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The diagnostic and prognostic value of
The initial rashes of Smallpox

by

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THE GROVE.
HOMERTON, E.

Shewly certify that this thesis on the diagnostic and prognostic value of the initial rashes of small-pox signed by me was composed by myself, and that I studied that subject after having received the degrees of M.B. and C.M. at the University of Edinburgh.

Roger M'Nill.

HOMERTON SMALLPOX HOSPITAL

APRIL 23rd, 1851
Memorandum.

Theses for Competition

From the Dean of the Faculty of Medicine.

To Professor J.R. Fraser


Read by Prof. Fraser. 1st July 1871.

Maclagan 4th July

Read by Prof. Fraser. 11th Nov.
The diagnostic and prognostic value of The initial rashes of Smallpox

Until a comparatively recent period little or attention was paid to the initial rashes of smallpox. Most authorities attribute this to the fact these rashes occur with varying frequency in different epidemics. I am however not aware of the existence of any statistics which establish this view. Trousseau I believe started the idea and Simon, Curschman, Ogle and others repeat his statement. If the history and characters of these rashes are studied it may be seen that they are rarely met with in unvaccinated cases, that they are most marked at a time of the disease when a physician is seldom consulted, that they soon disappear, or that their distinctive characters are soon masked by the development of the smallpox eruption, that they frequently occupy regions
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which are rarely examined during the promonitory stage of smallpox and that the patient is frequently not aware of their presence on his body owing to the little or no inconvenience caused by them. These facts are sufficient to explain the reason why medical men paid comparatively little attention to these rashes. If the literature relating to smallpox and its symptoms is examined it will be seen that the initial rashes have been found in varying proportion of the number affected whenever they were looked for. Few however took the trouble of studying their characters minutely. They have therefore been frequently mistaken for the co-existence of measles and scarlet fever with smallpox.

In studying the literature of this sign of smallpox there is difficulty in knowing whether the author means in some cases the efflorescence which precedes but afterwards develops into the papules or what has been at a later period described as the initial rash; a thing which has an existence independent of the eruption of smallpox. Before describing these rashes as I have seen them during some months in the Smallpox Hospitals at Deptford, and Homerton, London, I give the following brief extracts from English
authorities on the subject. These however only serve as proofs of the small value that was until recently attached to them, and also the almost entire absence of mention of those rashes by English writers.

(1) Sydenham in his account of the regular epidemic of 1667-68, and part of 69 states in his description of the discrete and confluent varieties "Variolae dictae mundi erysapeleticis rube, nunc morbillorum crumplunt."

(2) Dr. Walker states that in every bad kind of smallpox the eruption is ushered in by a scaly rash.

(3) Thomas states that the first appearance of the smallpox eruption is frequently preceded or attended by a rosy efflorescence similar to what takes place in measles.

(4) According to Bateman the roseola variolosa occurs previous to the eruption both of the natural and the inoculated smallpox. He is so far as I know the first who described a case of initial rash so minutely as to leave no doubt of its nature.

Dr. R. Milan remarks that it is an universal efflorescence of a dark red colour with violent fever that indicates a confluent eruption and a fatal disease.
(1) opera omnii Syd. Soc. 1846 p. 123

(2) Enquiry into smallpox medical and political 1790 chap. 8

(3) Prakt. of Phy. 1821 p. 239

(4) Synopsis of Skin dis. P. 146-1827
Watson refers to certain rashes like those of scarlet fever, measles, or erysipelas as preceding the characteristic eruption in the confluent variety. Aiken states that the confluent variety is often preceded by an extensive erythema or erysipelatous inflammation. According to Flint of Philadelphia a diffuse redness of the surface which is liable to be confounded with measles precedes the appearance of the papules in the confluent variola. Niemeier thinks that the scarlatinous redness which precedes smallpox is more characteristic of varioloid than variola. Brustowe states that petechial rashes are met with in cases which threaten to be severe. Living states that they are like the rash of scarlet fever and Tullbury Fox puts them under the head of erythema variolosa.

In the seventh edition of Tanner's practice of Med: 1875, p.280 it is stated that in the hemorrhagic smallpox instead of the usual papular eruption there is sometimes a general scarlet efflorescence and in other cases a patchy rash resembling measles minute petechial spots or large purpuric stains on the abdomen and thighs.
1. Pract. of Physio. 1st ed.: p. 857

2. Pract. of Physio. 6th ed.: Vol. 1 p. 1403


5. Pract. of Physio. p. 165. 1876

6. Hbth. of Diag.: p. 39. 1878

7. Skin diseases 3rd Ed.: 1878. p. 80

8. Pract. of Med. 1st ed. 1876 Vol 1 p. 280
Even Marson in his article on smallpox in Reynolds system of Medicine only states that in cases of smallpox after Vaccination a roseate exanthem often precedes the eruption which is liable to be mistaken for Scarlet Fever.

At a later period Osler of Montreal published observations on eleven cases and Dr. Sharkey, Assistant Physician to St. Thomas's Hospital, published observations on 12 cases.

It is apparent from these short extracts that until lately English physicians neglected the study of the characters and varieties of the initial rashes of smallpox. The case was otherwise with Continental physicians.

The characters of the different kinds of rashes have by them been minutely described, the sites occupied by them have in many cases been recorded and their value as a diagnostic and prognostic sign has been carefully considered.

The late Dr. Theodor Simon of Hamburg published observations on 38 cases. Hebra in his skin diseases and Curschman in his Article in Ziemssen encyclopedia give some consideration to these rashes. According to Osler, Dr. Knecht and Scheby Buch published
(1) Clinical Notes on Small Pox
(2) St Thomas's Hospital Reports 1880 Vol 6

(3) Archiv für Dermatol und Syph 1870-71-72
some observations. These I have not been able to examine. In France Trouseau described a few cases in his Clinical Lectures, Rager and other French Physicians have made less important observations.

Bateman states that the roseolar efflorescence antecedent to the smallpox eruption was observed by the earliest Writers on the disease and that both by them and by subsequent writers they were deemed to be Measles which were said to become converted into smallpox.

It is doubtful whether Bateman in this statement meant the initial rashes or the blotches that developed into the papules of smallpox. Further on however he gives the particulars of a case which he attended himself and which was mistaken for the coexistence of diseases before he was consulted. From the description which he gives of this case it was undoubtedly a case of an erythematous initial rash.

Dr. Galloway published another case which in all probability was a case of an initial rash and not the coexistence of measles with smallpox as Dr. Galloway supposed it to be. Another case which was mistaken for scarlet fever co-existing with smallpox was published by Dr. Gleich. Another case was
(2) Traité Théorique et Pratique des Maladies de la Peau Tom 1 P. 147

(3) synopsis of Skin dis: 1827 P. 146

(4) Lancel Aug: 28th 1858

(5) British and Foreign Medical Review 1837 Vol. 4 P. 219
recorded by the late Dr. Murchison which he copied from the Case book of University College Hospital and was treated by Dr. Walsh. This case as well as Illus. 5 which was probably treated by himself are more likely to have been not the co-existence of scarlet fever and smallpox as he supposed but the rash that frequently precedes and accompanies such cases as these undoubtedly were. Dr. Theodore Simon of Hamburg and Osler of Montreal both agree in considering these cases the initial rashes of smallpox. After careful perusal of the original publications in the British Museum I was compelled to come to the same conclusion. There is some satisfaction when one differs from so high an authority as Dr. Murchison to know that although he published these cases as examples of the co-existence of diseases he had some doubt about their nature. Simon and Osler also agree about Murchison's 9th illustration of the co-existence of diseases being initial rash Mason also believed that this was a case of roseola preceding smallpox.

So far as I know there is no record of an undoubted case of initial rash in a patient so young as nine years which was the age of this child. The state
(1) Medical Chirurgical Review July 1859 p. 180 illus. 3.


(3) Archiv für dermat und Syphil 1871

(4) Notes on Smallpox


Lancet Vol. 1845 p. 640
of the tongue the anasarca and oedema that supervened and the fact that another girl in the same house was seized on the twelfth day with scarlet fever all tend to make one regard the case as scarlet fever co-existing with smallpox or at all events make its diagnosis as an initial rash doubtful.

During some months past I have seen many cases of smallpox in whom the ordinary eruption was preceded and accompanied for some time by an initial rash. Each case admitted into the Hospitals had however to be certified as suffering from smallpox before admission. Consequently I have seen but few cases before the ordinary eruption was characteristic of the disease. As the initial rashes sometimes fade on the appearance of the papules and as their characters are at other times destroyed by the development of the ordinary eruption, it is probable that some cases were admitted from whom the initial rash had disappeared and from whom I could get no definite history of its existence. Careful examination of the patients proved this to be a fact. I have frequently on minute inspection made out the remains of a faded rash while its true characters were destroyed. I have also
seen cases from whom the rash had entirely disappeared although the patients assured me of its existence before the development of the papules. I have given the particulars of a few of these cases (30, 33, 35). In order to prevent the error of mistaking an erythematous rash for the blotches that develop into the papules I have only given cases in whom the smallpox eruption was scanty and in whom according to the statement of the patients the initial rash was uniform in colour over the area covered by it. As I did not see the cases during the premonitory stage I have not had the opportunity of watching the development of the rashes during the early period of their existence. The period of the first appearance of these rashes is frequently not known even to the patient. This is particularly the case with the petechial rash owing to its elective site and the want of any inconvenience being caused by it. I have examined each patient particularly on this point because of its value from a diagnostic point of view but frequently the rash was not noticed before the height of its development and in some cases the patient was not aware of its existence until I pointed it out.

My object in studying these rashes was with
the view of finding out their diagnostic and
prognostic value. For that purpose I asked questions
of the patients and the friends who came with
them as to the period of the first appearance
and the relation of that period to the commencing
of the premonitory symptoms and to the outbreak
of the ordinary eruption of smallpox. I also give a
description of the characters of these rashes at
different stages of their existence and of the
simultaneous development of the smallpox eruption
and the state of the case generally, the age, sex
and state of vaccination as well as the ultimate
result were noted.

Authors have classified the initial rashes of
smallpox in various ways according to their
characters. Théssan divided them into Morbilliform
and Haemorrhagic—Scarlatiniform, Simon and Oler
into Macular and Diffuse, Curschman and Slacky
into the Haemorrhagic and the Erythematicous. I will
follow Curschman's classification but I shall include
in the Haemorrhagic the pure petechial rash as well
as the petechial—erythematicous. In the latter I include
cases in whom the petechial rash was on an erythematic
base and cases in whom the petechial rash existed on
one part of the body and erythematicous rash on another.
(1) Clin. Lect.
(2) Archiv. für Derm. und Syph. 1871
(3) Notes on Smallpox
(4) Ziemssen Encyclopa. Art. Smallpox
(5) St. Thomas’ Hosp. Rep. 1880
and others in whom the rash had a deep red
colour with a purplish tinge, was quite diffuse,
partially disappeared on pressure) and in whom
petechiae developed and were seen after the redness
faded. The Petechial and the Petechio-erythematous
rashes would come under Curschman's "Hæmorrhagie"
but cover more ground than the same name as
given by Sharkey. I classify under the erythematous
cases which Hebra, Tellery, Fox and others would
describe under the name of Roseda Variolosa or
Erythma Variolosa as well as cases which are similar
to what has been described as Scarlatinous and  
Scarlatiniform and also some which Trousseau would
call Morbiliform.

According to Oster, Schefer-Buch believes that in most
instances the petechial rashes have an erythematous
base and in Oster's own cases five out of eleven showed
petechiae on an erythematous base. My cases tend to
prove that the pure petechial rashes are the most
common and that the petechial rash on an erythematous
base is less common than the pure erythematous. From
Sharkey's description of his twelve cases it would appear
that this was also the case, six were pure petechial
four were erythematous and two had petechiae on an
erythematous base. This seeming difference in the
Tilbury Fox, Skin Dis. 3rd Ed. p. 80
Niemeyer, Pract. of Med. Vol. 2. p. 554

(2) Clin. Notes
A proportional number of the different kinds of initial rash may to a certain extent be dependent upon the time at which the observer had the opportunity of first seeing the case. In the combined rashes the erythema disappears at an earlier date than the petechiae so that it might be mistaken for a pure petechial rash.

The Haemorrhagic Rashes. Sir William Jenner defines a petechiae as a dusky crimson or purplish spot with defined edges unaffected by pressure and not elevated above the skin. Millian states that when sanguineous spots of purpura are minute they are called petechiae. Murchison describes petechiae as minute purplish spots or subcutaneous ecchymoses which do not disappear on pressure. The individual spots in the petechial and petechio-erythematous rashes are in all probability minute subcutaneous haemorrhages. In the height of their development they are of a dark red brown colour with a purplish hinge. They are persistent on pressure. They are not raised above the level of the skin but their edges are not well defined. The haemorrhagic rashes vary in appearance according to the stage of their development or decay the number of spots composing them and the presence or absence of erythema.
(1) Med. Times and Gaz. 1850 Vol. 20 p. 419

(2) Skin Dis. 3rd ed. p. 387

(3) Cont. Fevers p. 132

(2) Archiv für Dermatol und Syphilis
The period of the premonitory stage at which these rashes appear is variable. This point is difficult to determine as the patient frequently does not notice the rash until it is fading. In Sharkey's third case the rash appeared on the afternoon of the day on which the patient was admitted into the hospital. This was the third day of illness. One smallpox papule appeared on the shoulder the same evening. In his twelfth case the rash was stated to have appeared on the third day of illness and the smallpox eruption on the fourth. In his tenth and eleventh cases the rash made its appearance on the second day of illness and the smallpox eruption on the third and fourth respectively. In Simon's 7th, 8th, and 9th cases the initial rash is stated to have appeared three days before the smallpox eruption and in his 10th case two days before the eruption and three days after the first premonitory symptoms. In his 32nd case the initial rash appeared on the abdomen three days before the smallpox eruption was developed on any part of his body and before he complained of anything except a little headache. In his 33rd case the patient got ill three days before the initial rash appeared on the abdomen and five days before the smallpox eruption was first noticed. Of the cases that Dr. Gayton
of Homerton Smallpox Hospital kindly allowed me to copy from his case books nine were pathological. In cases 36, 37, and 38 the initial rash appeared one day before the smallpox eruption. In case 47 the initial rash was noticed two days previous to the smallpox eruption Dr. Mr. Combré of Deptford kindly gave me the particulars of six cases of this nature. In cases 47 and 50 the rash was noticed the day after the illness began; the smallpox eruption making its appearance one day after the first appearance of the initial rash in case 50 and two days after its appearance in case 47. In case 48 the initial rash was noticed on the third day from the commencement of the illness. The smallpox eruption made its appearance in this case on the following day. In my own cases the initial rash was noticed on the first day of the illness in Cases 18, 26, 27, 4-5-24, 7, 3-7, 11-14-15-27, 4, 11-14-15-27, 5-20, 25.

The initial rash was noticed before the smallpox eruption part of one day in Cases 11, 14, about one day 2-5-7-15-25, two days 14-18-20-24.

(2) Arch. f. Derm. und Syph. 1871 part 1. p. 874
It will be seen from the above that the haemorrhagic rashes without any doubt whatever preceded all appearance of the ordinary smallpox eruption in a large number of cases by some hours to three days and in some cases as in Simons case 82 and in cases 59 and 60 of my own the initial rash may be among the first changes noticed in the premonitory stage.

The characteristics of these rashes on their first appearance are not familiar to me because in most of the cases which I was able to observe the rash was fully developed before it came under my notice. Sharkey states in his third case that on the afternoon of the 8th of June he observed at the groin a slight sprinkling of punctiform bluish petechiae. On the following day he states that the petechial eruption on the lower abdomen had become much more profuse. Simons states that the diffuse rash may begin as isolated spots which run together and become darker or according to the patients description be of a uniform redness from the commencement. According to the report of my informants in my own cases the initial rash was first seen in dark red spots and it extended over a wider area and grew darker in color as time went on. Although the haemorrhagic rash was fully developed in the groin in almost all my
cases before admission I have seen it beginning in the axillae as detached dark red spots about the size of a small pins head and gradually getting more numerous so as ultimately to become confluent. I have also seen petechiae developing on a diffuse uniform redness. The manner in which the rash disappears would suggest the mode of its development as a large number of the spots lose colour and disappear at irregular periods leaving detached darker spots which probably were later in appearing.

The time that the haemorrhagic rashes take in reaching the height of development that is in covering the widest area and attaining their deepest colour is very short as may be seen from cases 2, 5 and 15. These cases were admitted on the day after the rash was noticed and in each it had arrived at the height of development before admission Case 11 was admitted two days after the rash was first noticed. Case 12 three days and Case 25 on the fourth day. In all these the rash was faded considerably before admission.

In the petechial rash the colour of the individual spots is dark brown red. When the spots are thickly set the colour has a tinge of blue or purple. In some cases the coloration unless carefully examined appears uniform but in all cases if inspected minutely the
rash is found to consist of spots irregular in size and shape with ill defined faded borders. The size varies generally from pin's point to a small pin's head. The spots are in almost all cases found to vary in color, the larger size being darker. This may depend on the fact that some spots are developing while others are fading. The color of the petechial rash at the margin of the site occupied by it is generally more faded than elsewhere. Here also the individual spots are more scattered. The rash is quite persistent on pressure. The skin over it is smooth to the touch. As a rule no irritation is caused by it.

The site chosen by this rash is very characteristic. It almost invariably selects the lower part of the abdomen and the groins to an inch or two below Conport's ligaments. More rarely it extends higher on the anterior abdomen and sometimes covers the sides up to the asci and the chest to the nipples. It is only in very exceptional cases that any part of the body is affected by this rash while the groin is free. I have seen this only in one case of pusular hemorrhagic smallpox which proved fatal. Somehow I neglected to obtain further particulars of it. The petechial rash almost invariably ends inferiorly on the inner surface of the thighs, from one to two inches below Conport's
(1) Sri i Des: r. 56
ligament. From that point the lower border runs in front of the thighs upwards outwards and backwards parallel to the ligament to about an inch above the trochanter major and then upwards to about the middle of the crest of the ilium. The posterior and upper borders are not so well defined as scattered spots extend further than the well-marked rash. As a rule this rash does not reach further back than the edge of the latissimus dorsi nor upwards further than the axilla and lower edge of pectoral muscles. It frequently does not extend much higher than the navel. Helbra states that the petechial rash is invariably confined to a space bounded above by an imaginary line at the level of the navel. My experience as my cases will show would lead me to believe that the rash very rarely is bounded by "Helbra's line."

The petechial erythematous rash in the height of development is of a redder colour than the petechial. This redness is dark with a tinge of purple and sometimes it is almost blue in the grains. The petechial erythema covers a wider area than the petechial and the color varies according as the erythema is more or less mixed with the petechial. The skin over the area affected by it is not always smooth. In the
majority of cases however the skin over the site is smooth and entirely covered with rash. The color as a rule is not uniform as minute points are of a darker color. The redness fades but these points are persistent on pressure and sometimes remain after the erythema disappears. Sometimes the redness is quite persistent on pressure and in some cases it completely disappears until the pressure is removed. The sites chosen by the Petechia-erythematous is more complicated than that of the pure petechial rash. The parts on which the petechial are seen in the redness is as a rule similar to those parts affected by the petechial rash. Sometimes however there are no petechiae in the grains while present on the sides of the chest and on the inner surface of the upper arms and in the axilla.

This rash reaches lower down on the thighs and further up on the chest. In several of my cases it surrounded the body entirely leaving the back above the level of the spines of the scapulae free and the buttocks below the level of the trochanters. In one case a strip of rash covered the skin between the buttocks reaching from one ilium ischium to the other and joining the rash on the back with that on the abdomen by attacking the scrotum. On the thighs this rash forms an oblique border running from the inner sushe
upwards outwards and backwards similar to the inferior border of the petechial rash but as a rule it reaches considerably nearer the knee joint and sometimes is lower at the outer surface of the thighs than the trochanters from which it stretches across the back. Sometimes in addition to the rash on the body the forearms and the legs below the knees are covered with a bright red erythematous rash which entirely disappear on pressure (Cases 2, 4, 5, 10, 12, 18)

The duration of the Haemorrhagic rashes vary considerably. They begin to fade one or two days after their first appearance. Sometimes this process is so gradual that when the color gets light brown or coppery no difference can be seen for days. If the spots are thickly set the colouration at this stage might be the natural colour of some persons and can only be detected as abnormal by being compared with healthy skin elsewhere. In the petechio-erythematous rashes the redness disappears often leaving a yellow discolouration of the skin on which faded petechiae may be detected for some days. The petechiae fade gradually into the ordinary colour of the skin. There is no desquamation of the cuticle on the part affected by the haemorrhagic rashes. The duration of the Haemorrhagic rashes from the period they were first noticed has in

my cases been twenty days in Case 1
11 " " " 7
8 " " " 8
7 " " " 11
6 " " " Cases 2.4.18.26
5 " " " 10.15.16.19
14 " " " 5.11.
3 " " " 3.9.12.13

The Erythematous Rashes - Every Author that wrote about the rashes that precede Smallpox seems to have been acquainted with the erythematous. Only a few have described them except by comparing them with scarlet fever erysipelis or Measles. Helvick describes them as occurring in two forms one form being like roseola and the other like erythema. (2) Trousseau describes a form of the erythematous as being like measles and gives it the name of Morbilliform to distinguish it from the Scarlatiniform which in all probability was what I have described as the pectoral rash on an erythematous base or Morison in Reynolds system of Medicine states that they are liable to be mistaken for Scarlet fever but that they are of a lighter roseola tint. This rash was long confounded with the blotches that precede but develope into the ordinary papules but it is a different
phemonenon. It often disappears before the eruption of smallpox is developed. Shuckekey states that this happened in his 19th case. Case 30 who was a very intelligent young man assured me that the red rash totally disappeared some time before the red spots of smallpox showed themselves on any part of his body. It also disappeared before the development of the smallpox eruption in cases 35 and 38. I have only seen 5 cases that showed this rash on admission into the Hospital. This was probably owing to their short duration, and the advanced stage of the disease at which the patients were generally admitted. I have seen several cases in which an erythematous rash was present on one part of the body while mixed with the petechial rash about the groins. I have included these cases in the petechial-erythematous rash already described. The erythematous rash when fully developed is of a bright red colour which disappears momentarily on pressure. The redness is sometimes uniform like crysepolis. In some cases it is minutely mottled like scarlet fever and in other cases in patches and crescents like measles. In all the cases I have seen the rash was smooth to the touch. The redness was however in some cases so bright and contrasted so much with the healthy skin that one might imagine
the red part to be swollen but on careful examination this was found to be an illusion. The period of the premonitory symptoms at which the rash was noted varied in different cases. It was observed on the 2\textsuperscript{nd} day of the illness in Case 33.

8\textsuperscript{th}, 9\textsuperscript{th} Cases 30, 32

14\textsuperscript{th} 34, 35

The eruption of smallpox appeared in these cases on the 3\textsuperscript{rd} day of illness in cases 32, 33.

4\textsuperscript{th} 34

5\textsuperscript{th} 35

6\textsuperscript{th} 35

In case 45 the smallpox eruption appeared about 2 days after the initial rash. In Dr. McComb's erythematous cases the initial rash was observed on the 2\textsuperscript{nd} day of illness in Case 56.

8\textsuperscript{th} Cases 53, 54

14\textsuperscript{th} 58

5\textsuperscript{th} 57

The smallpox eruption was observed in this cases on the 4\textsuperscript{th} day of illness in cases 53 and 58.

The duration of the rash was about one day in cases 30, 33, 35, 54, 57.

About 2 days in Cases 31, 34.

3 53, 32, 58
About 14 days in Cases 29

The erythematous rash remains bright red but for a very short time. It simply fades to light red and disappears without leaving any pigmentation of the skin. The sites chosen by the erythematous rash when any part of the body is affected specially are the extensive surfaces of the arms and legs. In some cases the redness is quite smooth and uniform for some inches round the arms above the wrists and the legs above the ankles although mottled and scanty elsewhere. In other cases it covers the whole body. The rash was confined to the extremities in cases 29, 36, 64, 65, it covered the whole body in cases 30, 82, 35, 53, 57, 34, 145, 56, and 58.

There is no explanation for the fact that the initial rashes of smallpox are present in some cases and not in others. There is no apparent reason why they should be erythematous in some and petechial or petechio-erythematous in others. There is further no satisfactory cause given for the selection by them of particular regions of the body. Simon suggested that the nervous supply might have something to do with it but I do not think that there is sufficient evidence for such a conclusion. There are however certain
facts that may be mentioned. In two cases (2 and 19) there was a ring of petechial rash round one or both legs at the level of the garter. Both patients wore long stockings and garters. In Simon's case 19 there was a ring round the body at the level of the navel. Dr. Layton showed me a case of a girl who had a ring of petechial rash round the upper arms at the insertion of the deltoid muscles. Several of my cases had a ring of rash round the neck at the position of the collar. Sharkey gives a case who had this. The petechial rash selects part of the body which are rarely the seat of smallpox eruption. Some authors fell into the error of fancying that the initial rash always protected the part from being attacked. In the majority of cases of smallpox, there is no eruption of papules in the groins nor for an inch or two below Bonnart's ligament. It is seldom that the abdomen is much affected and often it is quite clear while the eruption is copious elsewhere.

The same may be said of the sides up to the axillae. As I have previously stated these are the regions most frequently affected by the petechial rashes. Why it is that instead of the smallpox papules that should appear in these places a petechial or a petechicerythematosous rash sometimes
developes cannot properly be explained. There is
reason to believe that in a more extended area
the smallpox eruption may assume the character
of a petechial rash. In case one the smallpox
eruption was semi confluent almost over the whole
body but it stopped suddenly at the boundary of the
petechial rash leaving the part covered by it almost
entirely free from papules. In case 19 there was a
ring of confluent papules round one leg and a ring
of petechial rash without papules round the other at
the same level. In several of my cases however the
site of the initial rash was afterwards covered with
confluent smallpox eruption. Of the 58 cases only 7
were unvaccinated (12.14 p. cent) of these 6 had the
petechial rash and 1 was doubtfully petechio-erythematos.
(46) From September 1848 to the 16th of January
1851 I attended 328 cases of smallpox. Of these 296
were vaccinated and 92 unvaccinated (28 percent)
Among them were 28 cases who had an initial
rash. Of these only two were not vaccinated (8 p. cent)
The proportion of unvaccinated was therefore lower
in cases which showed the initial rashes than in
cases free of them. In Simon's 37 cases 30 are stated
to have been vaccinated. It is not stated whether
the others were vaccinated or not so that not more than
1) See page 96
23 per cent could be unvaccinated and probably the proportion was lower. Of Osler's 11 Cases only one (9 per cent) was not vaccinated. Of Sharkey's 12 Cases 10 were vaccinated. It is not stated whether the other two were vaccinated or not so that not more than 16 per cent could be unvaccinated.

Of the 58 cases 31 were females and 27 males.

1 was under 10 years of age.
10 from 10 to 15 years of age.
19 , 15 to 20 ,
12 , 20 to 25 ,
16 , 25 upwards.

The oldest patient was 49 years old, the youngest having an initial rash that I saw was 10 years old. Case 52 one of Mr. Comrie's was 8 years. In Osler's 11 cases the ages ranged from 14 to 29. In Sharkey's 12 cases from 15 to 44. And in Simon's 37 cases from 18 to 53. It thus seems that a case of initial rash under 10 years is extremely rare.

As I have already stated vaccinated cases are more liable to be affected by initial rashes than unvaccinated. Comparatively few vaccinated children are affected with smallpox under ten years of age.

Of 276 vaccinated persons admitted into the Homerton
(1) Ziemssens Encyclopedia Vol. II p. 204
Smallpox Hospital in 1880 only 114 were under 10 years of age. Of 203 cases of unvaccinated persons 115 were under 10 years of age. This might explain the rarity of initial rash under that age.

**Diagnostic value** - The diseases for which the initial rashes of smallpox may be mistaken are numerous. They have been mistaken for Measles and scarlet fever by eminent men. In considering the diagnostic value it is not only necessary to know the history, characters and varieties of the rashes themselves but also of the diseases from which they are to be distinguished. Thoms's states that now and then an initial erythematous rash is met with in scarlet fever that is more or less diffused not entirely transitory and may cover the whole body. At page 207 he states that the rash of scarlet fever sometimes deviates from the general rule that it may be developed on the trunk alone or only on the face and neck and extremities or only a portion of the latter. He also states that the degree of redness may vary from a pale red to a dark scarlet red and that a somewhat bluish redness appears when the respiration is difficult (p. 204). An initial rash has also been seen to precede the eruption of typhus fever like a pink flush, disappearing on pressure and apparently...
(1) Murchison's continued fevers p. 135

(2) fiebert ziem. Jberi. Vol II pp. 316-327

(3) Med. Times 1850. No. 22

(4) Cont. fev. p. 515

(5) Deutsch Archiv fur Klin. Med. 1866

(6) Studien uber F. Reczvens nach Beobachtungen der Epidemie im Jahre 1868 zu Breslaw
due to hyperaemia. The ordinary eruption of typhus fever sometimes appears as early as the third or fourth day and closely resembles measles. Sir William Jenner gives an instance where an initial rash and sore throat existed in a case of typhoid fever. Murchison states that in cases of enteric fever the appearance of lenticular spots is sometimes preceded for two or three days by a delicate scarlet rash all over the body disappearing on pressure. Dr. W. Combe of Deptford Fever Hospital informed me that he saw one case which presented a similar rash. Beaumé mentions the existence of a similar rash in enteric fever. In relapsing fever a large number of authorities testify to the existence of an initial rash. Nyss and Bock noticed an initial rash in an epidemic of this fever at Kreslau in 1868. Dr. Claude Mainhead published two cases in the Edinburgh Medical Journal July 1870, one a doubtful case of relapsing fever with rose colored spots over the abdomen and back rather larger than those usually observed in typhoid fever, the other, an undoubted case of relapsing fever in which appeared on the fourth day a profusely copious rash over the whole body, it was of a rosy red distinctly papular, faded on pressure and was
(1) Oster's notes on S.T. p. 12
elevated considerably above the surface. It lasted for three days. There was no desquamation or pigmentation.

Dr. Tennent published 24 cases in the Glasgow Medical Journal May 1871. In most cases he states the rash was observed either on the 3rd day or a day before the crisis. Sometimes the rash assumed a uniform erythematous appearance which gradually faded into isolated spots. In two cases it was exactly like measles but differed in distribution - the neighbourhood of the joints being more affected. In some the rash was wholly on the trunk. In others on the arms and legs and in others general. Some had subsequent desquamation.

Scheuly Buch states that he met with simple erythematous rashes in the initial stages of tonsilitis, typhoid fever and measles presenting the same distribution and differing from those of smallpox in intensity and extent. I have seen on several occasions in cases of tonsilitis a rash which I was not able to distinguish from the light-colored erythematous initial rash of smallpox. In the British and Foreign Medical Review 1857 p. 35 there is a description of an epidemic of fever in Silesia which showed those rashes. They generally appeared on the 2nd day according to "Dumber" or on the 3rd "Trushis"
or from the 3rd to the 6th "Barenprung". It commenced on the flanks and then spread to the body and limbs. It was spotted with darker centres than borders rosy or pale red not dark and effaceable by pressure. Its duration was two or three days. It was followed by desquamation. The points that should be considered in the diagnosis of an initial rash are

**Firstly. The age of the patient.** Persons under 10 are only on rare occasions, if ever, affected with these rashes. There is no case as far as I know on record of an initial rash in a person under that age except case 52. The rarity of its occurrence under that age will exclude a large number of cases of scarlet fever measles and other rashes frequently met with in children.

**Secondly. Vaccination.** Initial rashes are more common in vaccinated than in unvaccinated persons.

**Thirdly. The site and appearance of the rash.** This I have previously described. I do not believe there should be any difficulty in distinguishing between the petechial rash of smallpox and the rash of scarlet fever.
(1) Ziemiel Encyclop. Vol. II p.p. 204-207
or measles. Its purple brown red colour, the spots which compose it, the site which it occupies; the well defined regular oblique border which it almost invariably possesses below Poupart's ligament should distinguish it from these rashes even when the scarlet fever rash possesses the unusual character which Thomas describes. The petechio-erythematous rash selects the same site above and below Poupart's ligament and ends in a similar border inferiorly although not so well defined. The superior border is not so characteristic as that of the petechial rash; but even, the upper border is generally such as has not been described in any other rash. This was particularly well marked in cases 2 and 7 and less marked in others. The darker colour of the rash about the groin, the sides of the chest, the axillae and inner surface of the upper arms is also characteristic of this rash. In some cases the forearms and legs below the knees are covered with a bright scarlet rash. On these parts it is generally uniform for some inches above the wrists and ankles. It is only
in exceptional cases of scarlet fever that one might fall into an error. Looking upon the appearance of the pure erythematous rashes only, in some cases it might be impossible to distinguish between them and some cases of scarlet fever and measles. It was this rash that Harison referred to as I have already stated as being like the rash of scarlet fever but to be distinguished from it by its lighter colour.

Fourthly—Circumstances to be taken into account in the diagnosis of other acute diseases such as (a) the nature of the accompanying symptoms (b) previous attack of the suspected disease (c) the existence at the time of an epidemic of any disease. These I need not enlarge upon.

The diagnosis of the initial rashes of smallpox from the initial rashes of other diseases is not difficult in the case of the petechial and the petechio-erythematous rashes but I am not able to state the difference between the erythematous rash which precedes smallpox and the scarlet rash stated by Sir William Jenner, Murchison and others to
(1) Watson Prac'. of Physic 1st ed. p. 858
(2) Flints Prac'. of Med. 3rd ed. p. 893
(3) Sibbings Holbk of cliag. 1878 p. 39

(4) Nimeyer's text book Vol. II p. 554
(5) Oster's Clin. Notes p. 18

(6) Bristowe Prac'. of Med. 1876 p. 165


precede typhoid fever. From the description given by Dr. Claude Muirhead and Tennent of the initial rashes of relapsing fever I do not think that there is much danger of confounding them with those of smallpox if circumstances are well weighed.

**Prognostic value.** Authors vary in their opinion regarding the kind of smallpox that is likely to follow an initial rash. Watson, Flint, and Lieving consider an initial rash an unfavorable symptom likely to be followed by a confluent attack.

Neimeyer, Oster, and Scheby Buch consider them as favourable symptoms. Knecht thinks that they are favourable below but serious above 30 years of age.

Bristowe and Curschman think the erythematous (Curschman) or scarlatiniform (Bristowe) more common in modified smallpox and the petechial as preceding cases which threaten to be severe.

Hebra states that cases having this rash on the abdomen more often terminate badly than in recovery and particularly when the affection passes beyond mere hyperaemia and becomes a hemorrhagic.

Trousseau believed that the hemorrhagic...

(2) Archiv für Dermat und Syph

(3) See page 96)
scarlatiniform (probably petechio-erythematous) is an alarming symptom in natural smallpox but not unfavorable in the modified variety.

(1) Shackley states that the more dusky or purple the tint of an initial general erythema the more unfavorable is the case likely to be.

(2) Simon considered the initial rashes of no or prognostic value.

Of my 58 cases 31 were petechial, 12 had petechial on an erythematous base and 15 were erythematous.

Of the 31 petechial 10 (32.2 p.c.) had discrete varicela, they were all vaccinated and they all recovered except one (case 448), 13 (41.9 p.c.) had semi confluent varicela, 10 of these were vaccinated and 3 unvaccinated, they all recovered.

7 had confluent varicela and one had hemorrhagic (25.8 p.c.) 4 of the confluent were vaccinated and 3 not vaccinated, 4 of them died, 3 were vaccinated and 1 not vaccinated. The one hemorrhagic case was vaccinated and proved fatal.

Of the 12 petechio-erythematous cases 11 of (33.3 p.c.) had discrete varicela were vaccinated and recovered; 2 (16.6 p.c.) had semi confluent
variola were vaccinated and recovered; 14 had confluent and 2 haemorrhagic variola (50 p.c.).
The 4 confluent cases were all vaccinated and they all died. The 2 haemorrhagic cases also died; 1 of them was vaccinated and the other not.

Of the 15 erythematous cases 14 (93.3 p.c.) had discrete and 1 (6.6 p.c.) had confluent variola. They were all vaccinated and they all recovered.

Thus in the petechial rashes 19.3 per cent proved fatal; in the petechio-erythematous 50 percent and in the pure erythematous none.

Of the confluent smallpox following the petechial rash more than the half died. Of the confluent following the petechio-erythematous all died.
The single confluent case that followed the erythematous rash recovered.

During the year 1880, 813 cases of smallpox were treated at the Homerton Smallpox Hospital. Of these 573 (70.4 p.c.) were discrete, of whom 1 died (0.8 p.c.)

127 (15.6 p.c.) semi confluent 27 (16.1 p.c.)
93 (11.4 p.c.) confluent 70 (7.5 p.c.)
20 (2.4 p.c.) haemorrhagic 20 (10.0 p.c.)
The percentage of discrete cases following the petechial rash was 32.2. Of all the cases admitted 70-14 per cent were discrete. Discrete cases were therefore about half as frequent in cases affected by the petechial rash as in all the cases admitted. The percentage of semi-confluent cases after the petechial rash was 14.1-9 while of all the cases admitted 15.6 per cent were semi-confluent, so that semi-confluent smallpox was more than twice as frequent in cases affected with the petechial rash. The percentage of petechial rash having confluent or hemorrhagic smallpox was 25.8 while of all the cases admitted only 13.7 were confluent or hemorrhagic, so that confluent and hemorrhagic smallpox was about twice as frequent after the petechial rash. It might be shown in the same manner that discrete cases are about half as frequent after the petechial erythematous rash as they are in general cases and that confluent and hemorrhagic smallpox are about three times more frequent than they are in general cases. In the erythematous rash the percentage of slight cases is considerably higher and of severe cases considerably lower than in
general cases of smallpox. The death rate in
the petechial rash is a little above the general
death rate while in the petechio-erythematous it
is about three times higher, and in the pure
erythematous much lower than the general rate.
The death rate of the confluent cases which
followed the petechial rash is lower than the
general confluent death rate, but that of the
confluent cases which followed petechio-erythematous
is much above the general confluent death rate.
The conclusion therefore that may be fairly drawn
is that.

1st If a case has a pure erythematous initial rash
it is more likely to have a slight attack and
to recover than a case of any other initial
rash or a case without any rash at all
2ndly If the rash is petechial the case is about
twice as likely to have a confluent or semi-
confluent attack but the ultimate result is
likely to be about as favourable as in general
cases.
3rdly If the rash is petechio-erythematous the
case is about three times more likely to
be severe as in general cases and the
termination is more likely to be unfavourable.
I have also the impression that in cases having this rash, the darker the redness and the more persistent it is on pressure, the more likely it is the case to be severe. But if a petechial (pure) rash is on one part of the body, such as the abdomen, and a pure erythematous rash on another such as the arms, the prognosis is more favourable.

Regarding the petechial rashes, I am under the impression, that the nearer the petechial spots go to the characters of true petechia, the more severe is the case likely to be. In the erythematous rashes, the lighter the redness, the easier it disappears on pressure, and the shorter the duration, the milder the case. In forming an opinion, other circumstances besides the characters of the initial rash must be considered and weighed. As Sydenham says, “we should not go by external appearances only.”

Roger M’Neill
All the cases that I observed from September the 13th to December the 18th, 1880, were at the Smallpox Hospital at Deptford. The other cases were treated at the Homerton Smallpox Hospital.

I have classified the quality of the vaccination marks according to the method adopted by the Medical Officers of the Smallpox Hospitals of the Metropolitan Asylum District Board.

A good vaccination mark – a mark well dotted or radiated, depressed, and with a well defined edge.

An imperfect vaccination mark – a mark which is smooth, not dotted nor radiated, but little or depressed and with an ill defined edge.
Case I

Louis Yoele, aged 30, not vaccinated, was admitted on Nov. 20th 1880 with confluent varicella. Nov. 18th, suffered from rashness, and had pain in limbs and back.

17th. Noticed some papules on face.

On admission on the 20th, a dark red spotted rash covered the abdomen and chest. It was bound below by a line on the thighs, running from a point on the inner surface about two inches below Poupart’s ligaments, upwards, outwards, and backwards parallel to the ligament, to about the middle of the iliac crest. Laterally, it was bound by the edge of the latissimus dorsi to the axillae, and by a vertical line from the clavicles to the anterior folds of the axillae. It covered the front of the neck for about an inch above the manubrium sterni. From the upper corners of this patch, a narrow strip went round the neck and met at the back so as to form a complete collar.

The rash consisted of dark brown red spots, varying in size from punk punt to a moderate-sized punk head. It was persistent on pressure and covered the skin so thickly as almost to be a diffuse
discoloration. On minute inspection, however, the color was found to be lighter in some places than others. The rash was thicker and darker about the groins than elsewhere. The skin covered by it was quite smooth. The spots were not perceptibly raised above the surface.

The smallpox papules were somewhat confluent on the face, and about the shoulders, thighs, and back. There were 12 small papules on the site of the rash excepting the strip at the back of the neck which was affected with the smallpox eruption like the rest of the back. The eruption of papules stopped suddenly at the margin of the initial rash although extensive in its immediate vicinity. This was particularly well marked in front of the shoulders and thighs.

Nov 23rd: Initial rash fading but seems darker about the groins.

Dec 1st: Initial rash coppery colored but the individual spots still well marked.

The rash faded gradually but the skin was moist all over the site occupied by it when the Patient was discharged on Dec 9th. The case was mild. The highest temperature after admission was 103.8 on the 20th. On the 24th it was normal.
Case II

Albert Humphrey, Aged 36, having two imperfect vaccination marks, was admitted on Dec. 1880 with confluent varicella.

Dec. 4th—In evening suffered from pain in his brawls.

5th—Pain still severe; sickness.

6th—Severe pain in back. In afternoon a dark red rash appeared below navel. Felt much irritation of skin over lower abdomen before the rash appeared.

7th—In morning noticed red papules on face and arms.

On admission on the 7th a dark brown red rash covered the body all round, leaving the head, part of the back, and part of the arms and legs, quite free. This rash was bound above by a line round the neck at the level of a point about two inches above the sternum. At the back of the neck two circular patches covered the skin from this line as far down as the superior angle of the scapulae. The border of these patches extended from the back of the neck to the angles of the scapulae and then turned outwards, then upwards & forwards to a little in front of the acromion processes. From these points...
the border continued downwards on the anterior surface of the upper arms to within three inches of the elbow joints, when it curved across the internal surface backwards to the posterior surface, along which it continued upwards to the back of the acromion processes. A patch was thus formed on the upper part of the inner surface of both upper arms. From the back of the acromion processes, the margin of the rash curved downwards to a little above the posterior axillary folds, then went straight across the back. The arms were therefore free of rash except the patch already described. A patch of the back was also free of rash, above the level of the posterior axillary folds, below the shoulder patches already described. Inferiorly the rash reached on the back as far down as a point about two inches above the level of the trochanters majors. From that point it slanted in an irregular border downwards and outwards to about an inch below the trochanters, and then downwards forwards and inwards to a point on the inner surface of the thighs about three inches above the knee joints. It ended in scattered borders on the inner surface of both thighs. There was a band of rash of the same nature about two inches broad round both legs a little below the knees. The man
were long stockings and garters.

In the groin the rash was dark blue uniform in color. Over the abdomen, thighs, sides, axillae, inner surface of upper arms, and back, it was dark brown red with a purplish tinge, mixed with minute patches of yellowish color. The redness faded perceptibly on pressure. On the chest and abdomen as far down as the navel the skin felt rough owing to the dark spots being on a higher level. The rash was smooth over the lower part of the abdomen, sides, axillae, thighs & back.

The smallpox eruption was conspicuous on the face which was bright red in color & had a brownish feel. Numerous papules had already developed on the chin. The papules felt stony although causing little redness on those parts of the body and extremities which were not covered with the initial rash.

Dec'd rash on the chest and abdomen above the navel of a lighter red color than elsewhere. Over this area the skin felt hard, granular, & brownish. The initial rash over the remainder of the site occupied by it was faded, and formed of brown spots varying in size with intervening yellowish colored spaces. The skin was also
smooth and devoid of papules except about the hips and loins where it felt hard and granular. A number of three penny piece sized haemorrhage into the skin round the legs at the level of the garters. The smallpox eruption on the face still flat and ill developed, skin hard and granular. The papules varied in size, shape and development: confluent, semi-confluent and flat over the arms and legs. Tongue thickly coated with a whitish coating. Delicious temp. 100.4° F.

Dec. 16th Over the front of the chest and the abdomen as far down as the Navel, the smallpox papules were confluent, flat, and of a duty white color. There were a number of blue haemorrhages into the skin on the chest, some of them of the size of a silver three penny piece. The initial rash was faded over the rest of the site, the dark spots turning coppery in color. The dark redness had faded into a yellowish discoloration or pigmentation persistent on pressure. On the face the smallpox eruption was scarcely any further developed. Numerous haemorrhages had taken place beneath the eruption on the forehead. Delicious, tremulous, temp. 100.4.
Dec. 11th. Initial rash about the same. Numerous small haemorrhages into the skin over the lower extremities, violently delirious; could swallow with difficulty. Temp. 100°. F.


Case III

Henry Hutton, aged 22, having no vaccination marks, was admitted on Dec. 12th, 1850 with confluent varicella.

Dec. 8th. At night had pains all over, sickness.
9th. Sickness continued, pain severe in back & limbs.
10th. Noticed red spots about the wrists.
11th. Red papules appeared on face.

On admission on the 12th, a dark brown red rash with a purplish tinge, quite smooth, and persistent on pressure, covered the skin over the lower part of the abdomen and groin. Superiorly, it extended in the middle line, in front, to about an inch above the navel. From that point it descended on both sides by an irregular curved border, to the anterior superior iliac spines. Inferiorly, it ended in an oblique border on the thighs about an inch and a half below...
The border extended from the inner surface of the thighs to about the middle of the iliac crest. Above the crest the skin was clear. The rash consisted of dark brown red spots almost confluent from the navel to the pubis and about Donpart's ligaments. It was discrete along the superior border. There was no erythematous redness. The skin was of its natural color between the discrete and semi-confluent spots. From the upper border of the rash to the ribs, spots of the same nature were scattered here and there. The smallpox eruption was copious. The face was red and covered with numerous papules slightly raised above the surface, and pretty regular in shape, size, and development. Semi-confluent on the arms and legs. There were no papules on the site of the initial rash. A few papules were scattered between the upper border of the rash and the ribs. The papular eruption was discrete on the chest and back.

Dec 13. Initial rash faded. Of light brown color. No papules on the site covered by it. Face red but vesicles developed into bright yellow dryish looking pusules. Sore throat, tongue dry and brown. No delirium temp. 101.2 F.
Dec. 14th Initial rash coppery colored, so faded below
Penpar's ligaments that the skin only appeared
dusky unless minutely examined, when the spots
could be detected. One papule on site of rash
below Penpar's ligaments although smallpox
eruption confluent immediately below. One
large papule on the abdomen below the
navel, and six papules on the site above the
navels. Throat better, tongue moister and cleaner,
delirious during the night, but quiet during the
day. Temp: 99 F.

As I had to leave Deptford I could not watch this case
longer. The Patient recovered.

**Case IV**

Alfred Thurston, aged 18, having three good
vaccination marks, was admitted on Dec 3rd 1800
with discreet varicela.

He was out of sorts for some time before admission
Nov. 29th had shivering and headache.

30. In same state. Noticed a red rash on
abdomen.

Dec. 1st Sickness and vomiting.

2nd In morning noticed red papules on face.
ON admission on the 2nd a petechial rash covered the lower abdomen and groin, and an erythematous rash the chest. On the lower abdomen and about the groin, the rash was smooth, moist, persistent on pressure. On the chest, it was bright red, mottled, smooth, and disappeared momentarily on pressure. The petechial rash was bound inferiorly by a line parallel to and about two inches below Porta's ligaments running from the inner surface of the thighs upwards and outwards to about the mid-iliac crest. From the iliac crest the rash was bound by the latissimus dorsi to the axillae and superiorly by the clavicles.

Dec 6th. Rash gone.
The case was mild and recovered.

**Case V**

Emma Russell, aged 32, vaccinated, was admitted on Dec 4th 1850 with discrete varicella.

Dec 2nd. Suffered from sickness headache and dullness.
3rd. Sickness and headache still severe. In the evening noticed a red rash on the fore arms.
4th. Smallpox first seen on the face.

ON admission on the 4th a diffuse bright red rash —
smooth and disappearing on pressure covered the forearms from the elbows to the tips of the fingers. The rash was uniform on the back of the hands, around the arms for about three inches above the wrists, but above that it was mottled with healthy colored skin. It was continuous over the declanion and extensor surface of the arms to the shoulder joint. A similar rash covered the chest, but in blotches. From the axilla to the iliac crest there was a strip of petechial rash spotted of a dull brown red color, and persistent on pressure. A petechial rash on an erythematous base covered the lower part of the abdomen & the groins to about two inches below the pubic ligaments, the inferior border running upwards and outwards from the inner surface of the thighs to about the middle of the iliac crest. The erythematous redness faded, but dull brown red spots remained persistent on pressure over the patellae there were patches of bright red uniform rash which disappeared on pressure. A similar rash existed on the dorsi of the feet & round the legs to about halfway up to the knees. Above that to the knees it was in patches similar to the chest. The smallpox papules were moderately conspicuous but discrete, umbilicated & regular in size shape and development on the face. There were no papules seen
not felt on the legs and but a few on the forearms.

Dec. 5th Initial rash gone entirely from the arms; a few papules on the site. Also gone from the knees leaving no papules on the site. Faded on the legs below the knees; a few papules developing on the site. The petechial rash on the sides in about the same state. The pyknomatous redness gone entirely from the lower abdomen and grains but left a coppery colored spotted rash smooth and persistent on pressure. No papules on the abdomen smallpox eruption vesicular on the face.

Dec. 6th Petechial rash much faded on the sides — abdomen and grains, Erysema gone from legs.

Dec. 7th Rash all faded. Eruption punctular. The case was mild and recovered.

Case VI

Robert Graffin aged 23, having four vaccination marks was admitted on the 24th of November 1880 with confluent varicella. The smallpox papules were first noticed on the 23rd. On admission a faded yellowish grey eruption —
closed rash was found in the groin reaching to a little above and below Poupart's ligament. The inferior border turned up to the anterior superior iliac spine. The rash was quite smooth to the touch & persistent on pressure.

The smallpox eruption was confluent on the face & cosy over all the body except that occupied by the initial rash where only a few papules were seen. The Patient was restless, delirious, tongue dry temp. 100.7
Nov. 23rd Initial rash more faded. Eruption vesicular still delirious temp. 101.2 A.M. 102.3 P.M.

28. Initial rash gone. Eruption pustular on the face complained much of sore throat. Slept badly delirious, had difficulty in swallowing temp. 104.4 A.M. 102.4 P.M.

After a very severe attack the Patient died on the 10th of December.

Case VII

Joseph Winch aged 26. having three good vaccination marks was admitted on Nov. 30th 1880 with semi-confluent vesicles.
Nov. 27th suffered from headache
28th Sickness and vomiting
Nov. 29th. A red rash appeared on his body which "tinged" all over.

30th. Noticed red spots on his face in the morning.

On admission on the evening of the 30th a red rash smooth and disappearing momentarily on pressure covered the body. Superiorly it reached as high as the chin and was bounded by the inferior maxilla from that point to the ears and by a line drawn from the level of the ears with a slight convexity backwards to a point about an inch in front of the acromion processes and down the front of the arms to the elbow joints. On the back it reached as high as the spines of the scapulae and was bounded superiorly by a well-defined border at that level. This border extended outwards to the back of the acromion processes and down the posterior surface of the upper arms to the elbow joints where it joined the anterior border already described. The inner surfaces of the upper arms were therefore covered with rash as far down as the elbow joints. Posteriorly and laterally the rash covered the body as low as the ischion. From these points the lower border slanted downwards forwards towards across the front of the thighs to the inner surface at a point about three inches above the knee joints. On the
inner surface of both thighs the rash ended in a scattered border. A band of rash extended from the lower border at the back to the front by attacking the scrotum, perineum & skin between the nates from one tuber ischium to the other. Although the scrotum was affected the pubis was quite clear. The parts not covered with rash were therefore the legs below the trochanters and oblique border already described the arms except the internal surface of the upper arms, the head and back of the neck and shoulders as low as the spines of the scapulae and the pubis.

All over the described area the rash was of a red color not so bright as scarlet fever rash generally is. It disappeared readily on pressure except on the inner surface of the upper arms and about the axillary folds where a few petechial spots remained persistent. The skin over the site was quite smooth. The redness was quite uniform without any mottling. The small firm papules were small and semi-confluent on the face. Only a few scattered papules on these parts of the body not covered with initial rash. No papules on the site of the rash temp 103°F.

Port. Initial rash on the chest fainter and mottled with healthy skin. The rash over the rest of the site the same as on the previous day except that petechial.
spills had appeared in the arms and more on the inner surface of the upper arms. This was best seen by pressing the skin when the redness faded but the petechia remained persistent. On the back the redness had a tinge of purplish pressure caused the redness to disappear but a yellowish discoloration remained. No papules on the site of the initial rash although they were developing in large numbers elsewhere. The blisters caused by the development of the papules destroyed the well marked boundary which the initial rash had on the previous day. The initial rash could however be distinguished from the blisters by its darker color.

Day 2. The initial rash had faded on the chest arms and neck. On the inner surface of the upper arms greyish yellow spots persistent on pressure were left on the site. On the neck and chest the redness was simply faded and disappeared entirely on pressure. Over the scapulae and lips the redness had faded leaving a yellowish pigmentation. On the remainder of the back the sides and the abdomen the rash was dark red with a purplish tinge and only faded perceptibly on pressure.

The smallpox eruption was progressing favorably.
There were three small papules about the ensiform cartilage. There were no papules on the site of the rash elsewhere. Tongue coated thirat sore, thirsty, slept badly, very restless - temp. 104.4 a.m.

Dec 3. Initial rash much fainter over the whole site. It was gone entirely from the neck and chest on the back a number of small sized papules were developing on the site of the rash. There were no papules in front of the edges of the latissimus dorsi muscles except the three papules noticed at the ensiform cartilage on the previous day. About the hips and on the lower part of the back the redness was gone entirely but there was a yellow discoloration or pigmentation of the skin over the area that was covered by it. temp. 102.

Dec 5. Initial rash paler on the abdomen redness had gone entirely from the back but left a yellow pigmentation of the skin. The smallpox eruption was pustular on the face. temp. 100.

Dec 8. The greyish spots on the inner surface of both upper arms and the yellow discoloration on the back about the hips were the only remains left of the initial rash. The pustules were drying on the face
Dec. 10: The yellow discoloration and grayish spots could not be detected. The patient rapidly recovered.

**Case VIII**

Anne Smith, aged 21, having three good vaccination marks, was admitted Dec. 15th, 1880, with semi-confluent variola.

Dec. 11: Suffered from pain in the back.


On admission on the 15th, a petechial rash was found on the abdomen and groin. It extended from the level of the navel to about an inch and a half below the pubic symphysis. The lower border extended from the inner surface of the thighs to about the middle of the iliac crest, where the rash ended laterally. Detached spots of the same rash were scattered above the superior border for an inch or two. The rash was a pretty red-pink color above but coppery below the pubic symphysis. The color was persistent on pressure. The skin was smooth to the touch. The skin between the spots was of its normal color.

The small pox eruption was semi-confluent in the face but discrete elsewhere. There were six abortive papules.
along the upper border of the initial rash but none on the site of the rash.

Dec. 19<sup>th</sup>. Initial rash lighter in color.

24<sup>th</sup>. The larger sized spots still present but of a light coppery color.

26<sup>th</sup>. The rash could not be detected.

The case was mild and made a rapid recovery.

**Case IX**

Henry Wiseman aged 18 vaccinated was admitted on Dec. 7<sup>th</sup> 1880 with Discrete Varicels.

5. Had headache and sickness.

7<sup>th</sup>. Noticed smallpox papules in the afternoon. On admission on the evening of the 7<sup>th</sup> a spotted rash covered the abdomen, chest and groin from the nipples about an inch below the pubis to ligaments. It extended laterally from one mid axillary line to the other. It was made up of spots of a dirty greyish color which was persistent on pressure. The spots varied in size from a pin's point to a middle sized pin's head. The skin over the site was quite smooth. The smallpox eruption was moderately copious on the face but discrete and of good color. There were a number of abortive papules on the site of the initial rash.
The initial rash was gone. The case was mild and recovered.

**Case X**

William Fogarty aged 15, having three imperfect vaccination marks was admitted on the 21st of Nov. 1850 with confluent varicella. Nov. 15. Suffered from pain in the back, sickness and vomiting.

21. Noticed red papules on the face and arms. On admission, on the 21st a bright red uniform rash covered the extensor surface of the forearms and the back of the hands and fingers. A petechial rash was found on the lower part of the abdomen and groin extending from the navel to about two inches below the parts ligaments. The lower border extended from the inner surface of the thighs to about the middle of the iliac crest. Detached spots of the rash were scattered over the chest and sides to the axillae. In the axillae it formed a confluent patch on the chest and inner surface of the upper arms. The rash consisted of spots varying in size from small pustules to a moderate sized pus head, the larger sized being fewer in number and darker in...
color. On the lower part of the abdomen the spots were so thickly set as almost to form a diffuse dark purplish discoloration. The redness on the arms disappeared momentarily on pressure but on the abdomen the color was quite persistent. The skin over the rash was smooth except the roughness caused by the papules which were developing.

The smallpox eruption was confluent on the face and thighs. About twelve small papules on the chest and two on the abdomen. Delirious, tongue coated and dry temperature 103.4.

Nov. 22. Initial rash still bright red on the arms and hands. Smallpox eruption semi-confluent on the arms except on the extensor surface where the papules were discrete. No change in the rash over the abdomen and axillae. The smallpox eruption and the general condition about the same state as on the previous day. Did not sleep any. It was violently delirious temp. 104.

23. Initial rash had disappeared from the arms on the abdomen and in the axillae it was of a light grey color.

24. Initial rash more faded. The smallpox eruption progressing slowly. Flat and pasty on the face tongue dry tremulous slept for one hour was
Emma Ryder, aged 10 having three good vaccination marks was admitted on Nov. 24th, 1880 with discrete varicella.

Nov. 15th suffered from headache and sickness.

19. In the morning noticed a red rash on the abdomen. There was no rash on any other part of her body until the evening when the red papules appeared on her face.

On admission on the 21st a faded petechial rash made up of spots varying in color from brown to coppery and in size from a pin's point to a pin's head was found on the abdomen and part of the chest. It extended from the nipples to the parts ligaments but was most marked a little above and internal to the anterior superior iliac spines.

On the 22nd there were only a few scattered coppery-colored spots to be seen on the site of the initial rash. On the 23rd these spots could not be detected. There were fine papules on the site of the rashes. There were no papules on the space below flaps. Ligaments usually covered by
the initial rash. In this case however there was no initial rash below Dupuytren’s ligaments. The case was mild and recovered.

Case XII

Harriet Hunter, aged 19, having two imperfect vaccination marks was admitted on October 9th 1850 with semi-confluent varicella.

Oct 4th commencement of premonitory symptoms. 8th smallpox eruption appeared.

On admission on the 9th a petechial rash on an erythematous base covered the left side of the chest and the lumbar region. On the right side over a corresponding area there were scattered greyish yellow spots but no erythema. The redness disappeared but the spots were persistent on pressure.

On the 10th the erythema was gone from the left side leaving the greyish yellow spots. These spots could not be detected on the right side on the 11th nor on the left side on the 12th.

The smallpox eruption was moderately copious but developed rapidly. The case was mild and recovered.
Case XIII

George Day, aged 20 having two good vaccination marks was admitted on Oct. 25th 1880 with confluent varicella.

On admission on the 25th a petechial rash made up of small spots of a purplish color persistent on pressure was found on the abdomen. It was most marked on each side a little above the pubic ligaments and for about two inches above and external to the anterior superior iliac spines. There were only a few scattered spots below the pubic ligaments.

The smallpox eruption was confluent on the face and covered all over the body of dark red color. temp. 104.8.

Oct. 29. Initial rash now of a brownish color.

30th Initial rash coppery colored. temp. 103.6.

31st Rash could not be detected. temp. 102.

The case was severe but ultimately recovered. There were no papules on the space generally covered by the initial rash below the pubic ligaments.
Case XIV

Charles W. Neal, aged 26, having three imperfect vaccination marks, was admitted on Dec. 27th with semi-confluent varicola.

Dec. 23rd. Felt weak and out of sorts.

Dec. 24th. Noticed in the morning that the abdomen was of a dark red color but felt no irritation. In the evening the pupils were observed on the face.

On admission on the 27th a dark dull yellowish or coppery colored rash smooth and persistent on pressure occupied the site of the petechial rash. It was uniform in color below the parts ligaments for about 3 inches. Semi-confluent near navel and discrete above it in eniform cartilage and on sides of the chest to axillae. Below 1" ligament it slanted up to about the middle of the iliac crests and from the crests to the axillae was bound by the edge of latissimus dorsi muscles. The smallpox eruption was copious on the face and extremities and of a dark color. There was one papule on the site of rash below the navel five at the eniform cartilage and
half a dozen small sized on the right side of chest.

Dec. 25. Rash more faded: more yellow in colour a few scattered spots on the abdomen of darker colour than the rest smallpox eruption copious getting purulter inter-pustular skin red semiconfluent below rash on the thighs: numerous papules on the penis and scrotum: no more papules on the site of rash.

Dec. 29th. The faded spots could be detected on minute examination; face was swollen the eruption angry looking, eyes closed throat sore tongue coated, very thirsty temp. 100.8 No delirium

Dec. 30th. The smallpox eruption was purulter temperature 104.6.

Jan. 1st. 1861. The initial rash had disappeared temperature 102.

After a protracted convalescence the patient recovered.

Case XV

John Edward Lee aged 19 having one imperfect
vaccination mark was admitted on December 27th 1850 with semi-influenza varicela. 
Dec 24th Felt cold and had a rigor in the evening.
Dec 25th Pain in the back
Dec 26th Noticed red rash on the abdomen.
27th Observed small red papules on the face and wrists.

On admission on the 27th a petechial rash smooth and persistent on pressure extended from about an inch above the navel to about two inches below Poupart's ligaments. The inferior border extended upwards and outwards below Poupart's ligaments to the middle of the crest of the ilium. Laterally the rash reached as far as the edge of the latissimus dorsi muscles. The rash was of a purplish brown colour and darker on the lower part of the abdomen and in the groins than elsewhere.

It was made up of numerous small spots varying in size from a pin's point to a 1 pin's head. The spots were confluent on the lower part of the abdomen and in the groins. Semi-influenzial near the navel and discrete along the appian border, scattered.
stick reached as high as the nipple on the right side. A rash of the same nature was found in the axillae involving the anterior and posterior fields, forming semicircular patches anteriorly and posteriorly where the arms were close to the sides. The smallpox eruption was scanty only a few papules on the face but the skin was red and more papules were felt under the skin. There was not a single papule on the site of the initial rash although numerous along the inferior border.

Dec 28th The initial rash was of a yellowish brown color from the upper border to about an inch above the pubes but purplish below that level. The penis was covered with initial rash for about an inch from the root but the scrotum was free. The axillary patches were of a coppery colour. The papular eruption was more copious on the face. There was a patch of confluent papules along the lower border of the rash on the left thigh. The tongue was coated and dry delirious temp. 102.

Dec 29th The initial rash was much fainter
in colour but could be detected over the whole of the site. The smallpox eruption was copious on the chin and forehead as well as on the legs and arms temp. 100

Dec. 30th. The initial rash looked like a dull yellowish discoloration of the skin. The smallpox eruption was getting vesicular on the face. A few abortive papules were developing on the site of the initial rash below the pupils ligaments.

Patient was still delirious temp. 99.

Jan. 1st. The initial rash could not be detected. The smallpox eruption was vesicular, tongue moist, no delirium temp. 99.

The patient made a rapid recovery.

**Case XVI**

Richard Eggleton, aged 17, having two good vaccination marks was admitted January 1st, 1881 with discrete varicella.

Dec. 27th. Suffered from pain in the back and headache.

Dec. 31st. Noticed the smallpox papules on
the face. On admission on January 15th a rash of a dark brown color with a purplish tinge persisted on pressure and smooth to the touch covered the abdomen, groin and sides up to the axillae. It reached in the middle line anteriorly as high as the ensiform cartilage from that point it ran along the border of the pectoral muscles to the acromion processes covering the skin over the border of the muscles about an inch from the acromion processes the border curved down the anterior surface of the upper arms for about two inches when it curved back and then up on the posterior surfaces to the back of the acromion processes, where it formed a circular patch round the posterior axillary folds. Laterally the initial rash reached as far as the borders of the latissimus dorsi muscles. Inferiorly it extended to about two inches below the infraspinatus ligaments parallel to which the lower border ran from the inner surface of the thighs to the middle of the iliac crest. The smallpox eruption was scanty. The patches at the posterior axillary folds were covered with minute papules almost confluent. There were
no papules on the site of initial rash anywhere else.

Jan. 2nd. The initial rash was much faded.
Jan. 4th. There was a dull moistening of the skin over the site of the rash. A few abortive papules were scattered here and there in this moistening and numerous papules had appeared on the site below the iliac crest.

January 6th. The papular eruption was dry on the site of the rash elsewhere the eruption was pustular and beginning to dry.
The case recurred.

**Case XVII**

Thomas Bridley aged 32, having two good vaccination marks was admitted on September 12th 1880 with disseet varicella.

December 10th. The smallpox papule were observed — On admission a spotty Dark Brown Red rash smooth and persistent on pressure covered the lower part of the abdomen and the groins. Inferiorly it ended in a well marked border parallel to and about two inches below fortnights ligaments running from the
inner surface of the thighs to about the middle of the iliac crest. The smallpox eruption was scanty and well developed. There were no papules on the site of the rash. The case was mild and recovered.

Case XVIII

gleorge Pitt, aged 25, having two imperfect vaccination marks was admitted on August 29th with discrete variola. August 30th suffered from headache vomiting and pain in the back. A bright red rash was observed on the forearms which continued until the 28th when small red spots appeared on the face. On admission on the 29th there was no rash on the forearm below the elbows, but over the olecranon processes and all round the upper arms there was a red rash which was continued over the shoulders, back chest and abdomen. It faded on pressure but left pustular spots on the abdomen chest and inner surface of the upper arms. There was also a
point bright red erythematous rash on the legs. The rash on the chest was exactly like that of scarlet fever.
The smallpox eruption was scanty. The papules appeared as bright red spots on the darker-colored initial rash.

Aug. 30th. The initial rash had disappeared from the legs. Otherwise the same as on the previous day.

Aug. 31st. The initial rash was present on the body but faded — Recovered.

Case XIX

Eliza Sullivan aged 49 having three imperfect vaccination marks, was admitted on August 7th with semiconfluent smallpox.
The eruption of smallpox appeared on the 14th. She did not notice the initial rash before admission. On admission a dark-purpleish petechial rash was scattered on the abdomen in discrete spots. It formed a complete ring round the left leg below the knee at the position of the gaiter, round
the other leg at the same level there was a ring of confluent pocks.
The smallpox eruption was copious the intervesicular spaces much inflamed on the face. The eruption was also copious over the site of the rash on the abdomen.

Aug. 29th. The initial rash was much as on the previous day, eruption getting pruritic. Haemorrhage in a number of the pocks on the abdomen and legs.

Aug. 30th. The initial rash was faded in color but still well marked.

Sept. 2nd. The initial rash could not be detected. The patient had haemorrhage into the pustules all over the body and extremities. The eruption however soon dried on the face. She made a rapid recovery.

CASE XX

Anne Meltheer aged 27, having three imperfect vaccination pocks was admitted on August 26th with malignant smallpox. The initial rash was first noticed on the 24th. There were only two smallpox
papules which probably made their appearance on the day of admission. On admission—haemorrhage spots were scattered over the body and extremities. These varied in color from Dark Red to Black and in size from pins point to about the size of a silver four penny piece. On the abdomen—and about the hips the rash consisted of small Dark Red spots having a few of the larger sized and darker colored spots among them. The whole rash was persistent on pressure and smooth to the touch. There were only two papules one on the back of the right hand and the other on the ankle.

On admission she was perspiring profusely. The pulse was imperceptible. Respiration 66 per minute. Bleeding from the mouth and uterus. No infection of the conjunctival—quite conscious. Temp. 101.4 p.m. died about 11 p.m.

Case XXI

Harriet Hartley aged 11 having three good vaccination marks was admitted on July
15th the second day of the eruption of disease varicella.

On admission the chest and abdomen were covered with a pretechial rash which consisted of numerous dark red spots, smooth and persistent on pressure. It continued dark until the 20th and then gradually faded and disappeared. The smallpox eruption was moderate and well developed: no eruption on the site of the rash. The case was mild. Recovered.

Case XXII

Jane Vince, aged 17 having three imperfect vaccination marks was admitted on August 26th 1850 suffering from discrete varicella. The eruption appeared on the 21st. On admission a faded pretechial rash covered the abdomen and part of the chest extending from the nipples to the pubis and from about one mid axillary line to the other. It could scarcely be seen on the 28th. The case was mild. Recovered.
Case XXIII

Susan Svinchatt aged 11 not vaccinated was admitted on June 17th 1880 with semi-confluent varicela. The eruptions appeared on the 15th.

On admission a petechial rash covered the abdomen and chest. It was spotted dark red smooth and persistent on pressure. There were also a number of three penny piece sized hemorrhage on the chest and abdomen and a few on the arms and legs.

The Smallpox eruption was scantly badly developed and with hemorrhage beneath a number of the pocks; there were no papules on the chest and abdomen. There was a velvety red ecchymosed patches on the outer side of the conjunctival of both eyes. The patient was restless and delirious, she bled from the mouth. Temp. 103.8.

June 18th. Ecchymosis spread more round the corned bruised patches on the legs and about the hips; bleeding from the mouth and vagina. This patient after a very severe illness recovered.

Case XXIV

Arthur Russell aged 14 years having four good vaccination marks was admitted on January 7th 1881 with semi-confluent Smallpox.

Jan 13th. Suffered from vomiting, headache and pains in the back.
Jan 14 th  In the morning noticed that the abdomen and
armpits were covered with a dark Red rash! The other
symptoms were the same as on the previous day.
Jan 16 th  The Smallpox papules were first observed.

On admission on January 7th a dull coppery colored rash
covered the abdomen extending in the middle line from
about an inch above the navel to the pubis. From the
pubis the lower border stretched horizontally to about an inch
below the anterior superior spines of iliums and continued
backwards below the iliac crest as far as the edge of the
latissimus dorsi muscles. The rash was semiconfluent
from this border to the level of about an inch above the
navel. Above that level it was discrete over the chest and
sides to the edge of the latissimus dorsi axilla and erucles.
It was confluent in the axilla and on the interior and
posterior axillary folds, for about an inch of the inner
surface of the upper arms at the axillae. The colour of
the rash was coppery; but the Mother stated that when
it first appeared it was much darker. The skin over
the semiconfluent area was quite smooth as well as
on the armpits and sides but there were three obtrusive
small bright Red papules on the chest. The penis
was covered with rash for about an inch from the
root.

The Smallpox eruption was copious, the face bright
red; the papules flat and varying in size, shape and development; discrete on the rest of the body except the site of the rash, where not a single papule was seen except the 3 abortive papules already mentioned.

Jan 8th. Initial rash faded of coppery color all over the site. The face was bright red, but the eruption getting pustular elsewhere. The 3 papules on the chest aborted. Kept badly delirious; tongue coated, but moist.

Jan 10th. Initial rash still present, but almost skin colored. Small pustular eruption aborted on the face quite dry already.

Jan 11th. The spots could still be detected.

The patient recovered.

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**Case XXV**

Ely: Well aged 27 having one imperfect vaccination mark was admitted on Dec 28th 1880 with severe semiconfluent variola.

Dec 21st. Suffered from sickness, headache and pain in the back and limbs and continued in the same state until the 23rd when she felt irritation around the grains and on looking she noticed that the lower abdomen and grains was of a dark red color. At the same time she felt irritation in the armpits, elbows and other flexures. Dec 26th noticed red papules on the wrists and face. On admission a faded
petechial rash spotty and of a coppery colour covered the abdomen and groins from about an inch above the navel to two inches below Porparks ligament. The lower border extended from the inner surface of the thigh to about the middle of the crest of the ilit. Superiorly the rash extended upwards to a little below the nipple line on the sides. The Smallpox eruption was copious but well developed. No eruption on the initial rash site below Porparks ligaments although semi-confluent in the immediate vicinity. A few small papules on the site on the sides. This patient had a severe attack but ultimately recovered.

__Case XXVI__

Thomas Gilmore aged 17 having two good vaccination marks was admitted on Jan 13th 1881 with Discrete Varicella.

Jan 4th 10th Suffered from headache and pains in the back. Noticed a dark Red rash on the abdomen and about the groins.

11th Smallpox papules observed on the face.

On admission a dirty greyish brown rash covered the lower part of the abdomen and groins. It ended superiorly about an inch below the navel and inferiorly at the usual distance below Porparks ligament.
ligament. The rash consisted of spots varying in size and intensity of color. It was quite smooth and persistent on pressure. In the axillae were patches of rash of a higher colour than on the abdomen.
The Smallpox eruption was discrete all over the body; no eruption on the side of the rash, only a few papules on the chest.

Jan 10th. Initial rash of a light coppery color, much faded.

Jan 17th. Rash gone, face dry.
Case mild. Recovered.

--- CASE XXVII ---

John Frankum aged 19 having one imperfect vaccination, mark was admitted on Jan 16th, 1881 with confluent Smallpox.

Jan 13th. Suffered from headache, pains in the back and sickness.

Jan 14th. Smallpox papules were first observed.

Jan 15th. Noticed a dark Red rash on the abdomen, chest, back and thighs. The redness disappeared on pressure leaving petechiae in the groins. On the back, thighs and chest the rash was mottled of a bright Red color which disappeared entirely on pressure. It was much faded on the 17th and
entirely gone on the 18th, even from the groin. The Smallpox eruption was moderately copious on admission, but ill developed and of a dark color. On the 18th the eruption was copious all over the body, and unusually copious on the abdomen, on the 19th he had hemorrhage into a number of the vesicles and after a few days of high fever he died.

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**Case XXVIII**

Robert Turner aged 22, not vaccinated was admitted on Jan. 16th, 1881, with confluent variolal. Jan. 18th. Felt out of sorts. Jan. 9th. Headache and sickness. Jan. 11th. Noticed Smallpox eruption. On admission there was a faded, petechial rash on the lower abdomen, groin, sides and arms. The Smallpox eruption was confluent on the face and copious over the whole body. Bluish hemorrhages were here and there under the eruptions on the face and chest. The patient was conscious on admission and able to walk about but died on the following day after being violently delirious since admission and bleeding profusely from the mouth, rectum and urethra.
Case XXIX

Mary Jane Sander aged 21 having one imperfect vaccination mark was admitted on the 11th of June on the 2nd day of the eruption of confluent Smallpox.

On admission she had an erythematous rash round the arms above the wrists and along the extensor surface of the upper arms it was of a bright Red color, uniform and disappeared momentarily on pressure she noticed that her arms were red two days before the papules appeared; it was entirely gone on the 12th.

The eruption of Smallpox was copious on the face but badly developed; only a few papules on the arms but here they afterwards developed. After a protracted convalescence she ultimately recovered.

Case XXX

John Bird aged 21 having two good vaccination marks was admitted on August 3rd 1880 on the 2nd of eruption of discrete variola. On July 30th he felt out of sorts but was not confined to bed; on waking on the morning of Aug. 1st his body was covered with a bright Red rash, which was most marked on the thighs and on the legs below the knees; on the morning of the 2nd the rash was gone but the papules of Smallpox were seen. On admission he had no
initial rash, the eruption of Smallpox was very discrete he recovered.

--- CASE XXXI ---

Alice Williams aged 18 having 3 imperfect vaccination marks was admitted on the 22nd July with discrete varicella on the 1st day of eruption. On admission an erythematous bright red rash smooth and persistent on pressure was noticed about the wrists and on the chest. The patient stated that a red rash like that of Scarlet fever appeared in her face chest and arms two days before admission and that it went away when the red spots of Smallpox appeared. The Smallpox eruption was scanty very few papules on the arms. The case was mild and recovered.

--- CASE XXXII ---

Catherine Duggan aged 13 with two imperfect vaccination marks was admitted on Nov. 22 with discrete varicella. Nov. 19th Pain in the back, giddiness and sickness Nov. 21st. Noticed the skin Red all over the body, face and extremities, observed a few red papules on the evening of the same day. On admission a
rash exactly like that of scarlet fever covered the
whole body face and extremities. It was of bright
Red colour and on close examination it was not
seen to be mottled with minute patches of healthy
skin except on the extensor surface of the arms
and the front of the legs below the knees where
it was uniformly Red-like Erysipelas. The skin
was quite smooth except the roughness caused by
a few papules. The redness disappeared completely
on pressure but immediately returned if the pressure
was removed.

Nov 23rd: Rash was much fainter. It was gone
entirely from the face, the neck and the front of
the legs below the knees, most marked on the
extensor surface of the of the upper arms and
about the shoulders.

Nov 24th: Rash all gone.
The Smallpox eruption was scanty there were only
a few papules on the whole body. Recovered

Case XXXIII

Hannah Gregory aged 22, having four vaccination
marks was admitted on Aug 29th, 1880 with discrete
vaccinal.

Aug 24th: The premonitory symptoms commenced.
Aug. 25. A bright red uniform rash appeared on the extensor surface of her arms extending from the wrists to above the elbow joints. She did not notice it on any other part of her body.

Aug. 26th. The initial rash disappeared on the night of the 26th. No red spots that turned into the papules
She had only about 20 papules on her face and proportionally few on the rest of her body; she made a rapid recovery.

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**Case XXIV**

Elizabeth Fowers aged 11 having 14 imperfect vaccination marks was admitted on the 10th Jan. 1881 with discrete varicella.

Jan. 17th. Suffered from headache, sickness and pain in her back.

Jan. 18th. Initial rash observed.

On admission an erythematous rash of a bright red color covered the body, arms and legs; it was mottled like the rash of Measles, but much lighter in color. It disappeared momentarily on pressure. The rash was most marked on the extensor surface of the arms about the wrists, the hips and the legs below the knees. The anterior surface of the legs was of a
deeper Red, but the Father stated that that was always Red from sitting before the fire. The redness surrounded the legs a few inches above the ankles in the same manner as above the wrists. The face was free. There were no smallpox papules except three doubtful on the back.

Her two sisters were admitted at the same time with the eruption quite characteristic of the disease, and another patient was admitted from the same house five days previously.

Jan 11th: The initial rash was gone from the body and extremities except a sprinkling on the right arm and about the ankles.

One papule appeared on the face, 7 or 8 on the arms, and some more on the back. The papules on the arms were distinctly umbilicated.

Jan 12th: Initial rash all gone, the patient was almost quite well and soon recovered.

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Case XXXV

Rose Settler aged 18 having one imperfect vaccination mark was admitted on Nov 1st 1880 with discrete virulæ.

Oct 27th: Commencement of pneumonic symptoms.

Oct 30th: A Red rash like Scarlet fever appeared all over
the body face and extremities

Oct. 31st. The rash was gone on waking in the morning.

Nov. 1st. The smallpox papules were noticed in the morning.

On admission there were only a few papules to be seen on the whole body, a few more developed but the case was slight and made a good recovery.

By the kind permission of Mr. Gayton I copied the particulars of the following 10 cases from the case books of the Homerton Smallpox Hospital.

--- Case XXXVI ---

William Dunn aged 25 having two vaccination marks was admitted on Oct. 28th 1880 with discrete varicella on the 2nd day of the eruption. There was a petechial rash on the lower part of his abdomen and about his groin. It was of a very dark almost purplish colour. It appeared about 24 hours before the smallpox eruption. It faded gradually and could be made out on Nov. 2nd but very faint. Recovered.

--- Case XXXVII ---

Louisa Taylor aged 20 having 2 imperfect
vaccination marks was admitted on Oct. 30th 1880 with confluent varicella on the 2nd day of the eruption. An initial rash, partly erythematous partly petechial was present on the abdomen, about the groin and on the chest up to the breasts. On admission it was described as bright red on Nov. 1st as deep red and on the 4th as dark, on the 5th she had a hemorrhage into the pustules all over the body was spitting blood and had a sanguinous discharge from the vagina. On the 7th she had a miscarriage and died. The rash was noticed on the lower abdomen about 24 hours before the Smallpox papules were seen.

___Case XXXVIII___

Mary Wild aged 17th having two imperfect vaccination marks was admitted on the 17th Dec. 1880 with discrete varicella on the first day of the eruption. On admission there was a petechial rash on the lower abdomen which appeared about 24 hours before the papules of Smallpox. The rash was extremely faint on the 9th. The case was slight and recovered.

___Case XXXIV___

Cardine Maylor aged 14 having one
vaccination mark was admitted on Sept. 30th, 1880 with discrete varioel on the 2nd day of the eruption. On admission almost the whole body was covered with a scarlet uniform eruption most marked on the abdomen and axillae where petechial spots were seen.

Oct 2nd. The Erythema was gone, Recovered

____ Case XI ____

Alfred Rush aged 18 having imperfect and vaccination mark was admitted on May 25th, 1880 with semi-confluent varioel on the 2nd day of the eruption.

On admission he had a petechial exanthem on the abdomen and the upper part of the thighs which was much fainter on the 3rd day and was gone on the 4th day of the eruption. The case was severe but ultimately recovered.

____ Case XII ____

Caroline Mc Dermot aged 35, not vaccinated was admitted on May 14th, 1880 on the 2nd day of the eruption of semi-confluent Smallpox.

On admission she had a petechial exanthem on the abdomen which was gone on the 10th. She had
hemorrhage into the pustules was spitting blood and had
melaena but ultimately recovered.

**Case XLII**

Elnora Millie aged 39, having imperfect vaccination marks was admitted on May 22nd, 1880 on the 3rd
day of the eruption of confluent smallpox. She had a macular eruption on the abdomen and about the acclae.

The smallpox eruption was in large quantity and of a dark color; there was hemorrhage with the vesicles and from the uterus.

She died on the 26th.

**Case XLIII**

Grace Russey aged 14, having three good vaccination marks was admitted on Sept. 13th, 1880 with some semiconfluent varicella on the 3rd day of the eruption on the abdomen extending from the navel to the groin.

There was an initial petechial exanthem. This according to the patient made its appearance at the same time as the varicella eruption.

The initial rash was all gone in the 16th. The eruption was drying on the 18th.

She recovered.
Case XLIV

Catherine Bathart aged 28, having one imperfect vaccination mark was admitted on Nov. 19th 1880, with semi-confluent varicella in the 3rd day of the eruption.

On admission she had a petechial exanthem on the abdomen and in the groins of a bluish color which was noticed on the 14th Nov. 22nd: Eruption drying on the face. Initial rash also drying. Recovered

Case XLV

Emma Hawkins aged 14, having three good vaccination marks was admitted on Oct. 2nd. 1880, with discrete varicella on the 2nd day of the eruption. She had only about half a dozen papules on the whole body.

An erythematous initial covered nearly the whole body, it was noticed two days before the papules appeared.

She had very marked premonitory symptoms and her sister was admitted two days before, her suffering from Smallpox.

Dr. W. Corbie of Deptford Hospital kindly permitted
me to copy the particulars of the following 13 cases from the case books of that Hospital.

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**Case XLVI**

Mary A. Hudson, aged 11, said to have been vaccinated but having no marks, was admitted on June 10th, 1880, suffering from hemorrhagic smallpox.

June 5th: Commencement of premonitory symptoms.

June 9th: Admitted into Guy's Hospital as a Scarlet Fever case.

On admission to Deptford Hospital, the body was covered with dull redness interspersed with a number of black subcutaneous hemorrhages varying in size from a pins point to the little finger nail.

There was no mention of smallpox papules, the conjunctivae were much infected, she had bleeding from the vagina, Temp. 103.4. She died.

---

**Case XLVII**

Jane Knuckley, aged 29, well vaccinated, was admitted on June 24th, 1880, with hemorrhage small pox.

June 20th: Noticed a rash over the abdomen.

June 22nd: Rash much darker.

June 23rd: Some papules on the face.

On admission, there was a bluish red area...
discoloration of the skin on the abdomen and for about three inches below Renparks ligament. The Smallpox eruption was copious on the hands and face. There was no hemorrhage into the conjunctiva and she was quite conscious.

June 27th. Initial rash faded and was of a coppery colour.

June 28th. Rash almost gone.

Note - This case was probably not hemorrhagic but the dark blue initial rash was probably mistaken for the petechial of malignant Smallpox. She had a severe attack but ultimately recovered.

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Case XLVIII

Edward Knight aged 26, having three good vaccination marks was admitted on July 21st with discrete varicella.

June 28th. Commencement of the premonitory symptoms.

July 1st. Initial rash noticed on the abdomen. On admission for several inches above and below Renparks ligament and up the sides of the body to the axillae there was a red rash like hemorrhage into the skin. It was persistent on pressure and not elevated above the surface. It was made up of very small red spots.
The smallpox eruption was more easily felt than seen.
She died on the 10th.

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**Case XLIX**

Isabella Wheaton aged 25 not vaccinated was admitted on Sept. 7th 1879 with confluent varicella. Sept. 11th commencement of the premonitory symptoms Sept. 14th. The smallpox eruption was noticed. On admission a triangular petechial rash was on the lower abdomen and upper part of the thighs. Recovered.

---

**Case L**

W. Young aged 28 having 2 indistinct marks was admitted on July 18th 1879 with confluent smallpox.

July 11th. Commencement of premonitory symptoms.

July 15th. Noticed a red rash on the grains and on the lower abdomen.

July 16th. The papules of smallpox appeared.

On admission there was a red purple mottled petechial rash at both folds of the axillae on the lower abdomen about the grains and on the sides up to the axillae. There was hemorrhage into the pustules and bleeding from the rectum and bladder. Dead on August 10th.
Case I

Anna A. Roseberry aged 32 having 2 good true vaccination marks was admitted on May 1st, 1878 with Hemorrhagic Smallpox.

April 27th. Commencement of illness

On admission the thorax was deeply reddened and there were petechial in the grain triangle with violet colored spots.

There was one papule on the left hand and a few on the back and feet; both conjunctivae were ecchymosed.

May 2nd. The hands and feet were swollen and livid and the right eyelid black.

Died.

Case II

John Blough aged 8 years having three imperfect vaccination marks was admitted on May 14th, 1879 with discrete variola.

On admission on both arms and legs there was a reddish slightly raised rash darker than scarlet fever looking patchy from bits of healthy skin between not so dusky nor so patchy as measles. The redness was more so uniform and did not shade off from the centre to the circumference. It was also on the chest and abdomen but more scattered and not so uniform.
The smallpox eruption was scattered over the whole body. He recovered.

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**Case LIII**

Maria Hart aged 14+ having one bad vaccination mark was admitted on Aug. 28th 1879 with discrete varicella.

Aug. 25th She had pain in her back.

Aug. 27th A bright red rash appeared first on the face and then over the whole body.

On admission a Measly rash covered the arms, face, and legs, not much on the trunk. There were a few spotty papules on the forearms. The initial rash faded on 30th.

The case was slight and recovered.

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**Case LIV**

Henry Blake aged 22 having two fair vaccination marks was admitted on April 2nd 1879 with discrete varicella.

March 31st Sleepy and drowsy.

April 1st Pain in the back.

On admission he had a measly preliminary rash from the elbows to the hands. It was patchy, level and faded on pressure. Below the knees at the ankles it was scarlet uniform.
March 3rd Initial rash gone
The case was slight recovered.

--- Case IV ---

Frances Rayner aged 17 years having two imperfect vaccination marks was admitted on Feb 12th with discrete variola.
Feb 19th Commencement of illness
On admission the arms were covered with a measly eruption interspersed with smallpox papules. It also pretty uniformly covered the lower part of the thighs and legs.
The smallpox eruption was scanty on the legs but copious elsewhere.
Feb 13th Measly rash was almost faded from the arms.
Feb 14th Faded from the legs.
The case was rather severe but the patient recovered.

--- Case V ---

Joseph Stewart aged 18 having four imperfect vaccination marks was admitted on July 16th 1878 with discrete variola.
July 12th Took ill.
July 13th Initial rash first noticed.
On admission a bright erythematous rash was present on the trunk and extremities and a few papules on the face.

July 17th. Erythematous rash fading.

The patient recovered.

---Case LXVII---

E. Mary Jones aged 19 having one good vaccination mark was admitted on August 3rd 1878 with discrete varicella.

July 29th. Had sore throat and general Malaise.

Aug. 2nd. A red rash came out all over the body but especially the arms very much like Scarlet Fever which she had 8 years before. By the same evening the rash was much less and disappeared during the night.

3rd. A few spots noticed in the morning on the face and arms.

The case mild. Recovered.

---Case LXVIII---

Elizabeth Howard aged 17 having four fair vaccination marks was admitted on May 30th 1878 with discrete varicella.

May 28th got ill.
May 31st. Rash like Scarlet fever appeared over the trunk, arms, and legs and papules on the face and arms.

June 2nd. Scarlet uniform eruption fading. No papules on the anterior half of the trunk but were numerous on the back.

The patient recovered.

I add the following cases out of many that I have seen since the thesis was written as illustrating the early appearance of the initial rash in some cases and also the fact that it does not always protect the site covered by it from being affected with the ordinary eruption of Smallpox.

--- Case LIX ---

George Thomson aged 26, having two imperfect vaccination marks was admitted on Feb 14th 1881 with semi-confluent varicel.

Feb 18th. Noticed that he had a red rash in his groin.
Feb 29th. The rash spread over the abdomen and chest. Suffered from pain in the back.
Feb 10th. Noticed a few red papules on the face.

On admission a faded petechial rash covered the abdomen, chest, sides and part of the back.
it reached as high as the nipples and covered about an inch of the lower border of the pectoral muscles and the anterior axillary folds. There was a patch of the same rash on the inner surface of both upper arms at the axillae. Inferiorly, it ended in an oblique border about two inches below. Nonparts ligament extending from the inner surface of the thighs upwards, outwards and backwards to within an inch of the spines of the lumbar vertebrae. The posterior border extended from this upwards and outwards in irregular ill defined curves to the axillar posterior axillary folds. Over the described area the rash was spotty and coppery coloured smooth and persistent on pressure. There were a number of watery vesicles on the lower part of the abdomen of dark Red colour. The Smallpox eruption was discrete and vesicular on the face and in confluent patches on the arms and legs. Feb 15th. The initial rash was more faded. The lower part of the abdomen was covered with Smallpox vesicles. Eruption pustular on the face.
Feb 16th. Confluent patches on the lower abdomen were macular but the pustules were of a smaller size than on any other part of the body. The remains of the initial rash were perceptible.
Feb 18th. The initial rash had all disappeared. Eruption drying on the face.
Feb 20th. Eruption on abdomen drying. He recovered.

Case IX

Rosetta Carter an Imbecile aged 2 having two imperfect vaccination marks was admitted on March 18th 1881 with confluent varicella. She had good family and social history and was well developed.

March 17th. She was noticed by her parents to have some irritation about the abdomen. On looking the Mother found it covered with a dark red rash. The girl did not complain of anything else, and took her food as usual. There were no spots on any other part of her body.

On admission on the 18th she was sick and complaining of pain in her back.
There were two doubtful small papules on the face and four on the right hip.

Temp. 104.5. A petechio-cyanematosus initial rash covered the abdomen and chest as high as the mammae leaving the skin over the rectus muscles free as low as the umbilicus. Inferiorly it extended to a little below Poupart's ligaments where it ended in an oblique well defined border from the inner surface of the thighs to about two inches above the trochanters. The posterior border was scattered irregularly from that point to the axillae covering the edges of the latissimus dorsi muscles and the posterior axillary folds. The rash was of a dark red brown color with a purplish tinge excepting in the groin where it was dark purple. The colour was not uniform as darker spots were scattered in the general redness. These spots were persistent but the redness faded momentarily on pressure. It was smooth to the touch although the darker spots appeared except on close inspection as on a higher level than the skin.
March 19th: The initial rash was of a bluish red colour almost entirely persistent on pressure. It had developed in the axillae as dark red spots during the night. There were only a few papules on the face or body and none on the arms, legs, or the site covered by the initial rash, was sick all night. Tongue coated, but moist. Temp. 104.8. Pulse 102.

March 20th: The erythematosus redness had disappeared from the initial rash leaving patches of yellow pigmentation which was persistent on pressure. Among the red brown purplish spots which covered the abdomen and sides above the level of the navel. The colour was almost blue and uniform in the axillae and in the axillae. Scattered spots were seen on the anterior axillary folds, the border of the pectoral muscles, the outer surface of the mammae and on the inner surface of the upper arms at the axillae.

The Smallpox papules were discrete on the chest, arms and legs. A large crop appeared on the face irregular in size and shape and of a dark red colour. There were no papules in the parts occupied by the initial
rash, only one papule on the abdomen and that one on the part free of rash, was restless and wandering all night. Tongue dry and coated with white fur. Pulse 102 full and regular. Temp. 103.8. There was a considerable amount of hemorrhage from the vagina all the night which from the Mother's statement was probably the menses.

March 21st. The initial rash was of a lighter purple colour and some spots were turning grey. A few papules had developed on the abdomen on the part not covered with rash but none on the site of the rash. The papular eruption was confluent on the forehead and semiconfluent on the rest of the face but was still developing. Tongue cleaner and moister. Pulse 120. Temp. 102. Sickness gone and hemorrhage better.

March 22nd. The initial rash was paler but still purple in the grains. The Smallpox eruption was confluent and pasty on the face. Semiconfluent on the arms, back and legs and discrete on the chest eruption vesicular on the face, which was swollen. The patient was delirious. The hemorrhage...
had nearly ceased. Temp. 99.2
March 23rd. Initial rash much faded and
was now of a light coppery colour. Two papules
had appeared on the site of the rash on
the abdomen and seventeen on the skin
over the recti muscles where there was
no initial rash. The eruption was now
purulent on the face. There was now
hemorrhage under a number of the
pustules on the forehead and thighs.
The hemorrhage from the vagina had
almost ceased. Slept fairly and took
nourishment well. Tongue brown. Temp. 101.2
March 26th. The pustules were bursting on
the face and the abdomen still so
mottled.
March 27th. Eruption scabbing; the skin
over the site covered by the rash was of
its natural colour.
After a protracted convalescence the patient
recovered.

Roger McIlvii
Abbreviations used in the Tables

N. Number
S. pox Smallpox
M Male
V. Var Variola
Dis Discreta
Conv Confluenus
Semicov. S. conv Semiconfluenus
Imp Imperfect
Vac Vaccinated
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<th>Life of Rash (Initial)</th>
<th>Date of First blush</th>
<th>Date Initial</th>
<th>Date Smallpox</th>
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<td>5</td>
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<td>Dec. 1st</td>
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Roger McNeil

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