Graduation Thesis by

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Subject

Observations on Smallpox

A thoughtful and careful essay. Mr. Reid adopts a more logical method than all previous writers of the history of smallpox. He limits himself to the facts of history and shows that the primary cause of smallpox is the virus of the variola natalis. He gives a table of his observations to support his views of the disease. He describes the disease in the body of man, and illustrates its nature.

W. L.
Observations on Smallpox.

The great interest that surrounds the subject of Smallpox, in the History as well as in the pathological manifestation of the disease, does, I think, render an apology hardly necessary for my selecting as one, upon which to write my graduation thesis.

But Smallpox, as this year a disease of more interest than usual, inasmuch as this city has lately been visited by a variola epidemic of more than considerable severity, and were it necessary, that I should seek further for an apology, I might state that I myself have been a sufferer from this loathsome disease.

I shall not, however, attempt to enter into the History of Smallpox and to take up the inquiry as to whether the disease was known to the ancient Greeks, for while the former could only be a
Recapitulation of what has been already written upon the subject. The latter is a question which I am satisfied can never be truly solved. But taking advantage of the late epidemic, I shall content myself with merely recording a few observations which have been suggested to me by a clinical study of the disease that during this season. I have taken this method of getting up my graduation thesis as the one most pleasant as well as most instructive. I shall in the first place endeavor to say something about various epidemics, confining myself chiefly to that which recently visited Edinburgh.

When we wish to determine the nature of an epidemic, we are in a great measure dependent upon the records of hospitals. We may indeed estimate its ravages in a general way by referring to the Registrar General's reports, but how to estimate its rate of comparative mortality, to watch its increase and decline, or to find out...
The various onediifying circumstances which may have come into play is only to be done in the way I have indicated by observing its effect in Hospital and also by studying the various meteoreological and other hygienic conditions, which may have been likely to affect it.

The commencement of the late epidemic in Edinburgh may be dated from the second week of August 1862. During the month of July 1862, no deaths from smallpox took place in the city. In August there were 4, in September 11, in October 31, in November 53, in December 72 and in January 33. There were admitted into the Royal Infirmary during August 5 patients, in September 21, in October 49, in November 102, in December 98 and in January 37. I wrote in February and the disease may be said to be now no longer epidemic for only two or three struggling cases have been admitted up to the 1st of March. It will be seen that the epidemic cases with the greatest virulence in the months of November and December.
It is a question which has puzzled the mind of every philosophical physician, as to whether there is any relation between epidemics and the atmospheric conditions existing at the time of their occurrence. No one doubts that there is some such relation, but of which the exact nature is by no means determined. Every now and then cases of smallpox are occurring, indeed, a year does not pass without a few deaths from smallpox taking place in every large town. But how does it happen that at one time hundreds are attacked and at another only a scattered few? And why is that at one time, an epidemic begins at one period of the year and that at another time an epidemic of the same disease has its commencement at quite a different period of the year? "Nothing," says Lydenburg, "strikes the mind that contemplates the whole and open domain of medicine, with greater wonder than the well known varied and inconsistent character of those disease which we call epidemics. It
is not so much that they reflect upon different conditions of climate in one and the same year, as that they represent and distinguish constitution of different and dissimilar years.

Subsequent experience has confirmed the truth of Hydenham's observation and the instances which I might record in support of it are very many. Thus for example the late epidemic took in this city commenced in August and went on to January, while the epidemic which took place in London in 1844, as described by Dr. Gregory began in January and went on to December; while that which took place in the same city a few years later began in the May of 1847 and went on to the month of March 1849.

A true explanation of these remarkable facts must, I think, be sought for in the science of Meteorology. On this point by the hand of Mr. Wyville: "How much and diligent and to the best of my ability, as I have observed the different characters in respect to the more manifest atmospheric
change of different years, and that with the view of detecting therein the reasons for the discrepancy amongst the epidemic disease. I am free to confess that I have not proceeded one single inch in one way." The correct conception of the faculty of British Medicine was no doubt literally true. But our knowledge of the collateral sciences is now much more extensive and precise so that by studying the relations of physics to medicine we may at least approximate to some correct results.

Now, in one respect, at least, the state of the atmosphere presented a peculiarity and that in a marked degree, during the months of the late war in London epidemic. I refer to the increased humidity of the atmosphere as compared with that during the month of August, September, October, November, December 1862 and January 1863, as compared with that of the same months during the 1856.1.2.9.6 and 61. From an examination of the Registrar General's tables, the following results will
arrived at complete saturation is considered as 100.

\[
\begin{array}{c|c|c|c}
\text{Humidity in Aug.} & 1862 & \text{Average of the year} & 1866.4.870.6.50.61. \\
\text{Sept.} & 85 & 89 & 84 \\
\text{Oct.} & 87 & 89 & 85 \\
\text{Nov.} & 89 & 89 & 86 \\
\text{Dec.} & 84 & 89 & 80 \\
\text{Jan.} & 89 & 89 & 85 \\
\end{array}
\]

General Results: 87 83.

It is certainly an interesting fact and I do think it is more than a mere coincidence. At all for the last 6 years we have had no true epidemic of small-pox, and that the years the average humidity was in an average 6 percent less than it has been this year, which is remarkable for the prevalence of small-pox.

The table which I have constructed above also shows another interesting fact. I have already shown that the epidemic was most severe in the month of December and that there was a remarkable decrease in January. The increase in December seems to be connected with increased humidity of the previous
in January

month viz. Nov. while the decline of the epidemic is connected with the decrease of humidity in December. For if the moisture of the atmosphere has any influence at all, on small-pox epidemics, it must be exerted chiefly as a conducting or a conveying agent of the poison. Now if a person dies of small-pox he is probably infected at a period between 3 and 4 weeks before his death. Therefore those who died in Dec. must have received the contagion in Nov., a very humid month, while those who died in Jan. must have been infected in Dec. a month the average humidity of which was exactly the same as the average humidity of the Decembers of the six years before. Thus therefore one might account for the crisis and decline of the late epidemic, taking place in the months of December and January. It may be said that this may be connected with the temperature, but the statistics of various small-pox epidemics show that this has very little to do with their occurrence.

The above, however, is a mere theory, and it can be nothing else until more facts
Of a similar nature are brought for ward to supply it. I regret that the opportunities which I have had of examining meteorological and statistical papers have been too limited to allow me to prosecute this inquiry further.

To return to the statistics of the epidemic. I have said that 311 patients were admitted into the Hospital. The ward, cut apart as for smallpox cases were Nos. 1, 2, 3, 4 for fever house, and for a short time Nos. 15 Medical House. Dr. Bennett also admitted a few cases into his ward for clinical instruction. The fever house records were kept by the Resident Physicians, Drs. Frass and Cunningham, first as to whether the patient admitted was vaccinated and secondly as to what was the nature of the disease. Compliment to deserts.

Of 283 cases admitted into these wards 205 were vaccinated, and 77 were not. While one had the disease before. About 23.5 per cent admitted were not vaccinated. This is certain a condition of things by no means creditable to Edinburgh. Nevertheless it is an
Improvement upon what used to be the case in Edinburgh 40 years ago. We find Dr. John Thomson describing an epidemic which took place in that city at that time. Where 2,556 cases of smallpox came under his observation 2,059 or nearly 77 per cent were not vaccinated. But even this is much better than the situation in the London epidemic of 1664-65. Where 1,467 cases observed by Dr. Gregory 312 or 48 per cent were not vaccinated.

It is sad to think that in this country, the birthplace of Jenner, people should be so shamefully unmindful of their own and of the interest of each other. And it is much to be deplored that a narrow-minded and shortsighted policy should prevent our government from adopting the remedy, so plain and obvious to every one. Namely, compulsory vaccination, vigorously carried out.

Ever since the protective power of vaccination against smallpox was fairly established by Jenner, so deeply have medical men been impelled with the benefits of that great discovery. Yet, volumes upon
Volume of evidence have been published with the effect of proving it to be a truth. This truth is none more fine in medicine. To this great mass of evidence I will also add a little more.

For, during the recent epidemic, of 311 cases admitted up to the end of January 40 died, of whom 34 were not vaccinated. Of the 311, who died and who were vaccinated, one was seized with smallpox after labour; a second was attacked in the medical house while labouring under gangrene in the lung; a third a child had severe convulsions; a fourth, a diphtheric man, had delirium tremens; the fifth was a young woman who was vaccinated on the 16th of October and admitted into the Hospital with smallpox on the 25th. So that the virus must have been in her system before that of vaccinia. Which in all probability had little or no effect.

I know nothing of the history of the sixth case. I do not remember having seen it. My self nor have I been able to ascertain anything of it.
Then as regards the severity of the case, whether they were confluent or discrete. 283 cases were admitted into the fever house up to the end of January 231 of these were discrete while 52 were confluent. Of the discrete cases 34 or 14 per cent were not vaccinated.

Of the confluent 43 out of the 52 or a proportion of about 81 per cent were not vaccinated.

The great benefit conferred on the human race by the Jennerian vaccination is evident in the epidemic as they have been in every other since the discovery was put into practice.

The results stated above make the mortality of smallpox, in its natural or unmodified condition, to be 40.24 per cent. Now, according to Mischinson the mortality of typhus in 1799 and that of Enteric fever 17.2. These comparisons give one an idea of the fearful devastation, which, in olden times, this disease was wont to commit among the people of every nation, not to speak of its frightful ravages on the beauty of those whose lives were spared in all ranks of society.
It is generally agreed that vaccination is not in all cases a complete prophylactic against smallpox. But there is no doubt to a great extent due to the fact, that many who are supposed to be vaccinated, have not really gone through the vaccine disease. The whole story of a patient having been vaccinated is not sufficient evidence that he made has undergone the vaccine disease. Nor is the mere instance of a cure enough. But if that curation presents to us certain specific characters, which we know to belong to vaccination and which I need not here describe, then we have a cure most that the patient has been really vaccinated. Now, there is a certain portion of those truly vaccinated who do not the smallpox. And this is doubtless owing to a greater susceptibility of some of the various viruses than others. I have often wondered at the cases from this malady made by physicians, nurses, and others, connected with smallpox wards. While dozens of patients have given upon their arms an indelible mark of their having undergone the vaccine disease.
were lying with smallpox and yet could
quite get the slightest history of any exposure
to contagion. As an instance of this I
may mention what occurred to myself.
Two years ago, I got smallpox under the
following circumstances. At the commen-
ment of the season 1880-61, I was vacci-
ated. I was appointed a dresser in Dr. Gillespie's
wards in the month of February, one of
our patients had his foot amputated for
aerubulous disease of the ankle joint.
He took smallpox and was sent to the
smallpox wards, where there happened to
be one or two cases at the time. Along with
my fellow dressers, I took my turn at
dressing him. We were all seven I unequally
exposed to the contagion. Yet, I alone took
the disease, to the surprise of my compan-
ions, for I was the only one revaccinated
and I was also supposed to possess the
healthiest constitution.

The same thing happened to a brother
in my own. A better specimen of a vaccine
vaccination I never saw, than that which exist
on his arm. He was also revaccinated, yet this year he took smallpox, without having been directly exposed to the contagion.

The case along with other cases tend to make me think that revaccination is a useful operation, where we have some evidence that the patient has been already well vaccinated.

This notion is also somewhat strengthened by the fact already mentioned, of many, only once but well vaccinated, enjoy complete immunity from smallpox throughout life, even although much exposed to contagion.

The only use of revaccination appears to me to be that of securing the first vaccination where it is doubtful, and also to ease the patient in case anything should happen.

Much has been said and written regarding the mode in which the smallpox poison is conveyed from one person to another. But since this principle is one we cannot easily get tangible, we must judge of its properties by its effect. The former practice of inoculation, daily showed that the pus
Of a small pox is capable of reproducing the disease when applied to a wounded surface on the body of another person. The virus must therefore reside in the fluid which does not differ in its histological constitution from ordinary pus. I mean, if we take a deck from the skin of a small pox patient, press it with water, and apply it to a broken skin, the same effect will be produced. The virus must therefore be soluble in water.

The case which I have been illustrating is somewhat as follows. A woman had a brother who took small pox. She washed some of the clothes worn by him during his illness. She had then a small cut on one of her knuckles. In a day or two this, in damp air, a pustule formed. Then borax appeared on the same arm, and a few on other parts of the body. In short, she was inoculated. The probability is that the water dissolved the virus, and in this way the one was infected.

Going a step farther, I think the most
national Actorn, that one can come to is, that the virus must exist in a state of solution in the aqueous vapor of the atmosphere. This idea also appears to be borne out by what I have already shown in another part of my paper, namely, the high rate of the humidity of the atmosphere during the months of the recent epidemic. Thus I would account for the fact which I have often seen exemplified this region that people from the overcrowded tenements of the Cowgate and Cannongate are often to be found by my side on the same small ponies, with others such as the maidservants from the clean and well ventilated mansions of the New Town, from whom I could not, under the most rigorous crop examination extract one item of evidence that they had been, in any way, directly exposed to the contagion. There is no doubt that the fact that the small box virus has the wonderful power of sticking to garments will account for many cases of smallpox contagion. But even this does not go against my theory for how did the poison get
on to the garment, and from the garment to the person of the infected. In all probability, through the agency of the aqueous vapours in the atmosphere. I have met with one remarkable instance of this property of the small-pox virus. A young man a groomsman at Baltimore, came to the hospital with small-pox, in the month of December. He was one that he had not been in Edinburgh for at least two months before, so that he could not have caught the disease in this way. But he had been working for some time with a man who resided in Edinburgh and who had been in the habit of seeing cases of small-pox there. In all probability, therefore, this patient got the disease through the man carry on the poison about his person from Edinburgh to Baltimore. Of course in this matter, I am presupposing the notion that small-pox is a disease which is never generated de novo, a theory in which most men believe, but into which I have not time to enter.

Considering the phenomena of variolæ, in their order as they appear in the disease, I come next to the period of incubation.
The only question which I shall take up under this head is that of its duration. I have only met with three cases in which I could come to anything like the exact date of the infection. The first was that of an Irishman, named Macleod, early in the spring. This man was residing in the country and engaged there as a labourer. When on Thursday, Nov. 5th 1831, not being able to work on account of the weather, he went into Edinburgh to see Hallow fair. After wandering about all forenoon, he began to feel cold and hungry. About one o'clock he entered an eating house in the Grassmarket. While there he took up some warm broth. He observed a child lying in a bed in the same corner in which he sat. He asked the housewife what was wrong. She told him that it was the child lying with smallpox. He left the house soon after and walked home. On Thursday the 27th he was seized with the symptoms of smallpox and the case turned out to be one of hemiconfluent smallpox. This man has not been in Edinburgh for months before
The text on the page appears to be handwritten and contains the following content:

No. from 13th 6 and 27th is just 14 days. From afternoon of 13th to afternoon of 17th almost 14 days. Yet I took all on Monday 20th. Therefore under than 14 days.

In like manner from Monday 20th 14th Thursday 8th just 14 days. Not over 15 days.
The 13th of Nov. soon after it was decided he came to it sick. There can therefore be little doubt that he caught the disease in the eating house. Of this it is clear the period of incubation must have extended over 14 days and a half, for he took ill in the morning of the 27th. This man was not vaccinated.

The next case which was a somewhat romantic one, occurred in a young woman residing in Dalkeith. This girl had a sweetheart, in Edinburgh, who was seized with smallpox, and turned out of his lodgings by his landlady. He went to the hospital. The young woman remaining true to her lover in his distress, came in from Dalkeith to see him on Friday 18th and also on Friday 25th. On Monday the 22nd she was seized with the pellagrous symptoms of smallpox and on Wednesday the pustules appeared. It is probable this girl caught the disease on her visit to the smallpox ward on the 30th Jan. The period of incubation must in this case have lasted over 10 days. This patient was vaccinated. There were only one or two cases of variola in
Talk with her in the winter, and these were patients who had caught the disease in Edinburgh and came out to stay, with their relatives, during their illness, so that it is not likely that any patient got the infection in this way. Since she informed me that she had not heard of a case in Dalkeith but her own.

The third case was that of a servant girl in Albany Street. She had a brother who took smallpox and was sent to hospital on the forenoon of Friday Nov. 28th. She never saw him during his illness but on the forenoon of that day, went to his house, to enquire after him, from his wife. On Sunday, Dec. 1st, she was seized with the fever or very symptoms of smallpox, which the disease turned out to be. This case is not such a good one as the other two, for there is a possibility that she may have caught the disease elsewhere than in her brother's house, for at that time the epidemic was at its height throughout the town. Still there is a strong probability that this girl was infected in her brother's house and if so the period of incubation must have been 13 days.
The only inference that can be drawn from these three cases, is that the period ranges from 10 to 15 days. In order to come to any general conclusion on this point, a very great number of such cases are required, and any conclusion that we can come to must always be more or less subject to one or two very evident fallacies which I need not point out. Suffice it to say that from an examination of the great many cases recorded by different observers. The latent period of smallpox would seem to vary in duration from nine to eighteen days.

I next come to consider the premonitory symptoms of smallpox, and as these constitute a subject which has received very little attention from observers, perhaps I will be excused should I say more about them than may seem necessary. The premonitory stage of smallpox is characterized by the usual phenomena of fever, with one remarkable symptom in addition, namely, a very violent pain in the back. Ponsonby speaks of it as a symptom hardly ever absent, and which does not manifest itself with the same degree of violence.
in any of the other febrile disorders, equally severe in their nature, with the single exception of yellow fever.

The first symptom that usually attracts the patient's attention is chills, which do not last longer than 3 or 4 hours. Then comes a headache which, in my own case was certainly the severest I ever experienced. The pain in the back then sets in, as a general rule about 12 hours after the chills. When it is present it is almost always very violent, but sometimes as in my own case it is absent. As a general rule the intensity of the pain is in proportion to the severity of the case in the empyema stage.

A marked weakness of the lower extremities is very often felt by the patient. This was first pointed out to me by Dr. Warburton Breese in a review of Mr. Troupeau's recent work, the Clinique Médicale de l'Hôtel Dieu de Paris. In my own case I observed this particularly and I can well remember the great difficulty I had in walking or in going up a stair. Complete paraplegia has been sometimes seen, but I have never met with such a case.
Conclusions are very apt to occur in children, and in adults more or less diarrhœa is not uncommon. Sick-nœs with vomiting and a sense of nausea with pain on pressure, on the epigastrium almost always occur. Very rarely, there is diarrhœa. Pain and a sense of heaviness in the chest is sometimes complained of. I have sometimes been told by patients that they had a great desire to make water and that they made it frequently. Haematuria sometimes occurs during this stage. There is always difficulty to pass urine through narrowness. Before making any remarks on these symptoms I shall give the history of one or two cases. I may mention, that although I have often watched people complaining of what I thought, might turn out to be the preliminary symptoms of small-pox, I have always, with one exception, been disappointed. So that what I have to relate has been gathered from the history of patients as told me by themselves. The occurrence occurred in the case of my brother which I now relate.

Case I. On the 28th of Dec. 1790 he told me that he had not felt well during the day and preceding night. His chief complaint was, that
A severe headache. I noticed, however, that his face was flushed and his eyes suffused. His pulse was 100 and respirations 30 per minute.

Dec 1st: In bed all day with headache. Crying and capricious. Pulse 115. Respiration 30 per minute.

Dec 11th: Remaining ill. Pulse 120, respiration 30 per minute. Headache, lapsitude, and delirium still continue.

Dec 17th: Feels better. Pulse 88, respirations down to 20 per minute. But one or two pimples are to be seen on his face and chest.

The case turned out to be one of smallpox, which ran a mild course.

Case II. Ann Moonlight, act. 27, admitted on Monday, Dec. 15th, 1882. She was a native of Aberdeen, born and not vaccinated. Stated that on Wednesday she was seized with a pain and sense of weight in the chest. This lasted her on Thursday, when she was seized with violent pain in the back. This continued over Friday and Saturday, till Sunday. During this, the pain was so severe that she was blistered for it twice by a medical man of experience in this city. She was feverish throughout...
During all this, she never experienced headache nor weakness of the legs. But she told me that she was very hot and feverish. I shall relate the rest of this case in another part of this paper. But the eruption made its appearance on Sunday night. The case turned out to be the fever, I am now aware and terminated fatally.

Case III. Donald Kennedy, letter carrier, age 23, admitted Thursday, Dec. 4th. Patient has some dim recollection of being vaccinated when a boy, but there is no cicatrix to be seen on either of his arms. He states that on Saturday night he felt a severe headache which continued over Sunday, Monday and Tuesday. On the two latter days he was able to perform his duties as a letter carrier, but he complained of great weakness of his legs. On Tuesday evening he observed the eruption, but he never during all this complained of pain in the back. This case turned out to be one of confluent smallpox, from which he recovered. He was making a slow convalescence, when one night he was attacked by a fit of convulsion. In a day or two he had paralyses and died encephale.
Case IV. Mr. C. Wm. Medical Student. Vaccinated with his first creation. Came into a private ward in the Hospital on Nov. 17th. He told me that on the evening of the Wednesday previous he felt unwell. He had chills and a headache. Next day he went to college, but was obliged to go home again, without entering a chapel room. He had a severe pain in the back, which he said was exactly in the region of the kidneys. He had also a great desire to make water and he made it frequently. On Thursday night he became delirious. Dr. Neglie & Grangee, who saw him in this state, told me that the delirium was wild and violent. He became conscious on Sunday morning when the smallpox eruption appeared. Mr. C. very distinctly before the delirium came on, that he had a very rapid pulse. Great feverishness, with throbbing at the temple. The disease turned out to be one of discrete smallpox which ran a mild course.

Case V. Thomas Carly. Irishman not vaccinated took ill on Nov. 27. His abdomen, pain in the back and chilliness, and he told me that when
he tried to walk, he felt on his legs as if he were drunk. The case turned out to be one of semi-confluent smallpox.

Case V. Christian Kennedy, act. 20. Vaccinated admitted Jan 22nd 1837. State that on the Saturday previous she was seized with chills, ico and headache. On Sabbath she had pain in the back. On Monday this continued along with a pain in the chest, and difficult in breathing. For this her medical attendant put a blister on the chest. These symptoms continued over Tuesday, but they all left her at the commencement of the eruption, which took place on Wednesday morning.

Case VII. Peter Johnson, act 16. Green, was seized with chills, headache and pain in the back on the morning of Saturday Nov. 15th. He was very hot & feverish and was sent to the Hospital by a distinguished medical practitioner in this city, as a case of continued fever. The smallpox eruption appeared on Monday, however, and the case turned out to be one of fatal confluent smallpox.

From a consideration of the symptoms
presented by a patient in the premonitory stage of smallpox. One cannot but come to the conclusion that these constitute a condition of distinct fever altogether independent of any local lesion. All the internal viscera seem liable to be more or less affected by it. The severe headache is. I have no doubt, owing to a condition of blood hyperaemia in the brain, and thus we have occasionally convulsions, delirium, throbbing in the temples, pulsating in the ears, and a feeling of giddiness. The pain which sometimes occurs in the chest is in all probability due to a similar condition in the lungs. And we have along with it a sense of heaving in the chest, and difficulty of breathing. Indeed, cases are on record where pneumonia had occurred in the premonitory stage of smallpox. The nausea, vomiting, increased about the orifices, and pain increased on pressure, is doubtless a form of mild gastritis. But I have one thing more to say about that most marked phenomenon, namely, pain in the back. This has usually been looked upon as a muscular pain or lumbago. But if examined carefully, this will hardly apper
to be the case. For lumbar gos do not always affect the same part of the back; in one case it will be found running along the track of the great longitudinal muscle of the spine, while in another it strikes the muscles which run obliquely from the spinal column. But the pain in the back in small doses is always to be found at one and the same spot, namely, on a level with the junction of the dorsal and lumbar vertebrae, and extending a little to the side.

In at least fifty cases, I have asked patients to put my hand on the place where they felt the pain, and without exception it was uniformly as I have stated.

Taupin in his recent work, looks upon it as depending upon a condition of the spinal cord itself "and of this" says he "we have the proof in a considerable number of cases. Last year in the space of a few days, I was enabled to show upon two examples of this lumber pain, accompanied by paraplegia. Sometimes the paralysis affects the bladder. Patients have retention of urine at least a marked dysuria. Ordinarily of brief duration, these paralytic
accidents sometimes continue to the ninth or tenth day of the disease, more frequently they cease with the development of the eruption. Whatever may be the correctness of this theory, it has certainly not been sufficiently brought out by Tscherny. The pain in the back and the paraplegia do not appear to me to be so intimately related. How rarely do we find paraplegia, while the lumbar pain exists in a greater or less degree of intensity, in the great majority of cases. Nor does this pain seem to bear any relation to the weakness or partial paralysis which I have mentioned above as occasionally affecting the legs. For the former may exist in the most violent form, without the latter being present at all and vice versa.

I would likewise urge the same objection to this theory as to the former, namely the region of the pain. If, were it spinal, it would be found along the track of the spinal column sometimes, perhaps, at one point, sometimes at another. But as I have shown the various pain is always at one spot. Many of the other symptoms of spinal irritation are likewise
never to be found, such as, for instance, spasms, paresthesia, tingling, numbness. I believe that occasionally the spine may be affected, giving rise to partial loss of power, loss of function, and as in one case, at least which I have seen, a spasmodic affection of the legs, this in all probability depends upon a hyperemic condition of the spinal cord, and may in many cases give rise to more or less pains of a certain kind.

What then does the pain in the back, in paroxysm depend upon? I think the most reasonable answer that I can give is, that it is owing to a condition of the kidneys, not an inflammation but much in blood hyperemia in these organs. Now, there was no one who could observe and describe symptoms more accurately than my friend Mr. Gunn when he took small for himself. He thought that there was something wrong about his kidneys. The girl Moonlight's case seemed to have been mistaken by her medical man, for one of acute nephritis, for she was
treated for that malady according to
I can conceive no other way of accounting
for the character of this symptom, than by
supposing that it depends upon the kidneys.
Thus we have that pain always occupying one
position and that exactly over the region of
the kidney, namely, at the junction of the lumbar
with the dorsal vertebrae extending a few inches
on each side of the spine. This, too, I would
account for the frequent desire of the patient to
muturate, and also for the haematuria which
is well known, sometime to occur in this disease.
During the hemorrhagic stage.
With regard to this point a question naturally
arises, why should there be no marks in smallpox? Now if the theory
which I have ventured to propose be correct
I think we may at least approach to come solution of the question. We know that
there is a lapse of time between the reception
of the virus into the body and the period at
which the patient begins to be distinctly
during this the poison would appear to hatch
itself and become enormously increased in quantity.
Nature, according to a doctrine of the old
humoral pathology, which has been if
late set in, this makes an attempt to
relieve herself of this morbid material. But
in doing so a disturbance is created.
The channel through which the poison
must leave the system is the skin, and it
as a day or two before this channel
begins to be opened up. Meanwhile, the
poison circulates through the excited system
and one or two of the internal visera may
as I have an acquaintance to show, of one a
hemorrhagic condition. The organs most
desirable to this state are the kidneys, which
all others are the most important as areas of
morbid matter from the blood. But the
renal organs and the skin are intimately
united in their physiological relations.
They are indeed often in a greater or less extent
incorrigible of each other. But it is the skin
which is to extirpate the veritable poison, and
before doing so, an attempt has been made by
the kidneys to perform the same act. Namely, in other words,

To eliminate the various poison then circulating
Nature, according to a doctrine of the old humoral pathology which has been of late so revived, has an attempt to relieve herself of this morbid material, but in doing so a disturbance is created. The channel through which the poison must leave the system is the skin, and it is a day or two before this channel begins to be opened up. Meanwhile, the poison circulates through the excised system and one or two of the intestinal viscus may as I have. In decaened to show, I have a high hæmæmic condition. The organs most liable to this state are the kidneys, which of all others are the most important as executors of morbid matter from the blood. But the renal organs and the skin are intimately united in their physiological relations. They are indeed often in a great or less extent vicarious of each other. But it is the skin which is to exert the varions poison, and before doing so, an attempt has been made by the kidney, to perform the same act. In other words, to eliminate the various poison then circulating.
in the system. Thus I would explain the pain in the back, along with the other neural symptoms which we positively to exist.

There are numerous questions which might be discussed in connection with the eruptive stage of varicella. I have only time however to take up one or two. And first as regards the nature of this stage. I think the correct way of looking at it is that if it is a local disease it does appear to me to be a local disease as much as any other is local, and whatever may be the amount of constitutional disturbance, this is entirely owing to the local lesion. The poison seems to have left the blood and to have localized itself in the skin there giving rise to a pustular eruption. It does not appear that the formation of pus is dependent on connected with the existence of the poison in the skin for we have good evidence that before the pus is formed the poison present in the papules or vesicles from which we can propagate the disease by inoculation.
It is interesting to observe the manner in which the constitution becomes affected by the eruption. At its commencement and after the patient has suffered pretty smartly from the skin symptoms, the patient very often tells us that he feels quite well. So much was this the case with myself when two years ago I took smallpox, that on the morning in which the eruption appeared, I felt as well that I resolved to get up out of bed where I had been lying for two days and go to college. But on stretching out my hand to draw on my trowsers, I noticed a pustule or two upon my wrist, and on examining myself I thought about a dozen more. It turned out that I had passed through a pretty smart attack of discrete smallpox. But gradually, as the eruption took on the patient becomes more feverish and the febrile excitement is at its height during the formation of the pustules.

Much has been said and written about the secondary fever that takes place in unmodified smallpox. With a fair to
Satisfy myself on this point, I have examined and taken notice of a good number of cases. My relating them here would only be cumbersome to this paper; so that I shall content myself with stating my conclusions.

I believe that there is no essential difference between modified and natural smallpox as regards secondary fever and that this fever is always in proportion to the severity of the case, whether modified or natural. But as modified case or case, in which the patients have been properly vaccinated, are never severe, it follows that there can be no marked secondary fever. Nevertheless in all ordinary cases, modified or of natural smallpox, the disease at first there is a gradual increase of the fever, as the length from the time that the eruption appears up to the periods of suppuration. And it is seldom that in well marked cases of modified smallpox and at this period, that the pulse is below 100; it is very often up to 100 or 120. In two such cases I have seen that peculiar division which we know to belong to smallpox, take place. Further I hardly think that this secondary fever
is entirely wrong as it is usually stated. At suppuration taking place in the pus-tule. This is no doubt a great cause, at the same time I cannot but think, that it is owing to a great extent to the skin all around the pus-tule, being in a state of irritation. In my own case this irritation which was at first very painful and then itching, entirely prevented me from sleeping without the use of spirits. The fever may be most severe before the poison begins to suppurate. In the clearest case I ever saw that I knew Mooneight not only was the pulse up to 150 but the patient died before a pustule was to be found in any of the pus-tules. I examined about a score of them in various parts of her body and found it as I have states.

The next point that I shall take up is the state of the urine in small-pox. I have examined daily and kept records of the condition of the urine in 33 cases of small-pox. In its general character the urine does not differ from those of the
While in ordinary febrile disease, the specific gravity, as a general rule, ranges from 1019 to 1027. In one case I found it remarkably low, ranging from 1006 to 1009, but without being able to discover anything remarkable in the patient, in whom this occurred. In the major typhoid cases, the urine is alkaline, but in a good number it is acid or neutral. During the progress of the eruption, the chlorides are always deficient, while the lithiums are very abundant. And as a general rule, there is an excess of phosphate during the maturation of the pustules. In very bad cases, the phosphate becomes mixed with oxides, forming a peculiar tenacious mass which is usually found floating upon the surface of the urine, from 24 to 36 hours after it is passed.

The question of most interest is the occurrence of albuminuria in smallpox. Concerning this point, some European writers say 'albuminuria is a complication of the disease and it is nearly as frequent in confluent variola as it is in measles.' This, however, is the difference that in
Dear sir, the albuminuria appears during the decline of the disease, while in varicella it occurs at its height. I suppose they tell us that he is indebted to Mr. A.Eille for this observation. A.Eille recently found a work on the urine in different diseases. In that part of it where varicella is treated, he says: "We have searched for albuminuria in 17 well-marked cases of varicella and found it in only one. It was a case of confluent varicella. It was noticed at the commencement of the eruption and continued five days. The urine was sedimentary and strongly acid. The flocculent precipitate obtained was slightly colored. It was the only confluent case in the 17." It will be seen that I suppose was not entitled to form any conclusion on this point, from the data laid down by A.Eille, for although that observer did find albuminuria in confluent smallpox, still he only examined one case of that variety of the disease.

when examining the urine of patients during the recent epidemic with a view to determine
This point I was always careful to select the severest case, that were to be found in the wards. Accordingly out of the 33 cases, which I examined 90 were confluent. But I the while I only found 2 case in which album in urina occurred.

As these two case were somewhat remarkable I shall give a short account of them.

Case 7. James Dick act 37. This man was a patient in ward 4. Medical House. Labouring under general paralysis. On Tuesday Nov 19th he complains of severe headache. After this he could take no food, and vomited. In the Friday morning while the nurse was going up stairs he observed an eruption small, like was at once suspected, and he was sent off to a smallpox ward. I examined his urine that day and found it was very highly albuminous. I as this I engage resident physician to the ward. Informed me that no albumen existed in his urine previous to the attack of smallpox. The patient died on Tuesday Nov 25th and his
As the remainder albumin was to the last,
In the direction it was found, that the brain
was rather congested with albumin in the ventricle.
The lungs, especially at their base, were in an
ecchymosed and oedematous condition. The
spleen, liver, and especially the kidney were
very much congested.

Case II. I have already alluded to this case, it
was that of Donald Kennedy, who had a severe
attack of unmodified small-pox. The patient
was convalescent by which both his legs were destroyed.
I examined the man's urine every day until
he became convalescent and failed to detect
the slightest trace of albumen. I sent
the urine to whom I submitted the urine once or
twice for examination, came to the same result.

The patient, however, was making a slow convalescence
when about a month after his illness, he was
suffered one night with convulsions. By and
by he became delirious and delirious.
His urine was examined when the fits came on, and
it was found highly albuminous, and remained
so till his death. This can hardly be said
to be a case of albuminuria in small-pox.
The albuminuria probably depended upon organic disease of the kidneys occurring at a sequel of smallpox.

The proportion of cases in which I have found albuminuria is, therefore, 1 in 33 or 1 in 15 of the confluent variety, and there can be no doubt that in the case in which I detected it, the albuminuria was in some way connected with the paralytic affection. Bell well found it in 1 out of 27 cases which he examined. Albuminuria must therefore be considered a rare complication in smallpox during the eruptive stage of the disease, much rarer than Irouseau seems to suppose.

But since I believe that in the paralytic stage there is a kidney affection, I would not be surprised to learn that albuminuria does occur not infrequently during this stage. My suspicion is strengthened by the fact that haematuria occasionally occurs before the eruption appears. I have often examined the urine of patients in the General wards, where from these symptoms there was a suspicion of smallpox coming on. But as my suspicions or rather guesses
never turned out to be correct, my labors were in vain.

I should have liked very much to have been able to say something about the anatomy of small pox, but unfortunately for me, very few bodies were opened. Indeed, I have only seen one cubic cadaver of a small pox patient during the whole epidemic.

I shall now only take up one or two points in the treatment of small pox, before finishing this paper.

One of the characteristics of the present age is that there is a strong desire for novelty, and it need not be a matter of surprise that every now and then the medical profession are startled by the announcement of certain infallible remedies or specific, for disease, over which we had formerly little or no control. Thus within the last six or eight months, we have been told that a specific has been discovered for small pox, and that a decoction of the leaves or root of the Phytocenia purpurea was the drug which possessed this property.
This drug was ushered before the world as "the great anti-venereal remedy and elixir for suffering humanity." Bitter were the discussions, as to whom belonged the credit of having first introduced the remedy, and as to who was the first to import it into this country. It is not for me to enter into the questions involved in these discussions, and that more especially as I think that Canacenia juncacea will shortly sink into oblivion at least as far as smallpox is concerned. Sufficient it is to say that this plant has been long in use among the North American Indians as a remedy for smallpox, and that it was latterly alleged to possess the property of curing smallpox almost at once.

I was kindly permitted by Dr. Beebe and Haleman, to make a trial of it in their wards and the latter gentleman ascertained that the thing I was using was genuine. I selected the worst cases that were to be found for the purpose. I administered it according to the directions of Assistant Surgeon H. Childers, M.D., who I really think brought
It first before the notice of the profession. As I was then very frequently in the wards, I saw that the remedy was given as soon as possible and also that it was taken regularly by the patient.

I have before me the notes of five cases which I shall relate very briefly.

Case I. Peter Johnson age 16 admitted Nov. 15th not vaccinated, got variola on the afternoon of the day in which the eruption appeared. He took it as long as he was able. The case turned out to be a very severe one of confluent smallpox. The patient died on the 28th Nov.

Case II. John Mc Donell admitted Nov. 19th not vaccinated. Got variola throughout his illness. The case was one of confluent smallpox. The patient died on the 3rd of December.

Case III. Donell's Kennedy admitted Dec. 4th not vaccinated. He took variola throughout his illness. The case was one of confluent smallpox with the total destruction of both eyeballs. He recovered, but only to die in month after in the same way I mentioned in another part of this paper.

not vaccinated. Began to take Caraccemia purpurea shortly after the eruption appeared and continued taking it as long as she could swallow. The case was a most severe one of confinement smallpox and proved fatal on the 31st of December.

Case 1. Mary Fitzgerald, admitted Nov. 29th, not vaccinated. The fifth Caraccemia throughout her illness. This patient recovered, but the disease was only confined.

Thus of 5 cases in which Caraccemia was used 3 were fatal and a fourth may be safely said to have died from Caraccemia.

I have conversed with several practitioners who have also tried it. They also fail to see any good effect whatever from its use. It does no good as I have shown, but at the same I don't believe it does any harm, which is more than can be said for some much vaunted specifics. With the view of action in its physiological action if it had any, I got some of the decoction as prepared by Mr. E. Duncan & I took it back I took 2 ounces of the drug three times daily for three days. But I did not feel the slightest effect, not even that of a diuretic.
We must therefore content ourselves at present with the ordinary constitutional treatment of smallpox, which is simply that of confinement fever.

I can say little about the specific treatment of this disease. Among the many inventions which have been tried for this purpose, that which seems to me to be the most rational is the one introduced by Dr. Stanley Baynes, a fellow student and intimate friend of my own. It consists simply in applying a solution of India rubber in chloroform to the pustule. The chloroform evaporates and leaves a coating of India rubber, which, as the face swells, does not crack, but on account of its elasticity expands, and thus effectively prevents the entrance of air.

This plan was only thought of a few weeks ago, and since then I have not fallen in with a case of confluent smallpox, upon which I might try its effect.

On account of the remarkable tenacity of the venereal infection to cling up in the seat of the cutaneous, or on any part of the surface of the body where they happen to be an irritation, an increased venularity of the surface it has
been suggested, that the production of an artificial
vibration, might draw the poxulce from the face
and the part irritated and thus prevent pock pits.
The plan proposed is to put a blister on any
convenient part of the body, where the pitting
will not be seen. This of course must be
done as soon as possible, before any, or at least very
little of the eruption is out. I have met with three
cases in which the patients were blistered before
the eruption appeared. One was blistered for a
pain in the chest, another severely for the pain
in the back. A third was blistered on the chest by
my orders just when the eruption was beginning
to appear. In all these cases not the slightest
benefit seemed to accrue from the treatment.
In one case, which was that of the girl Moonlight
who was blistered severely on the back, I even thought
that there were fewer poxulce on the blistered part
than on the surface around and certain there
was no improvement on the face, for it was the worst
I ever saw. In the beginning of November,
a man came into the Hospital with smallpox,
but at the same time he was laboring under
a violent gonorrhoea, which had been some
on for some days before he was seized with the
premonitory symptoms of smallpox. In this case
the les is was covered with matter more thickly
than any other part of the body. It would
seem therefore from this and other such cases,
that the irritation in order to produce any
beneficial effect, must exist previous to the
commencement of the premonitory symptoms.
If so the suggestion is practically of no use.

With regard to all the remedies that have
been employed in the treatment of the various
diseases, I do believe that they would very soon
be rendered useless or unnecessary were a proper
system of compulsory vaccination established
and I further think that, if such a system
were universally enforced, the disease smallpox
would no longer be clasped in the category of
human maladies; it would only be found in
the pages of history or in the records of antiquity.

Walter Reed