosis. As a rule clinical details are noted in orderly

sequence; changes in the wound, complication and investigations are frequently mentioned, while due importance is attached to relapses and the transmission of infection.

(II) THE USE OF SPECIAL METHODS IN DIAGNOSIS.

Surgical scarlatina is an exceedingly fruitful field for the employment of bacteriological and serological methods, the direct sequel to the phenomenal work of the Dicks in 1923 and 1924. It is no exaggeration to say that their discoveries inaugurated a new era in the development and study of scarlet fever. The way had been prepared by Löeffler, Dochez and Sherman etc. who had demonstrated the frequency of the haemolytic streptococcus in scarlet fever. In the experimental production of scarlet fever the Dicks used a strain of haemolytic streptococci which came to be known as the streptococcus scarlatinae, differentiated by serological reactions, but recently it has been shown by Mackie and MacLachlan that "no serological distinction can be drawn between scarlatinal and other haemolytic streptococci." Various workers have found the scarlatinal streptococcus not only in the nasopharynx of scarlet fever patients, but also in the uterus and discharges from puerperal cases and from the local injuries of surgical scarlet fever.

Following the isolation of the scarlatinal streptococcus the Dicks prepared a scarlatinal toxin which on injection in to

the skin of individuals susceptible to scarlet fever gave a specific reaction. Generally speaking a positive Dick reaction indicates susceptibility and the condition may be scarlet fever; most workers, however, have failed to get anything near 100% positive reactors in the first 2-3 days of the disease. On the other hand, a negative reaction is more significant, indicating that the rash is not scarlatinal and the individual immune.

And finally there is the Schultz Charlton pnenomenon in which the serum of a convalescent scarlet fever patient produces blanching of the exanthem at the site of injection in the early stages of an acute case. Birkhaug using convalescent serum found 89% positive in a series of 27, during the first 60 hours of the rash, whereas Dochez's serum gave 100% positive results in the first sixty hours. In a recent investigation by Gunn and Griffiths, they found that while a positive reaction justified a diagnosis of scarlet fever a negative reaction was inconclusive. They emphasise the fact that the serum may not be sufficiently specific for the given rash and regard this as responsible for doubtful or negative reactions in the true condition. So therefore the application of the two latter tests with bacteriological investigation of the naso pharynx and local injuries such as wounds and burns, is of paramount importance in surgical scarlatina. Apart from any

mental satisfaction rendered by clearing up a doubtful case, the procedure enables us to bring this condition alongside acknowledged scientific facts.

Roberts suggested the presence of the scarlatinal virus in the wound and to his mind this raised the question of the true etiology of scarlet fever. Like many others before him, he believed the streptococcus was involved in the disease. Greenhill states that haemolytic streptococci were isolated from the infected abdominal wounds in cases 6 and 8. Winter found haemolytic streptococci in the throat of his patient who had had Caesarian section performed: apparently the wound was clean and we infer that the cultures were negative. These investigations are so fragmentary that they lead us nowhere. However the work of Leiner, Ellenbeck and Minkewitsch are exceedingly praiseworthy, especially the latter two and they deserve special attention, Leiner and Ellenbeck have demonstrated the use of the Schultz-Charlton test. The former reports 2 cases of post-operative scarlatina both following abdominal operations, in which the first gave a rather indefinite reaction while the second was markedly positive. He concludes from those two isolated cases that the blanching phenomenon is the only method whereby we can prove that "wound" scarlet is identical with true scarlatina. The investigations of Ellenbeck and much more extensive: in a series of 18 cases of "wound" scarlet, 83% gave a positive

blanching test; in six cases of "burn" scarlet fever, one was positive, one was negative, two were questionable and in the remainder no results were obtained. He emphasises the diagnostic value of positive results.

The "burn" cases yielded very disappointing results which Ellenbeck thought were mainly due to the transient character of the rash.

Minkewitsch has made a most interesting and valuable study of the bacteriology of scarlet fever associated with burns. In 28% of a series of 25 children with "burn" scarlatina, haemolytic streptococci were cultured from the burn blisters and from the throats; by animal experiment he showed that the strain from the burn was more virulent than that from the throat of the same patient. He does not mention the result of his investigations on the remainder of the children. Another point of interest is, that haemolytic streptococci were not isolated from the burns of certain children who did not contract scarlet fever. Minkewitsch's contribution to the study of this aspect of "burn" scarlet fever, lies in two important observations:-

(1) The association of haemolytic streptococci in the burn blisters with the development of scarlet fever.

(2) The presence of haemolytic streptococci both in the burn blister and in the throat.

(III). COMPARISON OF PERSONAL FINDINGS WITH THOSE REPORTED IN THE LITERATURE.

Having reviewed the literature in its various aspect in relation to this subject we come to analyse this series of cases, and thereby illustrate so many of the features already mentioned. The investigations which are regarded as a special feature of this series are incomplete in parts but will furnish some interest by comparison with those just described.

Surgical scarlatina must be regarded as a comparatively uncommon conditionn, except in association with nasopharyngeal operations and even here one would hesitate to describe it as a common occurrence. In this series of 74 cases almost 50% followed ear,nose and throat operations. In Joe's series of 26 cases covering a period of 12 months and taken from the records of one hospital, 19 or almost 89% were associated with nasopharyngeal operations. Lovett's figures at the Durand Hospital were 65% following tonsillectomy out of a total of 20 cases. Ronaldson quotes figures similar to those of Joe. The higher incidence following surgical interference in the nasopharynx is to be expected in view of the fact that here we have the initial lesion in scarlet fever.

If we glance at the corresponding figures following abdominal operations and burns, the comparison is striking. Greenhill writing in 1930 says he can collect,only 32 cases

following abdominal operations in the literature, and probably not all were genuine; for a period of 15 years at the Durand Hospital, Chicago, there were 52 cases of surgical scarlatina, 7% of which followed abdominal surgery. In my own series the figure is 9% of the total, after abdominal operations, extending over a period of almost three years. The occurrence of "burn" scarlet fever appears to vary considerably; generally speaking the true condition is very uncommon. I have been able to observe 13 cases, in three Hospitals, over a number of years. Ellenbeck says he could find only six cases in one large Hospital from 1919-31. Goodall's figures are very high: over a period of four years, at his own Hospital, he found 34% of the surgical scarlet fever cases followed burns. Minkewitsch also reports a high percentage of "burn" scarlet fever but his were compiled during an epidemic of scarlet fever in Moscow.

In view of previous remarks, due significance must be attached to the incubating phase. In the 33 cases following tonsillectomy with one following adenoidectomy, the average incubation period was 1.7 days; in almost 50% of this number, it was 24 hours. These figures compare favourably with those of Ronaldson, who found a regular incubation period of 24 hours in 13 post-tonsillectomy cases: in 11 post-tonsillectomy cases reported by Rolleston the onset was

within the first three days and in 7 of Washbourn's following nasopharyngeal operations it did not exceed 48 hours. In Lovett's 13 cases following nasopharyngeal operations it varied from 2-4 days. In regard to "burn" cases I found the incubation period always within the first five days and sometimes as rapid as 24 hours. In the cases reported by Minkewitsch the onset was usually within 24 hours. Goodall, Ronaldson and Jurinac mention three days as the usual time. The majority of writers therefore agree that in the scarlatina following burns and operations on the nasopharynx the incubating phase is usually short and sometimes within 24 hours.

A longer period and wider variations have been noted in cases following abdominal operations. In two of Greenhill's cases the incubation periods were 20 days and 3 weeks respectively. Weaver apparently believed that if infection took place directly through the wound a longer period might elapse before infection occurred. It is difficult to accept such an explanation. Port, Günther, Floris, and Leiner, all mention 3-4 days in their cases and in my own series it varied from 24 hours to 7 days. Excluding Greenhill's two cases it would be reasonable to conclude that in post-abdominal operation cases the incubation period is normal or slightly delayed.

The presence or absence of angina in surgical scarlatina has been the subject of much controversy. We

noticed the reference to this point in De Bovis's critique. Bergé in his very able treatise on the pathogenie de la scarlatine, ennumerates a series of surgical and puerperal scarlet fever cases in which there was not the slightest involvement of the throat, Paget and other early writers reported absence of angina in cases which we cannot regard as true scarlet fever. Among the references to angina in modern literature we find that it varies from a very mild degree to the well-known moderate condition. Rarely do we find absence of characteristic appearances or severe inflammation. In the variety called "burn" scarlet fever, Günther and Jurinac found moderate angina and Ellenbeck reports the same in one case out of six. Probably Minkewitsch's cases had a mild or moderate degree in all. Schamberg mentions a genuine case in which there was "nothing characteristic in the throat." In the 13 cases of my own series, moderate angina was present in 6 and a mild degree in 7; in no case was angina completely absent.

In the other forms of "wound" scarlatina, e.g. following trauma and surgical operations, there appears to be no uniformity in the appearances found in the throat. Leiner says that sore throat in "wound" scarlatina is usually mild, often showing "only catarrhal appearances." Ellenbeck found severe angina in one of his 28 cases and I expect the others had a mild or moderate degree. Floris, Winter, Greenhill and

Roberts all report moderate angina in their cases. In similar cases in this series I have noted mild or moderate angina in all except one case following a plastic operation, in which the throat was severely inflamed. The tongue presented characteristic appearances in all the cases observed.

Relapses and second attacks are always regarded with a certain amount of suspicion, although both have been observed occasionally. There was only one relapse in this series, although practically all the cases were nursed in scarlet fever wards. The case in question followed circumcision, III(8), and was attended with fatal results. The characteristic scarlatinal syndrome appeared within 24 hours of operation: the course was one of moderate severity, desquamation starting on the tenth day. Complications included cervical adenitis and otitis media; the wound was moderately clean and commencing to heal by the 16th day. On the 18th day the second rash appeared following severe constitutional symptoms; bronchial pneumonia set in and death followed rapidly. The boy was nursed in a scarlet fever ward. Goodall states that in a series of 84 cases of "burn" scarlet fever, diagnosed as such on admission to Hospital and sent to a scarlet fever ward, only one developed scarlet fever subsequently and that case had been diagnosed on some desquamation; no rash was observed.

Jürgensen regarded transmission of infection as one

of the most positive points in the diagnosis of scarlatina. Okell says: "While ordinary scarlet fever has occasionally been recorded as having been propagated from a surgical case this is by no means the rule." I can find little reference to this point in the recent literature, apart from one or two isolated instances. Schamberg reports a case of doubtful "burn" scarlet fever which was isolated and observed. In about four days the nurse contracted a well pronounced attack of scarlet fever. There is one case in my own series which is of unique interest in this respect and in view of this fact repetition of the salient features will be permitted. Case VI.(13) - male of ten years with no previous history of scarlet fever: admitted to a special hospital for operation on both tendo achilles. A few hours after operation he sustained a burn on his right hip with a hot water bottle; two days later he developed a characteristic attack of scarlet fever with moderate angina, typical tongue and punctiform erythema. The course was moderate; started desquamation on the 8th - 9th day; only complication being cervical adenitis; burn healed fairly rapidly. 3-8 days after the onset of scarlet fever in the boy, four other cases developed in the ward. The ward was small and beds placed close to each other. Unfortunately, Dick tests were not performed on any of the children but all were at a susceptible age and none had a previous

history of scarlatina. All were mild cases except one. The remainder of the children were passively immunised. This case must be regarded as an isolated instance and not to be emphasised unduly. Transmission of infection from such cases is distinctly uncommon.

Certain anomalous features of the exanthem such as extreme evanescence and initial development in an unusual situation, have been reported. Ellenbeck found the rash so transient in his cases of "burn" scarlet, that his special investigations were upset. In the 13 cases of "burn" scarlatina included in this series, the exanthemata faded in 2-6 days or in an average period of four days. As for the second feature, I have been unable to observe any of them in the initial stages of the rash; but in Cases V(1) and (2) the history states that the eruptions started at the site of the wounds and I have no doubt this was correct. The same has been noted in some of the "burn" cases and here too it provides interest and significance to be referred to later.

Surgical scarlatina on the whole is a disease which runs a mild or moderate course, severe types being the exception. Practically all the writers already mentioned agree on this point. Joe describes his post-tonsillectomy cases as having "an uneventful convalescence." The only cases which could be described as severe, in my series, were two following tonsillectomy, one following a lacerated wound

of the knee, and the one who had a fatal relapse. Lovett reporting on her 13 cases following nasopharyngeal operations says that most were of a septic type and complications unusually numerous. Those following cleft-palate operations were particularly severe, the wounds sloughing in practically all the cases. Roberts reports a mild type in his three cases following operation for cleft-palate, and in my own case it was of a similar nature.

The bacteriological and serological investigations are regarded as the most important part of this study of surgical scarlatina. A moderate growth of haemolytic streptococci were found in the throats in 100% of the cases following nasopharyngeal and buccal operations: the noses were negative in slightly over 28% of the latter. Out of the eight cases with abdominal wounds six produced either a moderate or profuse growth of haemolytic streptococci, and in two of the latter the throat was also positive. In one case following uterine curettage a profuse growth was found in the throat while only a few were cultured from the cervix and uterus. In the five plastic operation cases, the wounds were positive in four and the throats in two; in the accidental wound cases, seven or 100% were positive while the throats of four of them were also positive. The "burn" cases also provide considerable interest

in showing the specific organism on the surfaces and blebs, in eleven out of thirteen and in seven the throats ~~was~~ were also positive. Special mention must be made of the fact that in a number of the cases, the growth on the surface of the burn was much more profuse than in the throat of the same patient, and also profuse when the throat was negative. Minkewitsch reports a much lower percentage with positive burn blisters and throats, namely, seven out of twenty-five cases; in three other children with large burns, haemolytic streptococci were found on the burns and in the throats and he adds, the cases were Dick positive. Of the thirteen cases of "burn" scarlatina in this series, two had the Dick test applied and both were positive. Okell mentions a case in which the throat was negative while the swabs from the burn produced a copious growth of haemolytic streptococci.

The Schultz-Charlton test was performed on three of the "burn" cases, two of which gave positive results while the third was indefinite. Ellenbeck found one positive out of his six cases.

In eight cases of wound scarlatina (operation and traumatic wounds) six gave positive tests and one was indefinite. In Ellenbeck's eighteen "wound" cases, fifteen showed blanching and three were negative. The test was performed on three of my tonsillectomies and one adenoidectomy case with positive results in all. In regard to the Dick

test I found, out of a total of thirteen cases (four following tonsillectomy; one adenoidectomy, one uterine curettage, two appendicectomies, three following injuries and two following burns) twelve were mild or moderately positive and one doubtful positive; the test was again applied in convalescence and was definitely negative in all. In the majority of the thirteen mentioned the Schultz-Charlton test was positive.

In a number of the cases bacteriological investigations of the throat and wounds were carried out during late convalescence and an appreciable number were found negative. In the following chapter I shall try to link up those investigations with the nature of surgical scarlet fever, which will be found to be essentially the same as that of ordinary scarlatina.

(IV). MODE OF INFECTION AND PATHOGENESIS.

This brings me to consider the mode of infection and pathogenesis in surgical scarlatina. It would appear that the three main considerations are the presence of haemolytic streptococci; susceptibility of the patient to scarlet fever and the operation or trauma. It is unnecessary to dwell on the well recognised fact that scarlatina is a local infection of the nasopharynx with haemolytic streptococci elaborating its specific toxin which is absorbed into the tissues and blood stream and produces the rash and constitutional symptoms. Okell speaks of the "erythrogenic" toxin in scarlatina. Further

we know that the nasopharynx is the natural habitat of the haemolytic streptococcus and that the specific strain known as the streptococcus scarlatinae is frequently found in healthy individuals. Anna Williams in her bacteriological investigations on excised tonsillectomy cases has shown that considerable numbers harbour haemolytic streptococci in the tonsillar fossae and nasopharynx, and some of the strains produced toxic filtrates neutralised by convalescent scarlet fever serum. The question of operation on this mucous membrane raises a number of interesting but difficult problems such as activation of the haemolytic streptococcus, raw surfaces for the absorption of toxin and the lowering of general resistance. It is quite conceivable in Dick positive individuals that the injured mucous membrane would provide an ideal medium for the production of the "erythrogenic" toxin. In this way the operation provides a port of entry for the specific toxin. Another factor to which Zingher attaches importance is the local resistance of the intact mucous membrane, which may be diminished or destroyed by operation or acute infectious process such as colds etc. This immunity inherent in the intact mucous membrane is such that it can protect a Dick positive individual, harbouring the specific organism in his throat or exposed to scarlet infection, from contracting the disease. He is unable to state the nature of this local resistance but adds "that clinical observations are frequent and indicate

that such local resistance exists." Similar observations have certainly been made and one is referred to in the small epidemic propagated from a case of "burn" scarlet fever. (VI.(13)). One of the children in this epidemic had a cold for 2-3 days before developing scarlet fever, and this may have destroyed his local resistance. If such resistance is a property of the mucous membrane of the throat in susceptible individuals, it is reasonable to accept Zingher's explanation.

This, then, may be regarded as the endogenous theory of infection which of course would only apply to the scarlatina following nasopharyngeal, and buccal operations. It is undoubtedly the way in which the majority of cases arise. Washbourn was inclined to this view and supported the same by instancing how frequently the Klebs Löeffler bacillus and pneumococcus are found in the mouths of healthy individuals. "There is no reason why the scarlatina virus should not be present." Joe readily accepts this mechanism of infection. Lovett mentions it among other possibilities.

Still referring to scarlatina following nasopharyngeal surgery, one must mention the possibility of exogenous infection. There are always convalescent and healthy carriers of haemolytic streptococci, who find their way into surgical wards and provide the source of infection. It is not necessary to postulate a case of scarlet fever; all we require is the susceptible individual with an open wound and the carrier of haemolytic

streptococci. An interesting illustration of this mode of infection is furnished by one of the cases in this series, which has been included for the purpose. Case I (14) is a post-tonsillectomy scarlatina: 5 days after his operation, a patient who was obviously a "missed" case of scarlet fever, with history of sore throat three weeks previously and desquamating freely, was placed in the next bed; two days later the patient who had undergone operation (I.(14)) developed a typical attack of scarlet fever. The second case was obviously the infecting source, and I have reckoned the incubation period certainly not more than 48 hours.

At times suspicion may be attached to the personnel of the operating theatre, the sister, the surgeon and his instruments. Otto relates a case in which a surgeon performed tonsillectomy on a child ten weeks after the onset of scarlet fever; after merely dipping the instruments in alcohol he used them on another child, who rapidly developed pyrexia, sore throat, followed by a typical eruption and desquamation. Washbourn, Joe and Lovett mention this possibility. However in the hands of an efficient staff one can almost eliminate this source of infection, although occasionally one finds aseptic laxity in the ear, nose and throat department of a hospital.

These are the modes of infection commonly met with but we have still to consider their special application to "burn"

and "wound" scarlatina. In the nasopharynx and buccal cavity we are in regions where none would dispute the facts but in the "extrabuccal" variety of scarlatina we are entering realms largely unexplored. We are not familiar with studying the toxigenic or "erythrogenic" properties of the haemolytic streptococcus in situations other than the mucous membrane of the throat. The open surface of burns or large wounds as in plastic operations would provide favourable conditions for the activity of the streptococcus, somewhat similar to that in the nasopharynx. We can easily imagine, considerable absorption of the specific toxin taking place on those extensive raw surfaces and giving rise to the typical scarlatinal syndrome. In some cases there is undoubtedly a scarlatinal source of infection as in epidemics, however it seems unnecessary to postulate this. From a study of streptococcal infections one is forced to the conclusion that any haemolytic streptococcus, given favourable conditions will produce scarlet fever in susceptible individuals. In the majority of the "burn" cases examined in this series, a profuse growth of haemolytic streptococci were found on the surfaces of the burns and all the children were of a susceptible age, some of them showing a Dick positive reaction. Minkewitsch in his more extensive investigations has reported similar findings.

In regard to the actual source of infection in burns Minkewitsch believed that it was <u>autogenous</u>, i.e. the children innoculated their burns with haemolytic streptococcic from

their throats and the burn became the locus minoris resistentiae. The suggestion is a valuable one and undoubtedly explains the mechanism of infection in a number of cases. From Minkewitsch's remarks on the toxigenic properties of the haemolytic streptococci in the burn blisters one would almost infer that the virulence of the streptococcus was exalted in its passage from the throat to the burn. If so this would be analagous to the exalted virulence found in animal passage or from one individual to another. This autogenous infection is also found in puerperal fever where conditions inside the uterus compare favourably with those on the surface of burns.

A wider study of the pathogenesis of scarlatina following operations and injuries would suggest that it is unnecessary to assume in every case that the specific streptococcus is present in the wound or that the wound is the actual channel of infection. Among the early writers, Paget, Marsh, de Bovis and others believed that the state of physical depression or lowered resistance following operation favoured the onset of scarlet fever. Thomas says "it really seems as if such persons in consequence of their general condition possessed a greater susceptibility to the disease". Ker also thought that this lowered state of resistance would predispose to infection by the ordinary channels. The problem is really more complex than it would appear. It hangs on the interplay of many factors such as the virulence of the streptococcus,

local resistance of the tissues and the degree of susceptibility to infection. It is quite possible that lowered general resistance produced by trauma might lead to activation of the haemolytic streptococcus present in the throat or render the individual more susceptible to infection from outside sources. The case of Von Leube, the German physician is of more than ordinary interest. He relates how he developed scarlatina following an injury to his finger at a post-mortem examination on a severe case of scarlet fever. Ten days after the injury he had pyrexia, angina, sickness and a scarlet eruption and he ran a course of moderate severity. Von Leube had considered himself immune to the disease as a result of exposure in childhood and subsequent contact with hundreds of cases in Hospital. If we accept the statement as to his antitoxic immunity, we shall doubt the genuineness of the attack; if not, there are two possibilities, namely, infection through ordinary channels with trauma as a predisposing factor and infection by an unusual channel. There appears to be no consensus of opinion on this case.

We have seen in the study of "burn" scarlatina that infection may take place through the injured surface and now we advance the same hypothesis in relation to surgical and traumatic wounds. As before we must postulate infection of the wound from an autogenous or exogenous source. The wound may not appear septic in the sense of exuding pus, because

the specific streptococcus is exhibiting its toxigenic more than its pyogenic properties. The pathogenesis is the same as in a case of "burn" scarlatina, the exanthem starting around the wound, spreading over the body and maintaining its characteristic distribution. A number of writers including Roberts and Weaver have mentioned that the scarlatina virus may enter through a cutaneous wound but few have described the initial development of the rash and the constitutional symptoms. Ker gives an admirable illustration of this mode of onset. A House Surgeon at the Royal Infirmary, Edinburgh, pricked his finger while incising an abscess in the Out-Patients' Department; three days later a bright erythema covered the affected arm and spread over his chest; the inflamed lymphatics could be seen through the rash; his throat was commencing to be painful and he had vomited once. Next day the rash was a generalised punctate erythema; he had sore throat, typical tongue and later desquamated. The case on which the house-surgeon had operated began to desquamate some days later. A parallel case is found in Section V(1) in which the patient was Dick positive on admission, gave a definite blanching reaction; haemolytic streptococci were found in the wound and in the throat: on discharge from Hospital she was Dick negative.

It seems to me that the only ground we have for accepting this mode of infection lies in its close relationship

to the Dick text and the use of prophylactic scarlatina toxin. The intradermal injection produces a local erythematous patch in 4-24 hours, rapidly fades and may leave slight desquamation. This patch may be regarded as a minute part of the exanthem of scarlet fever. By the use of increasing doses of prophylactic toxin we can produce a series of clinical pictures, which more and more resemble the actual disease. If an excessive dose of the toxin, say, one thousand or more times the amount used in the Dick test, is injected into a susceptible individual, a clinical condition appears which bears a close resemblance to scarlet fever, and has been called "the scarlatinal syndrome." O'Brien has described it as "miniature scarlet fever." The syndrome usually comes on rapidly, often in a few hours, with headache, malaise, sickness, pyrexia, rapid pulse, sore throat, furred tongue and a generalised punctate erythema which avoids the face. Circumoral pallor has also been observed. Some writers have reported albuminurea and Toyoda, Moriwaki and Futagi mention a case which desquamated. Here is a true picture of scarlet fever by injection of the scarlatina toxin. If we place the above case V(1) of surgical scarlatina alongside the "scarlatinal syndrome," the similarity is striking. The nature and mechanism of production in both cases are identical. Here then we reach the climax of our

argument for the existence and nature of surgical scarlatina. If the cases reported in this thesis bear similarity of appearance and of nature, to this experimental production of scarlet fever, we may regard surgical scarlatina as brought into line with modern medicine and placed on a correct scientific basis.

V. SUMMARY.

(1) The literature on Surgical Scarlet Fever has been reviewed and criticised.

(2) A case has been made out for the existence of Surgical Scarlatina.

(3) The employment of serological and bacteriological methods are considered essential for the true investigation of this condition.

(4) 74 cases of Surgical Scarlatina have been reported in detail, with clinical, serological, and bacteriological findings, which have been compared with those of early and modern writers.

(5) Clinical features characterising certain varieties of Surgical Scarlatina have been noted.

(a) A short incubation period is frequently found in cases following nasopharyngeal operations.

(b) Angina in Surgical Scarlatina is usually mild or moderate but never absent.

(c) The exanthem may start at the site of the wound, and from thence spread over the body; the characteristic distribution is maintained.

(6) Haemolytic streptococci have been found regularly at the site of operation and injury.

(7) A representative group of cases have been found to show susceptibility to Scarlet Fever by the Dick test, in

the early stages of the disease and immunity in late convalescence.

(8) A similar group have given positive results with the Schultz-Charlton test.

(9) Nature of Surgical Scarlet Fever is essentially the same as that of the ordinary form.

(10) Various modes of infection have been discussed, e.g. endogenous, autogenous and exogenous.

(11) Pathogenesis of Scarlatina in traumatised mucous membranes and cutaneous wounds has been fully discussed.

(12) Surgical Scarlet Fever has been brought into line with modern medicine and placed on a scientific basis in virtue of its relationship to "the scarlatinal syndrome" produced by an excessive dose of prophylactic scarlatina toxin.

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