THESIS

AN OUTBREAK OF PYÆMIA

GREENOCK 1878 & 1879

19th OCTOBER 1881

DAVID CAIRNS. M.B.C.M.

1. SHAW PLACE GREENOCK

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

— Preface. —

Amid the several branches of Medical and Surgical Science which continue to occupy the mind of every deligent Physician None I think can present more urgent claims to careful investigation than the aetiology Pathology and treatment of Pyaemia.

When we consider that it is almost certain death to the patient affected, the intense suffering induced by it and the desolation produced by its transmission in hospitals

and where ever else it may happen to appear. No one can fail to be convinced that every Step taken in advance by the Physician and the Pathologist cannot be too highly valued.

When we contrast the highly improved State of Medical Science in this and other diseases, with former ages one is easily impressed and encouraged by the Marked advance that has taken place. But it must be admitted that although we may now believe that we know a great deal More about the Pathology and treatment of pyaemia than such Eminent authors as Valsalva and

and Morgagni both of whom described cases very similar to those I have myself seen and treated for pyaemia yet I find that Morgagni has described the symptoms and pathology just as truly as they are now to be found in the Writings of the most Modern authors. with the exception of that advance made of late by the introduction of the microscope

It was while engaged as Resident Surgeon in a local Hospital that I was convinced of the vast importance of this subject owing to an outbreak of the disease having taken place. in Regard to which I shall try to shew that it was purely epidemic in character

and not due to any fault of the house or treatment. And in connection with this I shall append a drawing of the interior which I made from measurements taken while resident. Shewing a plan of the wards in which the cases occured withe the beds marked alphabetically as the several patients were affected.

In respect to the giving of a few of the cases in detail as I intend to do I consider it to be a much better plan than generalization for although there must be an unavoidable recurrence of similarities making it appear rather ambiguous yet I believe cases will probably

Convey more information in as few words as description and that they identify the nature of the disease as it were by example. I shall not however give all the cases but only those which presented the symptoms characteristic of this epidemic. So that I may be able to point out where they differed from the typical Cases given in text-books.

In regard to the Pathology I am sorry to say that I gained little or no information because the Managers of the House distinctly prohibited post mortem examinations to be made, even on unclaimed bodies, which I considered to be a very great hardship & a decided

obstruction especially where there is such a large supply of material. The only postmortem examinations we had were those ordered by the Procurator Fiscal in connection with criminal investigation

Pyaemia. is the term used for a febrile condition which is as a rule of an acute character, due to the absorption into the blood of a poisonous substance capable of reproducing itself with great rapidity and characterized by its tendency to produce Metastatic or secondary abscesses. wherever it may happen to be arrested in the circulatory system. and the resulting formation of septic abscesses. inflammations haemorrhages. and gangrene.

Septicaemia is another febrile condition the symptoms of which very closely simulate those of pyaemia and by many it is believed that

wherever we have the one we either have or may have the other. I believe that we may have Septicaemia without Pyaemia but that when we have Pyaemia then also we have Septicaemia. But then when we say that Pyaemia is due to the absorption into the blood of a Morbid Material capable of causing Thrombosis and Embolism either or both at the same. and that Septicaemia does not produce these, it is evident that there is a decided difference in the action of the two poisons But although I admit that Septicaemia & Pyaemia go together yet I think Sepsin which is said to.

to be the active Principle in Septicaemia is supplemented by some other fermentive material when acting in a case of Pyaemia Because it appears to me that the Sepsin alone has not the Power of uniting the fibrinogen & fibrinoplastic in the living blood So as to form a Septic thrombosis what that other substance is I do not know but I am certain that it is there an will be found out sooner or later.

History of Pyaemia.

In looking back over numerous books and Papers written on Surgical and Medical cases with their Complications with the hope of finding some reference made to

to the subject. I failed to find the subject treated under any specific name but discovered descriptions of surgical & pathological changes very similar to what we now class together under the head of Pyaemia. I shall here note one or two of the earliest cases to shew by comparison with my own that they were really what we would at the present day class as Pyaemia.

In Morgagni's great work entitled "The Seats and Causes of disease" Volumn III page 100. He states "that Valsalva was induced to observe by his own investigations, that the viscerae of the thorax were sometimes affected by collections of pus

pus after wounds of the head.
That Nicolaus Massa in 1553.
Reported a case where a man
died delirious and paralized
three weeks after an injury to
the head. And after death the
pleurae were found to be half
-full of pus. Yet he was never
known to have Complained of
Chest symptoms.
Morgagni further refers to the observ-
-ations of Marchetti written in
the Sepulchretum where he describes
cases of injuries to the head produc-
-ing collections of pus in the
pleurae, peritoneum, arachnoid, Liver
Spleen Kidneys and Brain."
Here I think they were really
describing pyaemic Cases although

under the head of Collections of Pus following Wounds of the head. They seem however at that time to have been very much under the belief that the complications were peculiar to * Wounds of the head. because as yet they had not been observed as a complication arising from Wounds of any other part of the body.

The liver seems to have been the organ in which they first observed these Changes. and although subsequently found in other organs and mentioned by Bohn & Molinelli yet they adhered to the belief that the liver was the organ most readily to be affected.

Some men thought that the liver was the only organ affected by abscess from suppurative wounds of the head. Morgagni however states that "he himself never in any of his dissections saw the liver affected by abscess." and in this he is supported by the experience of Valsalva who only saw one case. He further refers to Robinelle for confirmation of this but he rather refutes the assertion when he states that he has not only seen abscesses in of the liver from wounds of the head but that he has found them in other organs. and following wounds of other parts of.

the body". This statement of Molinelli widens the subject very much.

Again in the First Volumn of the Memoirs of the French Academy of Surgery page 147. a case of Compound fracture of the right Parietal bone is given. were because of coma the trephine was use to remove the depressed fragment of bone. After the operation the patient became conscious but rigours set in on the 15th day after the accident accompanied by pain over the liver region and he again became unconscious and died on the 17th day. Abscess was found in the liver after death as previously suspected.

See The Memoirs de chirurgie Militaire et Campagnes de D. Larrey Tom. I. Pol. 306 Paris 1812 I find the first Case described where there was depositions of pus in various organs from a Compound fracture of the arm. amputated and no injury to the head. This was the Case of General Cafferille who died on the 17th day after amputation of the limb. D. Larrey states that "Febrile symptoms set in on the 13th day after the operation accompanied by various internal derangements. This is also the first Case where I find febrile symptoms mentioned and the fact of the fever beginning on the 13th day after the opelation makes it correspond very closely.

in the period of incubation as I may call it to the majority of the cases which I had. I shall refer to this point further on.

In another case the same author mentions rigours, diarrhoea, fever pain and swelling over the hepatic region. and great tumefaction of the parts about the wound, which in this case was an injury of the Elbow joint. Abscess was found in the liver after death. He states here that he is of opinion that "these abscesses are Metastatic, and caused by Metastasis from the Site of injury to the affected point of the Miasmes ichoreux or dirty fluids plus ou

morbid acre et subtil. He also adds that the Communication of these morbid humours. with the hepatic System takes more easily when they are on the right-side of the body. not having to cross the Mediach line.

Mr. J Bennan in his principles of Surgery. page 271. year 1820 also gives Several very interesting cases following amputations with symptoms very like those of pyaemia but he does not mention when the complications appeared. and it might be that the changes which took place in the Lungs. pleura. and liver might have been due to long Continued discharge producing tuberculosis in lungs & pleura or amyloid degeneration

of the Liver.

In a paper by Mr Rose in the Medical & Surgical Transactions 1828.
I find several cases described under the title of "Depositions of pus & lymph after Surgical operations" All of which I am perfectly convinced are really cases of Pyaemia
He is the earliest writer whom I have found giving a description of cases which comprised nearly all the important symptoms
He was the first to mention vomiting severe rigours sweating increased temperature and pulse abscess in joints Liver lungs. Spleen & Kidneys also purulent effusions into the pleural & peritneal cavities dry tongue yellow skin and that the pulse was extremely

Small and Compressible a fact which now held to be almost pathognomonic of the affection.

I shall now give the most typical of the cases which occured under my own observation. and in the first place mention the name of the disease or accident in which the pyaemic complication appeared.

1st Caries of the first and second lumbar Vertebrae

2d Amputation at upper third of the left thigh. Primary operation.

3d Compound fracture of Tibia in Middle third.

4th Compound fracture of Femur in Middle third

5th Amputation through Condyles of femur

– primary.

6th Amputation in lower third of femur, primary amputation.

7th Excision of head of Femur. Morbus Coxae with sinuses leading from the cavity of the joint to the surface.

8th Removal of sequestrum from lower third of tibia.

9th Amputation of thigh through middle third primary.

10th Excision of Mamma for Scirrhus

11th Strumous disease of Ribs.

12 Laceration of thigh by falling through a glass window.

13 Erysipelas of right leg

14. Fracture of frontal bone at left frontal eminence. by a Kick from a horse.

I consider the above list of cases a very good sample of the surgical

Date

Day of Disease / Temp. F.	1		2		3		4		5		6		7		8		9		10		11		12		13	
	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.
108°																										
107°																										
106°																										
105°																										
104°																										
103°																										
102°																										
101°																										
100°																										
99°																										
98°																										
97°																										
96°																										
Pulse	104	112	104	120	113	116	98	104	104	118	104	100	100	120	119	116	118	132	110	128	126	120	136	130	140	—
Respn	18	18	22	21	20	24	22	19	17	21	24	26	20	19	18	22	21	28	24	30	28	32	32	34	30	25

Name Case No 1 Occupation School Girl Resi

Age 7 Years { S / M } Disease Caries of Lumbar Vertebrae Tem

Cases in which Pyaemia may appear as a Complication

I shall now give a few of the Cases as they occured. Shewing the beds marked alphabetically as they severally appeared.

1st A little girl aged 7 years. admitted suffering from caries of the lumbar vertebrae. On admission she was in a very wretched state of health and extremely dirty When examined she was found to be suffering from posterior curvature of the spine projecting most at the junction of the last Dorsal with the first Lumbar Vertebra. and in the same locality there was slight curvature to the Right. The bones

and appearance. But suddenly about the 16th day after admission she was seized with a violent rigour accompanied with increased temperature and sweating. She complained of no pain or uneasiness but looked very frightened.

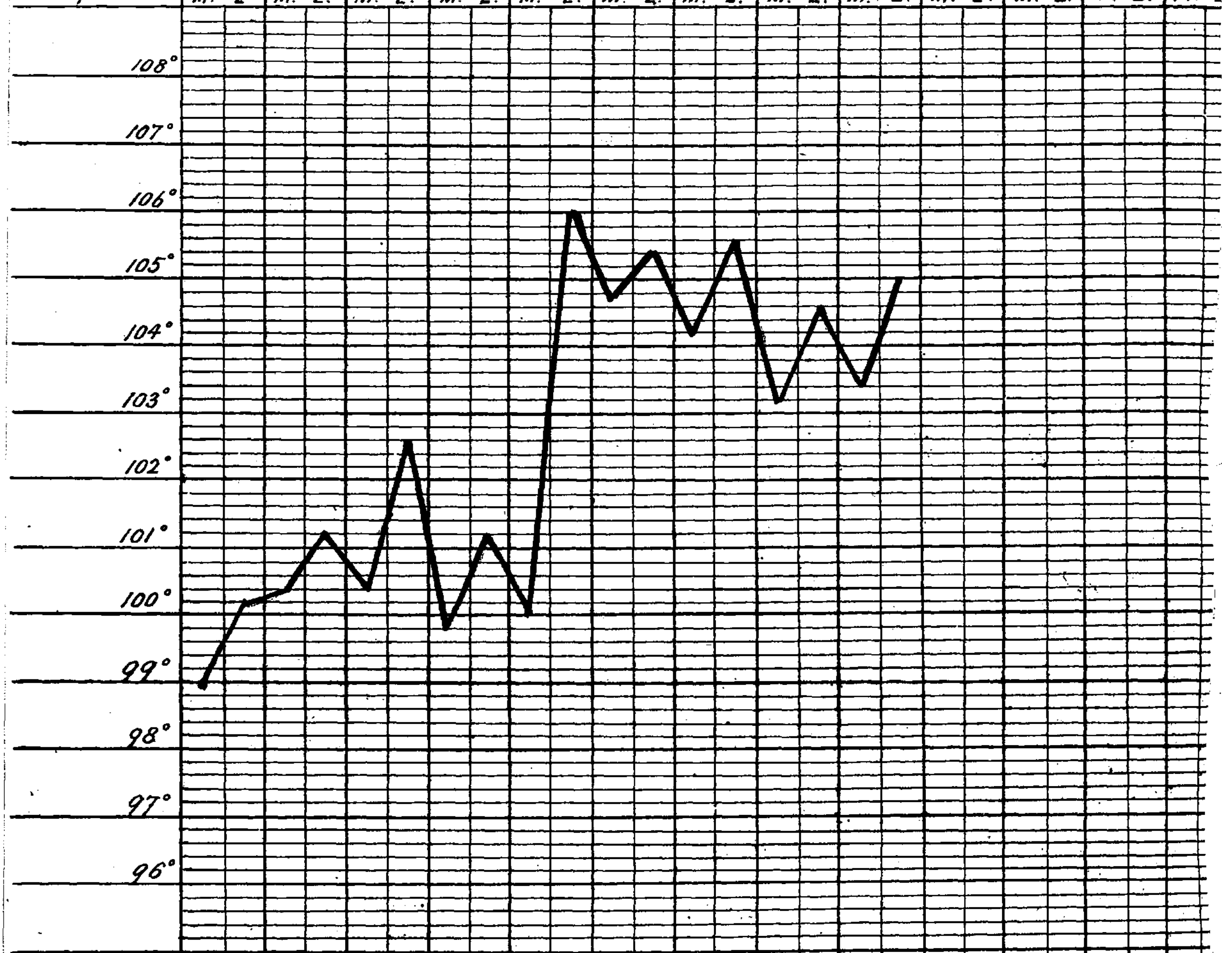
17th Day. Fever still high (see chart) pulse 100. very small. discharge decreased and watery. Rather foetid. granulations at orifice of sinus which were previously healthy now pale and soft. slight swelling in left Groin. pain in left foot. Vomited twice during the early Morning and had two slight rigours sleep. very disturbed. appetite bad tongue soft thick & white on surface

18th Patient much the same today as yesterday except that she complains

of more pain in the leg which is now swollen from the groin to the Knee. Swelling tense, skin white & glistening. veins well marked and a few of the lymphatic vessels can be felt like Cords under the skin these are especially painful to the touch. Still sick with occasional vomiting. Sweating copious,
The urine contains a slight trace of albumen today for the first time specific gravity 1014 Colour pale straw slight deposit of amorphous urates.
19 Discharge much less today but still very foetid. Granulations at orifice of sinuse sloughing. pulse still rapid very weak temperature variable but still high, tongue swollen and fissured by the teeth, and covered

with a dry brown fur. Leg still
swollen & painful to the touch. the left-
foot is now implicated in the swelling
and there is slight fulness over the
right groin. There was slight
delirium last night and today
she is at times quite comatose.
There is slight pain in left side of
chest but no evidence of pleuritic
or pulmonary mischief can be found
by auscultation. Rigours come on
about every 4 hours. they are not
so severe now but last longer.
Slight diarrhoea since four o'clock this
morning & there is very marked
tympanitis but no pain on pressure.
20 " Day. Patient quite comatose today
urine and faeces discharged into the bed.
occasionally slight convulsions temperature

Date																									
Day of Disease	14		15		16		17		18		19		20		21		22								
Temp. F.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.



Pulse	99	112	108	112	112	116	102	110	100	158	124	135	130	138	120	126	[illegible]	146							
Respn																									

Name Andrew McClure Occupation Brakesman R

age 24 {S M — Disease Amputation at hip T

gradually falling since last night. Pulse almost imperceptible. after dressing this morning she sank very rapidly and died during the afternoon after a severe Convulsion.

Case 11. A. M. Clure aged 25 years.

Primary amputation for compound Comminuted fracture of left thigh bone in the upper third. Amputation at hip-joint.

Everything went well in this case so far as could be observed till the morning of the 14th day after operation when he had a slight rigour followed by copious sweating. The flaps were all united at the free edges except at the points where the drainage tubes were introduced.

but then everything appeared to go wrong and on the 14th day. the flaps were found to be very much separated gaping all along the free edges where they were previously firmly united. Flaps swollen and painful to the touch. Discharge scanty whey like and foetid. The discharge previously being pale yellow and without any foetid odour. He complained of pains shooting through the Chest back and limbs. slight nausea but no vomiting bowels Costive. tongue Clean but thick & soft. during the afternoon he had his first rigour, and the temperature began to rise. from this Point Equine Pulse & temperature on chart Urine Normal,

15th day Parts redressed today. Flaps found to be very loose and flabby. granulations pale & sloughing all along the line of junction. The openings at each end of the incision where the drainage tubes were inserted were very much dilated and the edges everted. granulations gray and breaking down. Discharge fœtid acid in reaction and of a whey like appearance. Posterior flap swollen, of a bluish colour. This swelling extended up over the buttock. Pulse very small. but regular. Expression today that of fear. face very pale and haggard. Voice changed in tone and he has assumed rather a childish mode of expression. Rigours severe a occuring about once

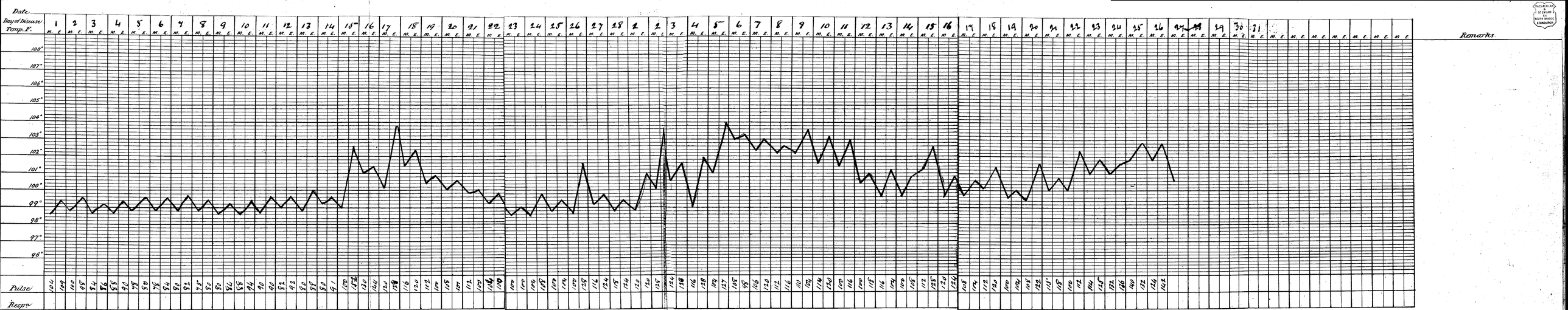
every six hours. Sweating very Profuse. but the perspiration usually dries up in about one hour after the Rigour when the Skin becomes dry an harsh to the touch. Cutis anserina Well marked immediately before and during the Rigours. but this also soon disappears!
Complains of a catching pain when he breathes deep. about the vicinity of the right Nipple but there is No evidence of mischief in lung or pleura to be found by means of auscultation Slight amount of Tympanitis but no pain. Bowels. Regular but the faeces are rather pale & have a very disagreeable odour. Tongue pale an flabby.

and indented by the teeth. Lips dry and hard. Breathing oppressed. Skin slightly tinged especially on face and over the abdomen.
No pain in the Stump. Urine normal.
16th Day. Slept well last night, had no Rigour till about 8 a.m. when he had a very severe one lasting about twenty minutes. Partly dressed and appear much the same as yesterday
Stool darker in Colour but very offensive in odour. Tongue dry with thick brown fur extending to near the tip Sordes on teeth & gums. Passed a very quiet day till 6 pm when he had another severe Rigour followed by very copious sweating. Vomited twice during the

Evening. Vomited Matter frothy & of a greenish Colour.
Urine high Coloured loaded with urates Chlorides deficient Specific Gravity 1014 Slight trace of albumen.

17th Day. Slept pretty well after midnight- Discharge very watery copious and foetid. Flaps entirely separated where they were previously firmly united. Pulse extremely small almost imperceptible at the Wrist. Slight Vomiting. Tympanitis very marked Bowels loose. Stools very enteric like alkaline in Reaction
Urine yellow and loaded with lithates Chlorids very deficient. Albumen well Marked Specific Gravity 1012
Pain in Right Side increased by the slightest pressure over the liver

and on percussion slight enlargement of the left lobe was found. this extended downwards and inwards about one and a half inches below the lower edge of the ribs. There was not however any evidence of bile fluids in the urine but the fasces were rather pale and some of a very offensive odour. The skin became deeply tinged towards the evening. The patient now began to sink much more rapidly and about 10 pm he was quite comatose, pupils very much dilated and insensible to the light The temperature fell rapidly after midnight and continued to fall till he died about 4 am. He died during a slight convulsion on the morning of the 18th day after the operation.



Name John Tomar Occupation Navvy Residence

Age 17 {S. M. Grade Disease Compound Fracture of Tibia Termination

{S. M. Occupation Residence

Disease Termination

{S. M. Occupation Residence

Disease Termination

Case III. John Somar. aged 17 years Navy.

This was an ordinary case of compound fracture of the tibia. with the anterior edge of the proximal fragment projecting through the skin about half an inch and so firmly fixed in the integuments that we had to remove a small portion of the bone before the parts could be adjusted This was done under the Carbolic spray and after being dressed in gauze the limb was fixed in a McIntyre splint. The dressings were removed next day by the Visiting Surgeon and new dressing applied in the same manner except that in place of McIntyre splint Potts splint were used. Every thing went on well in this case. the wound

having quite healed up. and the leg to bear to be lifted by the Groin without in the least causing any movement or pain at the site of fracture. But on the 15th day after the accident the parts about the fracture especially the cicatrix became very painful and on removing the dressings we found that there was a considerable amount of redness and swelling. The leg was redressed as before. but the patient still complained of pain he was very uneasy. and vomited several times during the day. About 10 pm he had a slight rigour accompanied by sweating and increase of temperature Next day an incision was made to relieve tension when a considerable

amount of pus escaped. This pus was watery and fetid. From this opening we found that there was a sinuse leading around the bone opposite the fracture. The ends of the fragments which were previously pretty firmly united were now quite loose and the pus was apparently coming for the most part from the broken surfaces of the bone.
He had four rigours during the last 24 hours and was loosing flesh very fast. But immediately after the pus had been given vent to the febrile symptoms began to abate. vomiting ceased rigours became less frequent and fewer and the sweating almost stopped.
On the 12th day after the first rigour, the

temperature which had now almost reached the normal began to rise again accompanied by slight rigours but no vomiting. He however began to Complain of pain between the shoulders. difficulty in breathing and short hacking Cough. Nothing however could be found abnormal in the Chest either by percussion or auscultation. There was no apparent Change in the State of the leg to account for these symptoms and the temperature fell again as rapidly as it had gone up.

Next day however the temperature again went up accompanied by increased urgency of all the other symptoms before mentioned. and especially pain in the left hip and

Right Knee joint. These parts on examination were found to be red swollen and painful to the touch. The temperature & pulse now went up very high as will be seen by the Chart. Urine loaded with amorphous urates chlorides Normal Albumen well marked. Next day free incisions were made over the Knee & hip joints indicated and at the middle of the left thigh behind from each of which a large quantity of Pus was liberated From this time onward his strength slowly failed. The nausea however did not return & so he was able to take a fair amount of food. About the 18th day after the first Incision a painful swelling appeared.

in the left Wrist-joint. This however gradually disappeared after the application of the wet bandage.

On the 20th day he Complained of great pain over the Sacrum and here a free incision was made at once an Charcoal poultices applied. A large quantity of dark thick matter was removed. and the surface of the Sacrum was then found to be bare over nearly its whole surface. This must have formed very rapidly as we never noticed any change 24 hours previously when we were looking his back for bedsores. From this time onward the temperature oscillated very much as also did the pulse.

which was Notably small and quick. and at times almost quite imperceptible at the wrist.

Then the Lungs began to shew signs of mischief! the Cough increased in frequency and he spat up a Considerable quantity of Reddish Yellow foetid Matter! Mucous Rales were abundant all over the Chest - front & back. Voice very much Changed in tone at times almost reduced to a whisper Hearing and Sight appear to be quite Normal!

23rd day. The tissues surrounding the original Site of injury are now completely Changed. the Greater bulk of the Muscular and Subcutaneous tissues Composing the Calf of the leg.

are reduced to one large mass of slough. And sinuses are found to extend from this point upward through the popliteal space to the opening in the thigh. and from this to the opening at the hip. Downwards the sinuse also communicates with the opening behind the heel where sloughing had previously taken place. The discharge from these extensive surfaces was so copious that we had to dress the parts twice daily till the 26th day when the discharge greatly decreased and at the same time pulse and temperature fell considerably. From this time on till the 35th day. the temperature & pulse varied very much but rarely

Rose above 100° or 120 per Minute he became very dull and required to be spoken to several times before an answer could be got which was then only in a more incoherent whisper. For five days before death he lay perfectly helpless not able even to lift his hands which lay where ever they were put. The urine and faeces were now always voided in the bed and it was therefore very difficult to procure a sample for testing but when I could not get any of his urine caught coming away I drew off a few drops by means of the Catether and I always found albumen present varying from a mere trace to 1/3 of the

volumn. Chlorides were markedly deficient. Fibe Casts granular and fatty were abundant.
On the morning of the 35th day gangrene appeared in the toes of both feet which rapidly spread up the dorsal surface. to the digs which were in a state already just verging on mortification.
From this time on till the end he was quite Comatose and so stupid that when we raised his head & shoulders. he would barely bend at the hips. During this time he was supported entirely by means of Nutritive enemata. being quite unable to swallow

Remarks. This was a case which I took to be a very fair example

of subacute pyaemia. And from its peculiarities compared with the cases occuring immediately before it was led to think that in this one we had an attempt of nature to break the type of the Epidemic, and although the disease proved fatal in the end. still the next two cases recovered and so with their recovery ended the epidemic which has not reappeared so far as I know.

On examination after death the lungs were both found to be extensively affected with secondary abscesses varying from the size of a pins head to that of a walnut. The abscesses were for the most part confined to the upper third in both lungs. The bases of both lungs were engorged with venous

blood (possibly due to the prolonged confinment in the recumbent position and the weak state of the circulation) Several small patches of thickened pleura were found in front of the apex of the left lung at points where abscesses in the lung tissue had come to the surface. In the pleural cavities behind both lungs a small quantity of whey like fluid was found containing pus cells and small flakes of lymph.

The liver was very much engorged as in section had an appearance very similar to the nutmeg liver. Could not find any abscess either in its substance or on the surface

The bowels were very much wasted and resembled very much the state found.

after death from Starvation. Lumal of Peyer's patches were covered with slough. some apparantly granulating while others were markedly congested. Spleen appeared to be quite Normal. Kidneys were soft and flabby very pale in section No abscesses were found but amyloid degeneration was well marked in the Malphigian bodies. The Brain was very soft in fact it could not be cut in section. No abscesses were found here but there appeared to be excess of fluid beneath the arachnoid and in the lateral Ventricles.

I may note further in regard to this case that there appeared two distinct breaks in the Course of the febrile symptoms. On both occasions the heat

fell to a point as near the normal as could be with such extensive distruction of tissue and from such a cause; And it was only after the pyaemic symptoms abated for the second time that the intervention of gangrene brought us back to a state of matters as bad and perhaps worse that we had. fatal dissolution and but for this untimely complication I believe the Patient would have Recovered. from the Ravages of the pyaemia per se.
This was the only case in which we had any complication about the joints so Commonly mentioned as one of the most prominent symptoms of pyaemia. Neither had we gangrene in any of the other Cases.

Case IV. This was a case of acute periostitis of the lower third of the right tibia followed by separation of a portion of the periosteum and necrosis of a piece of the bone on the inner aspect. Immediately after admission a free incision was made over the diseased part & the dead bone removed by ganging. a drainage tube was inserted and the part dressed antiseptically the operation having been performed under the carbolic spray. Everything in this case proceeded favourably till the 13th day after the operation. The wound was quite healed up and the sinus left by the drainage tube was almost granulated to the surface when he was discharged

with an attack of vomiting and purging accompanied with rigours sweating increased pulse & great rise of temperature.
On the 14th day the wound was found to be somewhat enlarged, the granulations flabby and gray. while the cicatrix had changed from a bright red to a dusky copper colour.
The discharge instead of the laudable yellow pus. was changed to a thin watery fluid of a buff colour.
He complains of pains in the back and head, nausea and sleeplessness. and is very sensitive to pain, in fact if he is touched anywhere he shivers all over. He is very spoiled and when spoken to begins to cry.
His symptoms varied very little from the

above for the next 9 days when the rigours and nausea ceased and he had a very good sleep free from starting or bad dreams. From this time the temperature gradually fell, although at times there was a very suspicious upward tendency. In this case there was a very troublesome cough developed during the ten days illness. Mucous Rales all over right lung & fine Crepitus at left base. Pleuritic friction in the vicinity of left nipple, lasting for three days, and accompanied with sharp pains. I have no doubt that the friction and pain noticed here was caused by a state of matters exactly similar to that seen at the.

autopsy Case III.

There was marked tenderness over the
Region of the liver but no increase
in the liver percussion could be
made out. This must have been
due to temporary Congestion. prob-
-ably excited by the passage of the
injected material in the blood through
the liver in its passage back from
the lower extremities. I do not think
that there could have been
abscess here because if there had
been the symptoms would have
been much more persistent and
not passing off in a few days
as was the case here.
A Consultation was held in Connection
With this Case to Consider the advisability
of removing the leg at the knee joint

with the hope of arresting the pyaemic mischief and it was agreed to do so. But the parents of the lad objected and I advised them to oppose the operation which they did. I believed that in so advising them against the decision of the Staff I was doing what was right for three reasons. First I did not think the patient was in a fit state for such an operation and second the pleura and liver showed distinctly that the system was saturated with the pyaemic poison and even if they were successful in removing the limb that the fresh wound and open end of the bone would be immediately affected from the blood & a larger surface would

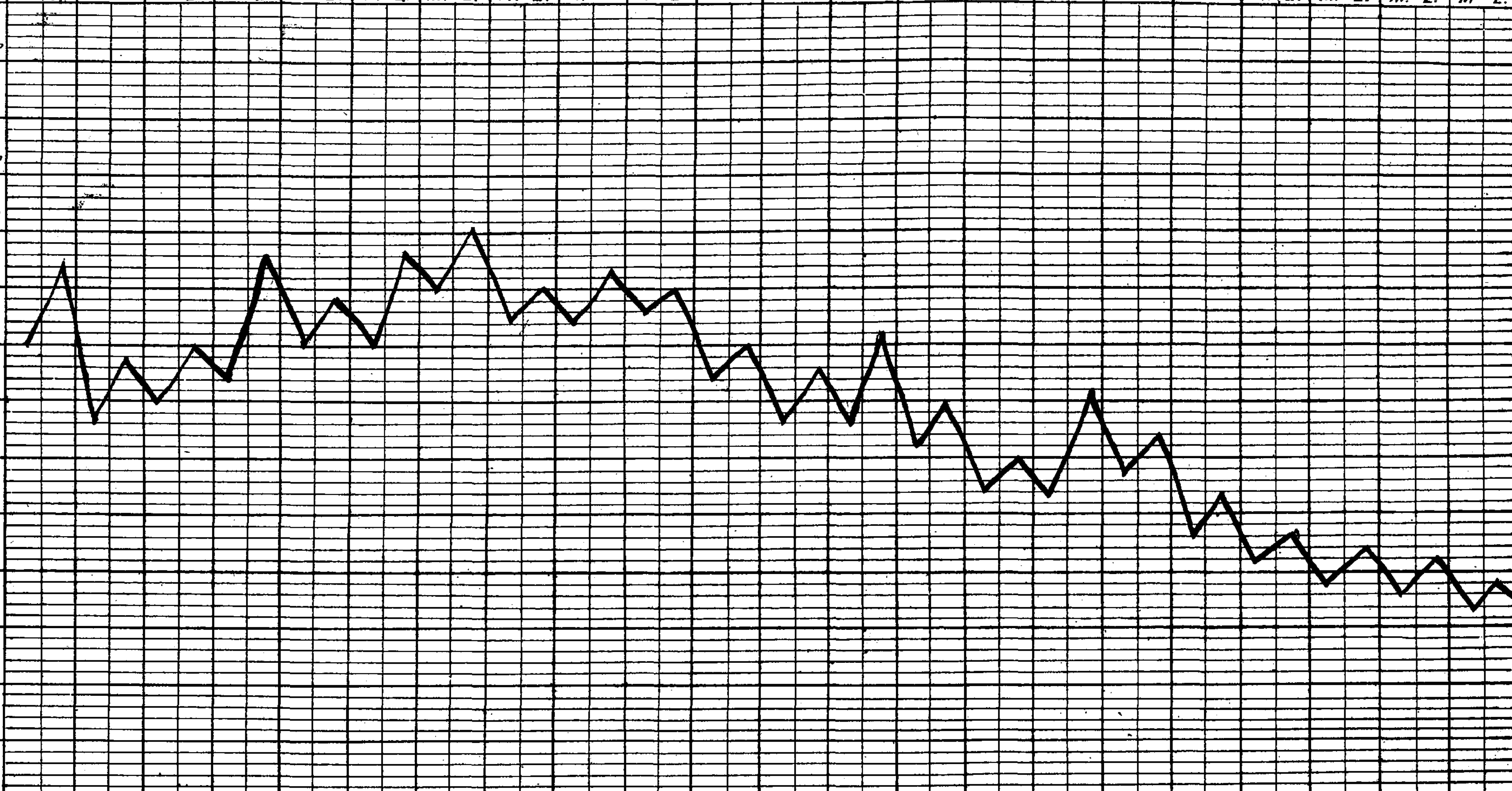
be presented to the atmosphere and a greater wound would be to heal with decreased natural power. It seemd to me that if we had free drainage and could get antiseptic fluids such as Chloride of Zinc applied to the site of mischief we had a better chance of eradicating the poison than by opening up new surfaces in a subject already saturated with the poison. And seeing that by carefully disinfecting the wound in this case & keeping up the strength we ultimately made recovery I consider that I was quite justified in advising opposition to the operation thus saving a useful limb and probably a life.

MACLACHLAN & STEWART 64 SOUTH BRIDGE EDINBURGH.

Date

Day of Disease

Temp. F.



Day of Disease	4		5		6		7		8		9		10		11		12		13		14	
	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.
Pulse	116	120	104	108	104	120	110	138	118	120	136	134	128	130	130	136	128	132	128	114	104	108
Respn																						

Day of Disease	15		16		17		18		19		20		21		22		23		24		25	
	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M	E.
Pulse	112	112	100	116	124	118	100	100	84	82	84	86	88	94	120	92	97	88	80	84	88	90.
Respn																						

Remarks

Name Patrick Millea Occupation Labourer Residence Greenock

Age 17. { S / M — Disease Necrosis of Tibia Termination Recovery.

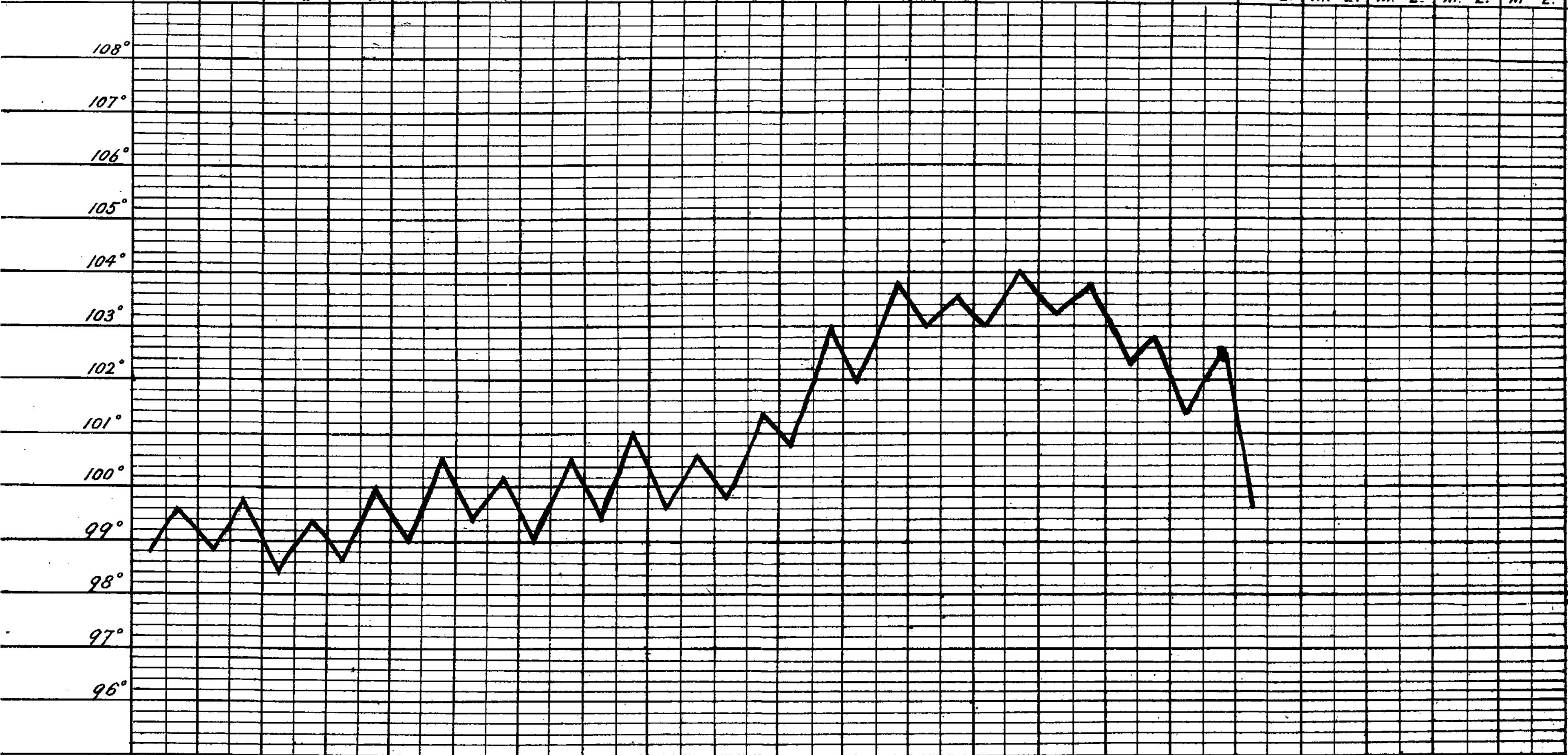
Case 5 John Shields Necrosis of Tibia left.

Two days after admission this patient was operated on. The operation consisting of the cutting down on the bone and the removal of the sequestrum which was incased in new bone all over except a small portion at the inner surface of the lower third. This opening was slightly enlarged before the dead could be got out and then a drainage tube was introduced and the would closed up. This lad was rather reduced in health previous to admission but after the operation he began to improve and continued to do so till the 12 day after the operation when he was seized with a slight rigour and increase of temperature. Next day he had another

Date: March

Day of Disease / Temp. F.: 1–22 (M. E. for each day)

Remarks.



Day	1 M	1 E	2 M	2 E	3 M	3 E	4 M	4 E	5 M	5 E	6 M	6 E	7 M	7 E	8 M	8 E	9 M	9 E
Pulse	114	112	113	110	104	106	124	113	118	100	100	104	106	100	92	104	106	103
Resp.n																		

Day	10 M	10 E	11 M	11 E	12 M	12 E	13 M	13 E	14 M	14 E	15 M	15 E	16 M	16 E	17 M	17 E	18 M	18 E
Pulse	114	117	124	132	124	160	124	122	130	135	126	130	122	124	130	135	—	
Resp.n																		

Name John Shields Occupation — Residence

Age 6 {S M — Disease Necrosis of Tibia Termination Fatal.

Rigour accompanied with sweating and followed by vomiting, the vomiting continued at short intervales during the whole day, and in the evening he had another Rigour much more severe than the first. after this he had no more vomiting but complained of pains shooting down his back and legs and tightness across the front of the Chest.

The wound looked very unhealthy but the discharge appeared much the same in Colour and quantity as before. Tongue became very dry and brown in the Centre and he Complained of great thirst. Bowels very costive Faeces pale and very offensive in odour. Appetite Completely gone and he takes no nourishment except small.

quantities of milk. The wound is very much opened up again and the granulations about the tube hole are entirely broken down. The discharge now (4th day) is thin and grayish in colour with a very acrid offensive odour.

5th Day wound much the same in appearance. Patient very weak tending to be drowsy. Rigours less severe but coming on about every 4 hours. Bowels loose since early morning. abdomen tympanic. Skin markedly tinged with bile. pulse rapid but very small and weak.

6th Day. Patient quite comatose, had a slight convulsion during the night and now he keeps constantly muttering. Pupils quite insensible to the action of

Date April 4th Operation

Day of Disease / Temp. F.	4 M.	4 E.	5 M.	5 E.	6 M.	6 E.	7 M.	7 E.	8 M.	8 E.	9 M.	9 E.	10 M.	10 E.	11 M.	11 E.	12 M.	12 E.	13 M.	13 E.	14 M.	14 E.	15 M.	15 E.	16 M.	16 E.	17 M.	17 E.	18 M.	18 E.	19 M.	19 E.	20 M.	20 E.	21 M.	21 E.	22 M.	22 E.	23 M.	23 E.	24 M.	24 E.	25 M	25 E.
Pulse		92		95		100		104		130		124		122		112		130		122		128		120		126		120		130		114		114		116		125		122		145		132		130		—
Respr																																													

Remarks.

Name James Mortemer Occupation School Boy Residence Port Glasgow

Age 4 {S / M —} Disease Excision of head of Femur Termination Total

Light. He began to sink Rapidly after arising this morning and died about 4 pm in a Slight Convulsion. being on the 4th day after the first Injury.

Case of John Mortimer act 7 years. Excision of head of Right Femur.

This operation was performed under the double jet Carbolic Spray, and by the ordinary Elliptical incision. The head of the bone was Removed successfully and found to be very much Necrosed. as was also the Acetabulum. which was cleaned out with the gauge & Volkmann spoons as well as could be. The drainage was well provided for and the parts dressed in the ordinary way with green silk and gauze

He was dressed every second day. and progressed most favourably so much so that he could allow the limb to be moved when being dressed without complaining of any pain. But about the tenth day after the operation he complained of pain and although it was not the day for dressing him we took down the dressing and found the part to be red and swollen. The tube was removed and washed and chloride of Zinc in solution injected & then dressed as before. The temperature from the time of the operation till the change on the 10th day averaged 99° degrees. pulse about 100 and general condition very good. But on the afternoon of the 10th

10th day he complained of sickness and vomited immediately after dinner about 10 pm. he had a slight shivering followed by sweating. During the night he was very restless and the temperature went up to 104°2, pulse 125 very full but soft. 11th day. We found him in a very exhausted Condition. face pale and pinched, tongue thick and flabby with a thick yellow fur. He Complained of thirst, pains in the back between the shoulders, and at the left elbow joint but here there was no evidence of irritation externally. The hip was redressed and it was found that the discharge which was thin and slaty in colour was very profuse. The granulations

were pale an enlarged just as if they were engorged with water, And the wound which had previously appeared to be firmly united by first intention was Gaping in its whole length about one quarter of an inch deep.
The sickness was very much abated but he still complains of pain in the back, and the rigours come on about every 6 hours.
The skin today is somewhat yellow in appearance. face very pale and lips blanched. Bowels rather costive urine normal.
12th Day. Passed a very bad night, had three rigours since 6 p.m last night voice very much changed in tone and almost reduced to a whisper

Skin today very yellow. especially on the forehead. Abdomen very tympanic Bowels loose. since 8 am. moving about once every hour faces greenish yellow and very offensive in odour Urine loaded with urates Chlorides deficient- Slight trace of albumen Specific gravity 1.016.
Discharge from wound very foetid in odour. but in quantity and appearance very much the same as yesterday. Slight haemorrage from nose this Morning. Pulse 130. Temperature 102°4. Tongue brown in Centre and yellow at the edges. His breath has a very offensive smell. but Nothing of the hay odour so much spoken of in Connection with these Cases. At 8 pm he had a very.

he had a very severe rigour which passed into a fit very like an apoplectiform convulsion ending in complete coma. after this he never recovered consciousness but gradually sank and died about 2 am on the 13th day after the operation. There was no swelling of the joints in this case. No indication of any lung complication and no evidence of pleurisy But after death I found several small patches of inflamed pleura scattered over the front of both lungs. and a considerable amount of thin milky fluid in both pleural cavities. I made an incision into the left Elbow joint but found nothing abnormal there. The liver was quite healthy so far as I could.

fluid out. There being neither abscess, inflammation or even passive Congestion at any point. and this after the jaundiced state of the skin before death I think is specially worthy of note. but I shall refer to this point further on.

The brain substance was very healthy in appearance but there was excess of fluid at the base and in the lateral ventricles.

The Kidney appeared to be quite healthy. But the bowels were very thin and transparent. and Mucral of Peyers patches were markedly Congested but there was neither sloughing or ulceration.

Date March / April

Day of Disease / Temp. F.	14		15		16		17		18		19		20		21		22		23		24		25		26		27		28		29		30		31		1		2		3		4	
	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M	E.
Pulse	84	92	90	95	93	100	75	84	90	95	88	85	84	79	77	100	100	98	90	92	84	88	80	82	80	94	96	124	126	125	120	102	130	120	79	84	82	77	85	82	82	84	75	70
Respn																																												

Remarks.

Name John Morris Occupation Engineer Residence Glasgow

Age 26 { S / M Disease Amputation at Knee Termination Recovery

6

Case. Wm. John Morris aged 26 years Engineer.
This was a case of primary amputation at the Knee joint by Carden's Method. Passing through an attack of acute pyaemia and recovering.
The amputation was successfully performed and the parts dressed antiseptically by means of Carbolized gauze, the whole operation having been gone through under the Carbolic Spray from a double jet Spray Produced.
On the Morning after the operation the dressing was Removed and all the Sutures (which were of Silver wire) were Removed so that a Vessell might be tied which had been bleeding in the lower flap during the Night, the Clots were Removed and the Surfaces Sponged over with.

a Solution of Chloride of Zinc Strength 20 grains to the ounce. And the flaps were again adjusted roughly with the fred edges of the Cut Skin everted and not approximated as I think they should have been, if an attempt at union by first intention be desired. For Several days after this the Stump was dressed every Morning and the discharge which was of a thin brown material was very copious. The discharge however gradually resolved into a healthy Yellow Colour but was always in excess. The temperature averaged 99° in the Morning an 99°5 in the evening Pulse about 85 till the 14th day when he began to Complain of general uneasiness and

and a peculiar sense of tightness about the front of the chest. During the evening he became sick and vomited a considerable quantity of greenish fluid. The temperature began to rise about 8 pm. and at 10 pm. he had a severe rigour followed by sweating. The temperature registering 103·4. Pulse 124 per minute. Face pale expression haggard. voice tremulous, and speaking as if he had received a great shock or fright.
On the 15th day the stump was redressed and then the discharge was found to be rather increased in quantity but very much changed in quality more fluid in consistency & of a greenish colour, odour rather foetid. The drainage tube which passed from

from one side of the stump to the other was resting on the cut surface of the bone and was decidly stinking when taken out. I drew the attention of the acting Surgeon to both facts but the tube was simply washed in a solution of Carbolic acid (strength one part in forty) and replaced as before. And the gauze dressing put on fresh. The symptoms continued just as before the rigours however being rather more frequent and severe. and the sweating almost continuous. Tongue very brown and dry. Bowels costive and thirst excessive. He continued in this state for the following three days becoming rapid reduced in flesh

and strength. till on the morning
of the 20th day he was dressed
by another Surgeon who removed
the long drainage tube and syringed
the wound well out with a saturated
solution of Chloride of Zinc and intro
-duced a fresh piece of tubing from
each side only long enough to reach
through the thickness of the flaps.
And otherwise Changed the treatment
as I shall point out under the head
of treatment. from this time forward
the patient rapidly improved in every
way and made a good and rapid
Recovery which was only interrupted
by the separation and discharge
of a piece of dead bone which I
believe was the portion against
which the tube had rested and killed

Case VIII. Joseph McKirdy aged 8 years.

Amputation of left leg at Knee by Cardens Method. The process of treatment was carried out in this case as in the last with this exception that in addition to the long tube passing across in front of the Cut end of the bone there was also a tube introduced in the middle of the flaps. the inner end of which also reached the bone. The edges of the flaps were also kept everted the reason for which I several times enquired after but never got any explanation.

This lad recovered well from the effects of the operation and progressed very well till the evening of the 13th day when a decided rise in temperature and pulse took place. Early the

The next morning he had a slight shivering followed by sickness and vomiting. And at the morning visit he was found to be very much changed in general appearance temperature 103.2 pulse 130. Respirations 40 The stump was redressed but the ligatures were left untouched except that they were syringed out with a 1-in 40 solution of Carbolic acid The flaps were found to be very much swollen and painful to the touch but there was no redness or oedema. Edges of the flaps were pale and grey like. And the discharge whey like, copious, and foetid. Slight tympanitis with pain on pressure in the vicinity of the umbiliceus Bowels loose stools watery and very.

offensive in odour. Urine high coloured loaded with urates. Chlorides Normal and slight trace of albumen.
He did not Complain of any pain when left untouched but whenever he was moved cried as if affected with acute Rheumatism.
The Rejoins were now Coming on about once in every 4 hours and he was Continually bathed in perspiration Causing him to have a very sickly odour. Tongue clean but very dry. Skin becoming very yellow especially over the temples.
15th Day Parts dressed as before with the same tubes Replaced. He passed a very restless night had very little sleep, and when he did doze over for a short time he always started up.

crying as if he had had some frightful dream. The Rigours were very frequent during the night occuring about once every 4 hours and lasting from two Minutes to twenty Minutes. The perspiration was very copious and continuous between the Rigours. Tympanitis very marked today and seems to impede the action of the diaphragm very much Bowels bore since last night. Stools copious, fluid and green in Colour streaked with a little blood.
Early this morning he had a severe bleeding from the nose which has caused him to be much weaker today than he would otherwise have been. The flaps are now almost entirely separated from each other and

and are still soft swollen and painful to the touch. They were today adjusted and held together by means of adhesive plaster.
The skin tonight is very moist and large drops of sweat are continually running down his forehead.
The jaundiced appearance is also very much increased in fact his skin has the appearance rather of a half caste Pathan of a lad with a fair English skin.
16th Day. During the night he had a slight convulsion and since then he has remained quite comatose Breathing quick and laborious. Distension of abdomen persistent and extreme. Bowels still loose and the faeces and urine are voided in the bed

He was not dressed this morning owing to the very depressed state in which he was found at the visiting hour. There was very little difference in the patient during the rest of the day. He lay perfectly motionless except the heaving of the chest till about 5 pm. when he had a convulsion slight in nature but lasting about 20 minutes after which he sank still more rapidly and died about 7.30 pm.

The drainage tubes were never changed in this case although they were decidedly foetid from the beginning of the attack. And the silver sutures were not removed even after they perfectly loose some of them in fact only retaining their hold in one flap.

Case IX Thomas McKay aged 65 years.
Navvy. Compound Comminuted fracture
of right leg in upper third extensive
laceration of Scalp and fracture of
fourth fifth sixth and seventh ribs
on the right side. This man had
a Splendid Constitution as will be
seen from the fact that with all
the above mentioned injuries he was
brought fourteen miles in a Spring-
- cart over a Rough Country Road
and then found to be in such
good Condition as to admit of
amputation of right leg at the Knee
Dressing of the Scalp and fixing of
the ribs with adhesive plaster. He was
65 Minutes under Chloroform and Came
out of it at the end of that time
without the least bad Symptom

The flap formed by the laceration of the scalp ran directly across the skull from about one inch above the left ear to one and a half inches above the right ear. This was fixed accurately in position by means of Silver Sutures, and a small drainage tube inserted through a hole cut immediately over the occipital protuberance.

The leg was removed by "Cardan's" Method and a drainage tube inserted straight across the stump protruding at the extremities of the flaps "just in the same way as before mentioned."

The patient rallied very rapidly. The scalp wound uniting in nearly its whole length by first intention. The only piece not so uniting was about the middle of the wound where a

little bit about one inch long. Sloughed from the Effects of the pressure when the Stone fell upon him.
The Stumps healed very well. the flaps were firmly united and the free edges (left everted) were nicely contracted and cicatriged. at the end of the second week, but just then he began to present the symptoms now so Common to us and so much dreaded. He first became very ill-natured, Complained of his food being bad and not agreeing with his Stomach then vomiting set in accompanied with Pains in the Stumps and Scalp. Short hacking Cough and Severe pain at times Shooting along the injured side in the line of the fifth rib. The temperature which

had previously averaged about 99°5 now went up to 103 in the evening on which the sickness began. During the night he had several slight rigours followed by profuse sweating We removed the dressing from the stump and found the flaps somewhat swollen and painful to the touch but the discharge appeared to be very much the same as yesterday with the exception of the odour which was decidedly fœtid. The parts were just dressed as before the same tube being introduced. The wound in the scalp was very much changed in appearance for such a short period The discharge was more copious but less dense and of a greenish tinge and the cicatricial tissue which was

previously well Contracted on each side of the part where the Slough had separated was now very much soft-ened and broken down for about one inch at each end. The posterior flap like portion was Red Swollen and very Sensitive. Drainage quite free from behind where the tube was inserted. Dressing reapplied as before. Tongue pale and flabby. Breathing hurried. Face pale and pinched and slightly tinged with bile. Bowels Costive Urine slightly Coloured with urates but otherwise Normal.

16th Day. Last night he passed a very restless time slept on for a few Minutes at a time and was not refreshed in the least degree. He had two severe Rigours during the early

part of the morning and the sweating is Constant & Copious.
The Stump and head were not dressed today as he was not Complaining of any pain in these parts and the discharge was not through the coverings. Bowels acted Several times during the night loose and very offensive in odour. Urine loaded with urates. Chlorides deficient. Small quantity of albumen. but no evidence of bile pigments. Specific Gravity 1018.
19th Day. Slept a little last night but has been very wakeful all morning Diarrhoea very troublesome. faeces very fluid pale Yellow odour very offensive very like the Enteric Stool.
Parts dressed as before. Flaps of Stump entirely separated the lower flap dropped.

down when the dressing was taken off. The internal surfaces of the flaps then presented a dirty gray surface with small patches of slough at several points. But although these surfaces appeared to be so lifeless still with the least roughness in washing or otherwise dealing with the flaps bleeding was very easily induced. The flaps were brought together again and fresh adhesive plaster applied so as to retain them in position. And the whole dressed as before. Fresh silver sutures were applied in the scalp wound which was also very much widened and here as might have been expected from the sensitive state of the skin great pain was produced which greatly

disturbed the Patients Rest.
Rigours Still Continue at intervales
of 4 and 5 hours. they do not Come
on at Regular Periods. But the
Sweating is almost Continuous.
Appetite is now entirely gone and
the only things he can take
without vomiting are Brandy and
ice. He is very fond of the ice in
small pieces but does not Care to
drink the water in which it floats.
Tongue. Brown and dry. Lips parched
and black, Sordes on the teeth
and the breath has a heavy sickly
odour Bowels Still loose and he
Complains of Severe pain about the
Umbilicus at times. Urine thick
Yellow and Scanty. Specific gravity
1.024 Albumen Well Marked.

Pain in the injured side not so much Complained of today. Last night he coughed severly and spat a considerable amount of black matter very fœtid and composed for the most part of decomposed blood clot which we supposed might have been lying at the site of the injury to the lung by the broken ribs and during the time the patient was doing so well it may have partially organised but when the pyœmia set in it had broken down and passed up the bronchia

18th day. Last night he rested a little better but today he is extremely weak Pulse at the Radial almost imperceptible and very rapid Temperature 102°6 (vide chart) The voice is quite inaudible

And he appears not to be able to find words to express himself. Parts were not dressed this Morning because of the great weakness. From this time forward he sank very rapidly. And about 4 pm. he was quite insensible. Respirations hurried and short and kept up for the most part by the action of the diaphragm Temperature 104-2. pulse could not be counted at the wrist and the first sound at the apex was quite inaudible. He had a slight rigour about 8 pm. after which he perspired very freely the temperature at the same time falling rapidly till at about 10 pm. he died perfectly collapsed the heat being only a fraction over 98° at the time.

Case X. Donald McKinnon aged 60 years. Carter.

This man received a kick from a horse whereby the skull was fractured just over the left frontal eminence. He was unconscious for a few hours after admission but recovered rapidly afterwards and was able to leave the Wards on the Seventh day. We heard no more of him for eight days when he came back and was readmitted for pain in the head in the vicinity of the recent injury. bilious vomiting and obstinate Constipation. The bowels were freely purged but the above symptoms were not removed in the least degree. On the following day being the 16th from the time of the accident, he had several rigours accompanied with sweating and diarrhoea, at the same

time his Skin became very yellow but the tongue remained clean and moist. He did not complain of thirst and although the vomiting was very persistent he would not take either ice or brandy. as prescribed On the 14th day he complained of shooting pains in the abdomen. and a constant dull heavy pain in the region of the liver. On examination the liver was found to be very much enlarged extending downwards and to the left nearly to the umbilicus. The pain was greatly increased by palpation or steady pressure over the lower ribs and when pressure is made here he complains of pain in the back and over the right shoulder. No well defined prominence or sore spot can.

be discovered as indicating an abscess in the Substance of the Liver.
The Skin is very much tinged as well as the Sclerotic in both Eyes.
Today he Complains of Pain and weakness of sight in the left Eye. the pupil of which is dilated about one half larger than the Right and Heather Sluggish. There is no evidence of irritation about the Cicatrix which is quite firm and the Skin moves freely on the bone. The Rigours only occur once in 24 hours but are then very severe lasting about half an hour and resembling very very much an epileptic fit.
Urine Natural in Colour Specific gravity 1.018 loaded with albumen and a small Sediment of amorphous urates.

Tongue white and soft indented with the teeth.

18th Day. Passed a very restless night had one very severe Rigour at 9 pm yesterday but none since. Perspiration very Copious during the whole night. Face very pinched and yellow. lips blue and parched. Tongue hard and dry. with a rough brown fur in the Centre but still he has no thirst. Diarrhoea very much abated. Pain in right side still very severe. but not so Constant. He is loosing flesh very Rapidly. and is so weak that he cannot turn in bed without help. Vomiting has ceased but he is still at times rather sick. and has not the least inclination for food. Today there is a very large quantity of

of albumen in the urine. and it is loaded with urates. Chlorides Normal. Specific gravity 1.018. Pain over the liver still severe and it is now accompanied with a Considerable Amount of tympanites Sight almost entirely lost in the left eye and the right is very weak left pupil still dilated and quite insensible to the action of light. the right however is still active. During the Morning of the 19th day he had a most severe Rigour after which he was quite Comatose and at the Morning Visit he was so weak that the heart's action could only be heard with the greatest difficulty He continued in this way gradually getting weaker till he died about 11.30 am.

In regard to the Remaining Cases four in Number I am Unable to give them as I lost the notes and prefer not to Relate from Memory. They were essentially the Same as the foregoing Cases in every respect.

I shall now take up the General Symptoms of these Cases as they occured to me.

1st Premonitary Sensations. These presented themselves to me in the form of fleeting pains in the chest, back and limbs, beginning as a rule in the Chest as a sense of oppression or weight causing more or less breathlessness. The pains are not severe but cause great uneasiness. Then they have occasional flushing of the face. Nausea, and

and frequent micturation the urine being pale and of low specific gravity. At first took no notice of such slight symptoms as these but when I had seen several cases beginning thus and passing rapidly into the more dangerous symptoms I soon became very easily alarmed by the slightest departure from the natural state in surgical cases.

2ª Rigours Following rapidly on the above symptoms came the rigours, which at first were as a rule slight but soon became very urgent. The rigours were constant in all cases and I do not think that a case of pyaemia could be determined without them. They vary very much in severity and duration in different

lasting as a rule five minutes but I have seen a patient under the action of one for twenty minutes.

Cuts anserina is generally well marked immediately before and during the Rigour but I have seen cases where it never appeared.

There is always a sensation of Cold during the time the Rigour is present but the temperature is really high the whole time.

Sweating. This always follows to a greater or less degree after the Rigours often lasting only for a short time but not unfrequently remaining during the whole period between the Rigours. It may only amount to a mere moisture or the patient may be absolutely bathed in sweat.

There is generally a heavy sickly odour arising from it- Not unlike the smell caused by the sweat of Rheumatic patients. In regard to the appearance of sudamina Mentioned by many authors as a Constant symptom with the sweating I was unable to find them on any occasion although looked carefully for them. Towards the latter stage of the affection the perspiration is as a rule very copious and resembles the colliquative sweating of such wasting diseases as Phthisis very much.

The Skin The state of the Skin varies very much in different cases at different times. At one time you have well marked cutis anserina

and again a soft moist skin as found immediately after the sweating Again you may have it dry and scraggy. The colour always changes more or less. but as a rule it is tinged with bile pigments And this colour when present varies very much in shade in different cases. I have seen some so slightly affected that it could hardly be noted, while others again assumed the appearance of a Creole.

The breath. The breath has always a very peculiar sickly odour but I could not define it as some have done as a hay odour. I do not think this odour is in any way pathognomonic of the disease as I have often noticed a state of the breath in Phthisical patients very

similar to it. The frequency of the respirations is as a rule increased and varies from time to time with the rise and fall of the temperature Complications in the lungs are seldom so frequent as to account for the rapid breathing in every case. And even if the lung were affected in such a degree as to cause the increase. slight variations in temperature would not influence as I have seen it do. I think increased frequency in the respirations is further due to the same cause as that which raises the temperature viz. the action of the pyaemic poison on the nerve centres commanding the action of the lungs themselves, and any increase or decrease of the quantity of the poison in the circulation varies the

the action accordingly. This symptom and the first rigour frightens the patient dreadfully as will be seen by the marked change which takes in their features. A change which I have always marked as a very important indication of the state of the patient.

Pulse. The frequency of the pulse is not very constant but as a rule it is very rapid generally. Regular in rhythm but not always so. The smallness of the pulse is a most important indication as is I think more constant and more pathognomonic than any other symptom connected with the affection except the rigours and sweating. It generally rises and falls very much in

harmony with the temperature depending. I have no doubt for this variation more to Changes in the Cause of the temperature than in the temperature per se.

The Rapidity varies very much. I have Counted it at every Number between 90 and 160 per Minute but never higher with any degree of Certainty

Temperature. The temperature begins to rise with the earliest indications of Mischief such as I have Mentioned at first and I have seen it register as high as 101° before a Rigour had been noticed. or any Complaint made even when questioned further than General uneasiness and a little heat. The Temperature seldom attains its

greatest height before the morning of the second day. And even when it has attained its height it does not remain constant there but rises and falls continually never however while the other symptoms remain does it ever fall to the normal. There is no definite crisis if the case is going to recover but a slow irriguler fall. Somewhat similar to but rather quicker than Enteric fever, The charts appended with the Cases give a very good idea of this, in those Cases which recovered. And also show the difference between the course of the fever in these and Traumatic fever Hectic fever Enteric fever and such like, Traumatic fever is the one which following an operation might most

most readily be confounded with Pyoemic fever. but in traumatic fever proper the rise is sharp to its height from which it runs along almost level till the Crisis when there is a direct fall just about as abrupt as the rise In pyoemia the temperature oscillates daily to a great degree but never descends to the normal and never takes an abrupt Crisis.

Urine. The urine is subject to very great variations. In the early stage we generally increase in quantity and with decreased specific gravity and paleness in colour. But after a day or two the waste appears in the form of urates. which are generally very abundant

As a Rule it Remains acid in Reaction but in two Cases it became alkaline just a day before death. Albumin was Constant in all our Cases except one. and that one recovered. It generally appears faintly on the second day after the Rigours first appeared. and gradually increasing in quantity as the Case became worse.

Renal debris is very rare apparently for only in two Cases did I find either epithelium or tube Casts and these were in both Cases fatty so I donot think that they were due to the Septicæmia because the time was too short to admit of the formation of Casts of this Nature. The Specific Gravity varied daily in every Case.

averaging from 1.010 to 1018.
After the the appearance of albumen the Chlorides were as a rule rather deficient but I never saw the totally absent.

Diarrhoea. This Complication was very frequent and was generally preceded by Costiveness. The Colour of the faeces varied very much. being at times, brown or green, or white but generally pale Yellow At times there was a little blood but it was always very slight and probably due to the ulceration which I have frequently observed in Peyers patches.

Nausea and Vomiting.

Nausea was a Constant and very early Symptom and one which annoyed the patient to a very great degree.

as it began with the first disturbance and generally troubled them to the last. The vomiting generally began on the second day although I have noticed it as the very first departure from health. It was not however so persistent as the nausea. They generally got clear of it in a day or two and although still sick still they could retain what little nourishment they were able to take in.

Pains. Pains were very constant about the chest back and limbs but they were seldom severe and generally shifted about from one place to another. The pains about the chest were generally nervous but occasionally they were due to pleurisy when friction could be made out over the affected

part by means of auscultation.
Pain in the wounds was not very often complained of after the symptoms appeared than more than before.
Coma The patients all passed into
the State previous to death and
it generally took place between 36
and 24 hours before death preceded
by either a very severe Rigour or an
apoplectiform Convulsion which left
the patient in a perfectly helpless
condition. After this the pupils were
always dilated and insensible to light
and the faeces and urine were voided
in the bed.

Treatment

The treatment of pyaemia is in the main strictly prophylactic And to insure this it is absolutely necessary that we should have large well ventilated wards for surgical cases and that cleanliness should be most rigidly observed not only in the keeping of the hospital itself but of the attendants, instruments dressings, sponges, and even the surgeons themselves. Everyone handling in any way a surgical case where there has been or is about to be a surgical operation should have his hands well saturated with a disinfecting solution. Nails especially should be kept perfectly clean as well as coat sleeves. This last remark I think

applies Specially to the Cases given because I noticed that the Surgeon who dressed the Cases over a period of 12 Months used the Same Coat the whole time having kept it in the Hospital for the purpose. And I never had a doubt but that the Sleeves of that Coat had a very active part in the propagation of the epidemic for a surer mode of Conveying the Poison could not have been invented The use of the same instruments such as Syringes, forceps, and Scissors, should not be allowed, yet in our Cases they were Carried from infected to noninfected Cases without the least Care being taken even to have them disinfected further than a dip in a 1. to 40 Solution

of Carbolic acid which I am Certain was not sufficient to Remove the virus. And men although it was sufficient the practice was very dangerous.

The patients affected should be removed from the wards where other unaffected patients are lying. This was not done in any of our cases till they were several days ill in fact, not till they were Comatose.

The rule in regard to Cases brought into the hospital if an accident was first the house Surgeon arrested bleeding if necessary and then determined whether or not he required the aid of the Visiting Surgeon. If he deemed the Case one requiring Surgical interference he simply covered

up the wounds with Sponge Cloths
Saturated in a Solution of Carbolic
acid Strength 1 part in 20 of water.
In this way the Patient lay till the
visiting Son and examined the Case
then if he thought an operation to be
necessary a Consultation of the whole
Staff was Called and when they
were assembled the Patient was
taken to the operation room shewn
in Sketch and there having been
brought under the influence of Chloroform
the operation was performed. The
parts having first been well washed
with the above Solution of Carbolic
acid and hair shaved off if any
happened to be in the vicinity of the
injured parts. All instruments used
here were placed in a tin dish

And Covered with a 1. in 40 Solution of Carbolic acid. Sponges were always kept in large tin Covered vessels and Covered with the same Solution from which they were Squeezed out when Required and Never used twice at the same operation. The whole operation was performed under the Cover of the Spray producer Charged with a Solution of Carbolic Strength one part in twenty. giving when Mixed with the Steam a Strength of one part in forty.

When the parts had been removed as for example in the amputation of a leg. the vessels were all tied so far as they could be seen then the tourniquet was removed and any other bleeding points secured. All the

ligatures were of Carbolized Catgut which was always kept in Carbolic oil strength 1 of acid to 20 of oil. just Cut of as Required.
Then the flaps were washed over with a solution of Chloride strength 20 grains to the ounce. Here I think a very great Mistake was always made. because the Chloride of Zinc actually Cauterized the surfaces which were glistening with a fine layer of lymph. Which is the most essential substance to retain and protect from violence so that the opposing surfaces of the flaps may have the earliest and best Chance to unite. But by Cauterizing this material you loose it and at the same produce a discharge from the

which Ever Should have been there
Sutures In all our Cases Silver Sutures
were used placed about 1/4 of an
inch from the edge of the flaps and
pitched about 1/4 inches apart.
The wire I always Considered to be to
harsh and unyielding for the purpose
Causing to much tension for its small
diameter and Consequent tendency
to cut its way out of the Skin.
For this purpose I believe such a
material as Cat-gut or horse hair
very much superior as they are
neither so rigid or harsh in the
Skin and tend much less to produce
inflammation or Cut their way
through. and for the same reason
they should be placed much closer
so that the pressure would be more

equalized. the tendency to puckering less and the raw edges of the skin more accurately adjusted and gaping avoided

The cut edges of the skin should be accurately brought together so that every chance for union by first intention may be had. This was entirely overlooked in all of our cases where the edges of the flaps were studiously kept inverted but for what reason I could never find out.

Drainage The drainage should always be provided for and the openings for this purpose should be placed at the most dependent points

Vulcanized perforated India rubber tubes are very good and are the most useful

in cases such as amputations. They should be carefully introduced before the flaps are brought together and if possible not disturbed for several days so that the lymph and blood clot which generally gathers about them may not be disturbed but allowed time and place to commence the process of organizing. The forcible removal of tubes and the free injection of lotions with the intention of washing out the interior of the wound before the first dressing has been applied and even at subsequent dressings is I believe very foolish treatment and totally in opposition to the theory of antiseptic treatment proper. This however

was the every day method pursued by us. and the results were the very reverse of what we expected from our careful antiseptic treatment and no wonder when we really destroyed the material which we should have endeavoured to Sage, and produced discharges from material which we ought to have assisted in the process of organizing

Again the tubes when used should be short just sufficiently long to reach through the thickness of the flaps, but never as they were in our amputations passed straight across the stump with their extremities with more or less force on the cut surface of the bone. This

invariably produced Necrosis of a portion of the bone the separation and discharge of which greatly retarded the progress of the Case even if it did not give rise to more serious mischief. I have seen exfoliation of a small piece of bone from the end of a bone caused I have not the least doubt by this mistake.

Again it is very essential that fresh sutures should be inserted at every second dressing at least as they are very apt if left much longer to decompose and give rise to a very disagreeable odour which in turn very soon infects the other parts of the wound. Catgut sutures are sometimes twisted and tied into bunches and inserted for drainage purposes.

but I do not think they are very efficient at least I prefer the tubing.
Next the cut surfaces it is best to place a strip of waterproof silk so as to protect the tender surfaces from the action of the Carbolic acid direct but I think it is a very great mistake to make it come to much surface as it then only compresses and distributes the discharge over the good skin thus causing unnecessary irritation over this the Carbolized gauze should be adjusted, composed of 7 layers of gauze and one of Sacconette placed between the two outer layers of gauze. But in addition to this I think it is very advantageous to place a soft piece

of gauze saturated in a Solution of Carbolic acid in glycerine strength one part of acid to 4 parts of glycerine this lies very close to the Stump. and excludes the air very efficiently. at the same time being soft and grateful to the parts. In regard to the first dressing after the operation I believe it is right and proper to remove the dressing the Morning after the operation but the parts should then be handled with the utmost Care & if there is no tension or other indication for interference I think the parts should be at once redressed without interfering with the drainage tubes. or any thing else and then left for three or four day just as the symptoms will indicate The second dressing should be about

the 4th day and then the tubes may be gently withdrawn cleaned shortened and reinserted. And if all goes well they may removed altogether at the fourth dressing as I have often seen in amputations both of legs and arms.

In the Case of the patients which recovered there was a slight change in the principles of dressing. For instance absolute phenol was used instead of the ordinary Carbolic acid and the Glycerine and Phenol Solution was applied next the wound strength increasing to the ounce. The drainage tubes were cut short there was no injection of Caustic lotions into the wounds or other interference with the flaps. Each dressed only once every 4 day.

instead of every day. Horse hair Sutures were used instead of Silver wire and placed much closer together and the edges of the Skin were accurately approximated

In Regard to the internal treatment after pyemic Symptoms had desinitely set in not a great deal can be said. Nourishment by means of Beef tea Milk Soups Custard and such like were used freely according to the taste of the Patient And Brandy with ice was used for a Stimulant and to allay the gastric irritation which was so frequently present. Quinine an Salicylate of Soda were given in Combination Quinia Sulphatis 5grs Salicylate of Soda 15 to 20 grs according to the age of the Patient given along with

the brandy. The brandy was given in half ounce doses every 3 hours and it was always our endeavour to give the brandy double dose just before we expected a Rigour.
When there was very Copious Sweating 10 grain doses of Spirit of Nitre was added to the above powders which had I believe a very beneficial effect.
For the diarrhoea we generally used the Tinctures of Kino, Catechu, and opium with Mistura Cretæ.
I often wondered whether the cure of the two cases which recovered was due to the introduction of Salicine instead of Salicylate of Soda in Combination with the quinine or to the Change in the Mode of dressing or both together. But after I left the Infirmary I had in private

a very marked Case of Pyaemia from neglected abscess in the Mamma. Which had been allowed to become foetid when I saw the Case. all the principle Symptoms of Pyaemia were present. I at once made free and dependent incisions cleared out the decomposing matter washed the Cavities with a Solution of Carbolic acid and gave her. Quinine and Salicine powders. Quinae Sulphatis gr 5 Salicine grains 15 one every 3 hours. in brandy and water and applied Charcoal poultices. Here I had Rapid and permanent Recovery. Granting that the incisions and poultices relieved and removed the local mischief still the Constitution was affected. beyond a doubt and here the battle must decidedly have been in favour of

the quinine and Salicine especially the Salicine. I am of opinion therefrom from what I saw of these Cases. that Antiseptic dressing properly Carried out with the aid of Quinine Salicine brandy &c. and the nourishing diets are the best and only treatment for pyoemia so far as to know at present.

I believe the quinine has a very beneficial effect on the temperature while the Salicine acts to a great degree as a Neutralizing agent in the blood. destroying or at least preventing the the manufacture of the virus in the blood. Diaphoretics have been recommended by some authors but this I think would not be heard of for one moment in such Cases when the patient was always

perspiring so freely in fact in many Cases it was ~~nothing~~ short of colliquative sweating.

Purgatives for the same reason are not indicated so far as I could see after the Cases were fairly begun, although I do they are advised by some. As a rule we had rather to check the bowels than to purge.

For the vomiting the best remedy we had was Bismuth. and of late of Cerium. They both relieved the vomiting and pain as well as the distension and sense of pressure so often complained of by these patients.

External abscesses found to be extremely rare even about joints although described by most authors as a leading complication. Swelling of the joints only occured in one

Case and that we relieved by means first of hot fomentations and secondly by the wet bandage. Suppuration did not actually take place but if it had done so we would have made a free incision and dressed antiseptically Erysipelas was most frequent in very young subjects and this we relieved by such Purgatives as the following

℞ Ol. Terebinth 3iiij
Tr Card Co 3iij
Syr Zingiberis 3ij
Aq. Menth. Pip. ad 3ij
℔ss

℥ 3i every 4 hours.

℞ Ether. Sulph. 3iij
Spt. Ammon. arom. 3ij
Tr Card. Co 3v
℔ss

℥ 3ss in water every 3 hours

This Complication is not taken notice of in any of the authors which I have consulted yet I believe it is very frequent in its appearance and most distressing when present.

Pathology. In pyaemia there are two pathological conditions one Chemical the other due to the presence of animalculae. In the Chemical form we have not what is generally termed pyaemia but rather Septicaemia and we may have this form without the other but we cannot have pyaemia without at the same time having Septicaemia. Both are due to the introduction into the blood of the products of decomposition of animal fluids. The living organisms called Bacteria and Micrococci are generated in the decomposing fluid and from this find their way by some means into the circulation where they produce the whole train of symptoms before described. It is well known that such organisms are not

in the healthy blood but that the blood of patients when a great number are kept together becomes reduced in its power of opposing them and hence they are able to exist and reproduce themselves when once they have gained an entrance. What happens when these organisms have once gained admittance then is this. they pass along the vessels till they come attached either to some rough point or at junction of the nervous with the arterial radicles here they set up inflammation an produce thrombosis. This thrombosis soon take on the form of an abscess breaks down and discharges a quantity of debris into the circulation which is again carried forward till again

arrested in a vessell where it is to large to pass here we have an Embolism which set up inflammation in the Contiguous walls of the blood vessell in which it is. Softening takes place in the Centre and gradually extends towards the periphery which may be of greater or less diameter according to its age and the density of the tissues in which it is placed. These so called secondary abscesses are are Mostly found in the lungs and Liver. I have found them in great number in the lungs but very rarely in the Liver although I have sought there especially to find them in connection with the Jaundice Symptoms. And in regard to this point I may state that in two Cases where I had well

marked jaundice of the skin no pathological changes could be found in the liver and in another case where during life there was distinct enlargement of the liver and considerable pain abscess was found in the left lobe after death yet in this case there was not the least trace of bile pigment in the skin Inflammations in Muscular tissue serous membranes and heart are due to the presence of infected emboli. But the pleurisy ~~so~~ so often found is most commonly due to the inflammation extending from abscesses in the periphery of the lung to the pleura by contiguity The period of incubation which I have noticed in these cases was for the most part about 14 days must be due to some peculiarity in the organisms. that is

to say in their power of reproduction because I see that most writers put down the first symptoms as appearing about the 3d or 4th day after the accident. In these I think the activity of the organisms must have been much greater than in those which I have seen and it is a very important point in the argument that this group of cases was the direct outcome of an epidemic.

That this was an epidemic form of pyaemia is I think quite certain, because the period of incubation was the same in all primary cases. they all with one exception died about the same number of days after the attack when it was fatal. And there was no cases known in the wards before this neither have they appeared since

them in regard to the cause could
find none. The house in which it
took place is comparatively new
and built on the most approved
plans for the treatment of surgical
cases. The site is well elevated
admitting of the free access of fresh
air and a good run for the water
in the drains. The wards are large
and well arranged, and there is
an average of 1842 cubic feet of air
to each patient. The water closets
are cut from the wards but they are
well ventilated and never cause
any bad odour in the wards.
I have here appended a drawing of
the wards which I made from measure-
ments taken while resident there,
so as to shew the general arrangement

And marked the beds alphabitically so as to shew how the affection travelled about among the patients apparently by selection and not as one would have expected that it would have passed directly from one bed to another. It did not select the apparently weak in preference to the strong but at one time a weak worn out strumous child and next a strong full blooded man in the prime of life.

D. Cairns M.B.
18th Oct. 1866

2.