Thesis accepted (S) 1902
Faculty of Med. July 1902
ITINERARY

With reference to

ANTITYPHOID INJECTION

And the enteric epidemics of

1900-1901
1901-1902
1902-1903
1903-1904,

In South Africa.
It was in November 1900, that I joined the Army Medical Department as a civil surgeon. I was at once sent to Netley Royal Victoria Hospital and placed in charge of convalescent enteric cases.

These had all contracted the disease in South Africa. The great majority came from the line of Lord Robert's march up country.

There were at this time no medical case sheets being kept, owing to war conditions, but hospital transfer sheets were forwarded with each man, giving the reasons for his being invalided and the name of the hospital from which he was transferred, such as No. 1 General Hospital, Wynberg, Mooi River General Hospital, or Pine Town Bridge Hospital.

From notes made at the time, I find that I was handed over on the day after my arrival at Netley 120 cases, 62 of which were enteric convalescents. Many of these had suffered from bed sores and some were still being daily dressed. Most of these bed sores were over the sacral prominences. Some of the patients had also had sores on the heels. One had a large sore over the spine of his right scapula.

Next to bed sores, the most common complication was thrombosis. Of my 62 cases, 25 had had thrombosis/
thrombosis. Many were still lame and had marked thickening of the left leg. The obliterated vein could in most cases be rolled under the skin and felt like a tendon. Since that time, I have seen a large number of cases of enteric thrombosis. In nearly all cases the clotting had taken place in the left long saphenous vein. In 5 of the Netley cases and in 3 other cases of which I have notes, both large saphenous veins were obliterated. In one of the Netley cases thrombosis had occurred in the left long saphenous vein and in the right short saphenous vein. The latter case had great pain in the calf of right leg and was for a considerable time painted daily with Extr. Belladonnae.

Two other cases of thrombosis are worthy of note.

When at De Aar in 1901, I was called in to see a case of great oedema of the right forearm and hand. The case was that of an officer in Kitchener's Horse, who had been a few days normal after a mild attack of enteric fever. The tension of the right pulse was higher than that of the left. There was great distension of the veins of the forearm. The thrombosis had taken place in the veins at the bend of the right elbow.

The other case was that of a private patient
I had while at Beaufort West. After a mild attack of enteric fever, there occurred thrombosis of the left long saphenous vein in the defervescent stage. I admitted him to hospital, as he had at home no decent chance of pulling through. I saw him in a marquee at about 10 a.m. and about half an hour later, an orderly came to tell me he was dead. His wife had been admitted to see him. He had sprung up in bed and fallen back dead. This was on the fourth day after the formation of the thrombus. As the case was a private one, I was not permitted to do a post mortem.

Having volunteered for foreign service, I was sent to South Africa in medical charge of the transport Columbian, having on board about 400 men and 400 horses.

I had been greatly influenced by Professor Wright while at Netley, and I advocated the use of his serum like an advertising agent. Just before sailing, I had been handed a large quantity of the material for injection, a bouillon culture of the typhoid bacillus of very high virulence heated to such an extent that the bacilli are killed.

Part of my duties was to deliver lectures on First Aid, and in these I urged upon the men the/
the necessity of being injected. The privates said they were willing to be operated on if the sergeants would submit, and the sergeants were willing to submit if the officers would lead. No one thought any one else would consent.

I at once called the officers together and put the case to them very strongly. Most of them were very young.

I told them how the ages of the men on board averaged under 20 years. I pointed out how exceedingly liable men of that age were to the disease. I asked did they wish to keep their units efficient, and pointed out how extremely responsible their position was. If they consented, the men would follow. Then I wound up by quoting the Ladysmith statistics, showing how 2% of those inoculated in Ladysmith out of 1705 suffered from Enteric fever, whereas 14% were attacked of the 10529 not inoculated, and of the inoculated 46% died, while of those not inoculated, 3%, or putting it roughly, their chances were 13 times better as regards enteric if injected.

Colonel Yale, whom I had to admit, was too old to be in much danger, but whom I maintained ought to set an example, and a Civil Surgeon were the only officers not injected.
The officers having suffered, determined that the men should suffer, so the non-commissioned officers and men of the port side were paraded and injected one night before lights-out sounded, and the starboard side was similarly treated next evening.

So greatly impressed were some of the ship's officers by my propaganda, that they came forward and voluntarily suffered.

After we had crossed the line and while still a few days out from Capetown most of the officers and men were injected a second time. Some of the reactions were very severe. The 5 c.c. injected affected the thin much more than the fat.

Captain Marker (now Lt. Col.) had diarrhoea, with stools not unlike typhoid ones, and a temperature for 4 days.

Captain Marker, injected at night. Next day,

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He was a very wiry, athletic man with not an ounce of spare fat on his body. I asked him to watch for/
for rose spots, but none were observed. Mr Acland Troyte, 4 K.R.R's and Mr Fitzherbert, 8 K.R.I.Hussars, who were also of slight build, reacted severely.

Professor Wright wrote me in March 1902 in answer to an inquiry that he had been quite unable to follow my cases, that he had not seen any of my list quoted as having died of enteric fever, and that he would like to hear my opinion of the efficacy of his method.

I have seen a large number of cases of enteric fever, a few, perhaps in all 20, of whom had been injected. They had all mild attacks of the disease, uncomplicated as a rule. Unfortunately, my experience is much more favourable than that of many men I have met.

We disembarked at Durban and I stayed there until sent round to Cape Town in medical charge of the Orotava. We had a few details on board and there occurred among them some cases of high temperature. These I took with me to Wynberg. Two days later I was ordered to Deelfontein Imperial Yeomanry Hospital. I was ill, with a high temperature, but by scraping my tongue and taking a large dose of quinine I managed to pass the doctor, who was on plague inspection duty at Cape-Town.
Town Station.

On the 1st April, 1901, I reached Deelfontein with a temperature of 105°. I was admitted to the officer's acute enteric ward, but next day was removed to the Infectious Hospital, diagnosed German Measles.

My resistance to disease may have been impaired by the two injections of typhoid virus.

At Deelfontein I was given two wards of Typhoid cases. They were chiefly convalescents. Again a large number had had thrombosis, amounting in all to 15. The thrombosis had occurred in each case in the left long saphenous vein. One man, who had each long saphenous vein thrombosed, was not certain in which the condition had first begun.

One case of hemiplegia was of interest. I could not elicit any history of venereal disease, but as the soldier was from India, I put him on Potassium Iodide. He took this extremely well, and in a few days was getting $\frac{3}{4}$ t.i.d. This treatment of a man, who had been pointed out to me as an instance of enteric hemiplegia, proved entirely successful.

In June 1901, I was transferred to Beaufort West. Here I found a civil surgeon Ellis, who at
at once handed over to me the hospital. My predecessor, a civil surgeon, Sowden, was lying dangerously ill of enteric fever. At this time, he had been six weeks ill and was then having a severe relapse. My copy of his three temperature charts is lost. In my experience, the typhoid patient is listless and cares little what happens at the height of his fever, but all through his disease this man studied his case, saw his friends who called, and maintained that he would in the end get better. He never lost hope. Each time I saw him, I felt as if called to a consultation and he discussed his case in the most impersonal way. I completely lost hope, as bed sores developed and complication followed complication, as the heart became weaker, respiration more rapid and laboured and stimulants and narcotics had to be increased.

In the end, he recovered after a military funeral had been arranged.

While at Beaufort West, I saw 58 cases of enteric fever, including a native. There were 3 fatal cases, all of whom belonged to an irregular corps - Warren's Mounted Infantry. This regiment marched north from Worcester, left us seven cases/
cases and were gone in 48 hours. Nearly all the cases were in the second week of the disease, judging from the temperature charts and histories. I copied the charts of those who died.

Allowing a fortnight for the incubation period and admitting that the cases were in the second week, it appeared most probable that the disease had been contracted at Worcester. I reported at once to General Macnamara, who was at the time, Principal Medical Officer of the Lines of Communication and he had the Worcester camp closed and the hospital removed.

The Beaufort West cases were nearly all of a mild type. In the Worcester series, the infection may have been worse originally, or they may have been severe simply because ambulatory.

In September of 1901 my senior went home and I determined to move on. General Macnamara sent me to the 2nd Battalion, the Royal Berkshire Regiment. This was a regiment of veterans burned black by many hours of the South African sun, and I had not a single case of enteric while with them.

The regiment was ordered south and in a month I was sent to the 60th Rifles on the line above De Aar/
De Aar. The work was very hard, as I had to ride 78 miles of block-houses very often, and I was covered with veldt-sores, so I asked to be sent to the Transvaal, with the result that in a fortnight I was with Colonel Hickie's column in the South Western Transvaal. The Senior Medical officer was Captain Jamieson, M.B., Edin.

I was told off to attend to the 2nd Battalion, The Cheshire Regiment, The 2nd Battalion, the South Wales Borderers, veteran troops, and the Imperial Yeomanry with Hickie's Column, who were not veterans.

On the morning I took over, I detected several suspicious cases. I reported and five men were sent to Klerksdorp at once. Major Swan, R.A.M.C., was in charge of the hospital at this place, and he confirmed my diagnosis some days later.

All these enterics came from the squadron of Captain de la Poer Beresford, Imperial Yeomanry. This officer volunteered the information that one day some three weeks before I joined, he had been ordered out on reconnaissance to watch General Liebenberg's movements. All day he and his squadron lay on a hill watching the Boers cutting mealies/
mealies. It was very hot and his men would drink out of a slime covered pool at the foot of the hill. A few days later this squadron was badly up, losing a lot of killed and wounded, but enteric took a heavier toll than the sword. The information was volunteered and there seemed a clear case of cause and effect.

I had often heard men remark that troops were all right when on the march, but when halted for a few days, especially if under depressing circumstances, that men went sick by companies.

It was in November 1901 that the Cheshires and South Wales Borderers were ordered into the blockhouses we had built on the Schoon Spruit valley, and I went with them as Medical Officer. For a time there was lots of excitement, the Boers not knowing the exact positions of the blockhouses, but later this stimulus disappeared.

Then came the enteric epidemic of 1901-1902. The regiments with whom I was, had camped often on the foul Klerksdorp camping grounds, for it was here that all the columns operating in this district refitted, it being the terminus of the railway line. The town drew its water supply from a point on the Schoon Spruit down stream from/
from the hill on which stood the Kaffir location. The rains had fallen, there had been a large remount depot, the hot weather was beginning, the flies were springing to life in myriads and dust-storms occurred daily. There were, therefore, at hand all the essentials of a first-class outbreak of enteric fever, and it came. The two regiments were stationed in Klerksdorp and garrisoned the line of blockhouses in the Schoon Spruit valley to Venterdorp 42 miles away.

For a year, the columns operating towards the Magaliesburg Mountains and the Lichtenburg country had passed up and down the valley. They had occupied, when camping, the strongest positions available and these in all cases, were the small kopjes scattered along the valley. When the blockhouses were built, they were, of course, erected on these very positions and hence the conditions which obtained in Klerksdorp held to a great extent in the valley. The sites were very foul. I remember one blockhouse which was built over some latrines. The Non-Com. in charge told me how difficult he found it to make the men sleep inside on account of the smell. He added with a smile that this difficulty had in no wise diminished/
ed since to the original smell had been added the smells of my disinfectants. I had distributed any disinfectants I could get, to the men, e.g., Izal, M'Dougall's Disinfecting Powder, Chloride of Lime.

I was in the saddle night and day. My ambulances were kept busy, then the mules broke down and the Remounts, Klerksdorp had no more to issue. Then I took Dysentery and was taken in an ox wagon to Klerksdorp. I had a very acute attack and the 4 men who shared the wagon with myself had enteric. With the poor team we had, it took 24 hours to do the 35 miles from the signal kopje where I had taken ill. I was placed in a small room, where there was one other patient, Lieut. Eugene Ryan, R.A.M.C., who had replaced me on Hickie's Column. He held up his temperature chart, detailed his symptoms and I had to admit that he had enteric fever. The smell in his case was very marked. I pointed out to him that cases like his, in which there were early haemorrhages, were usually very mild in my experience.

Some days later a large train was made up and we were all taken to Johannesburg and distributed to the hospitals in the neighbourhood. The officer/
officer in charge of the Remounts, Lieut. Ryan and Civil Surgeon Eustace of Methuen's Column, all enterics, and myself occupying the same compartment and going to No. 16 General Hospital.

It is of interest to add that Lieut. Ryan had a very mild attack, his temperature going over 103° once only and he helped a few other officers to carry me on to the verandah some weeks later.

After a period at Pine Town Bridge Hospital, Natal, I was again placed on duty and later went home in the Britannic. I reached home in March and in May 1902, I landed at Capetown, being medical officer in the 32nd Battalion Imperial Yeomanry, Colonel George Kemp, M.P.

On our arrival we were sent to Stellenbosh, which had been used as a depot for troops during the war. The camping ground was on the slope of a hill facing the Hex River Mountains.

Unfortunately, during the war, the Sanitary supervision of the camp had been imperfect, and latrines had been dug above the troops because a public road ran along past the foot of the hill. The rainy season was coming on, so a deep trench was dug obliquely across the hill above/
above the camp to cut us off from latrines dug just above us by former occupants of our site, and other drains were cut through the camp and horse-lines to the road below. These were bottomed with scrub and filled in. They worked admirably. After two months we went to Caledon and after a month at this place, we returned to Stellenbosch where we found our old camp and all the best sites occupied by about 7000 troops.

This was in August 1902. Our camp had been pitched by our advanced party on a spot selected by the Camp Commandant, but under protest. The heavy rains of the recent rainy season had converted the ground into a swamp. The hill above was riddled with latrines and through the camp itself were the marks of other latrines, many only partially filled in. It was a question of immediate removal. I rode over to a farmer who lived in the neighbourhood and asked him to allow us to camp on a part of his land, which I knew would make an admirable site for a small number of troops. He readily consented in consideration of getting the land cleared of scrub and that evening our camp was removed. Our new camp was on the side of the ridge occupied by the main body of troops but nearer the town and on the line of the/
Extract from Memorandum on the Sanitary aspects of Garrisons in South Africa.

In comparison with these figures the principal garrisons in South Africa have given the following results since peace was declared; the ration in each case being worked out to an annual ratio per 1,000 of average strength in order to make the comparison approximately correct.

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<tr>
<th>Location</th>
<th>Ratio</th>
<th>(Period of weeks)</th>
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<tbody>
<tr>
<td>Stellenbosch</td>
<td>92.9</td>
<td>(Period of 47 weeks)</td>
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<tr>
<td>Potchefstroom</td>
<td>58.3</td>
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<td>Bloemfontein</td>
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<td>Middelburg (C.C.)</td>
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<td>Pretoria</td>
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<td>Harrismith</td>
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<td>Middelburg (Transvaal)</td>
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Epidemics of 1902-3 and of 1903-4. Received in answer to enquiry.
the main from the pumping station, which was still
easier the town. From our former camp and from
the pumping station we were cut off by two deep
natural trenches, which ran down from the ridge
behind to the road.

We had occupied this camp for some time,
when the Irish Horse, or 29th Battalion Imperial
Yeomanry, and the 17th Lancers came down country
and occupied the site we had just quitted.

The rains were now past, they had been un-
precedented, the hot weather had begun and flies
were wakening to life after the South African
winter and filth and disease germs had been wash-
ed through the camps from the old latrines on
the crest of the hill. There were many plague
spots in that enteric season of 1902-3, which
followed the war, but Stellenbosch was easily
first.

The Royal Army Medical people at Cape Town
were quick to recognise that something was wrong,
and a senior officer was sent to inspect - during
the war civil surgeons had been in charge of the
small hospital and camp sanitation, and if they
had the will they certainly had not the power to
correct the unsanitary condition of things -
This/
This officer reported and in 1903, a circular by this man was sent to all medical officers in South Africa, advising as regards prevention of typhoid and giving statistics showing how much worse Stellenbosch was as regards enteric than any other camp.

The Irish Horse and the 17th Lancers who occupied the ground where we had been ordered to camp, suffered very severely, losing many men from this disease.

The 32nd Battalion Imperial Yeomanry to which I was attached, had, during the time it was in South Africa, (a period of about 9 months), 3 cases. One man, an officer's servant who slept among the mules of the transport in the conductor's tent some 50 yards from the main body, died of the disease. Another man who contracted the disease, was a mounted orderly who was attached to the headquarter office and slept there on very foul ground in the main camp. The other case I have not been able to follow, but he recovered. We returned home in January 1903, having lost the above mentioned man and another who fractured his skull and did not regain consciousness, out of a total of 470 men. This result was largely due to the foresight and care of Colonel Kemp.
In April 1903, I was again on route for South Africa. On H.M.T. Sicilia there occurred three cases of enteric. Two of these were very severe, and toxaemic, and had several haemorrhages. They belonged to a draft of the Royal Irish Rifles and both had come from the same barracks in Ireland.

I reached Pretoria in May in good time for the enteric season of 1903-4. In August I joined the 8th Hussars and went on manoeuvres with them. One day in the cavalry camp at Klip River, a Basuto was brought to me by the conductor. His tongue was typical and his temperature was 105°. I ordered the ambulance out to take him to hospital. Next morning I was surprised to hear that the boy had died in camp. He had run away and hidden while the ambulance was being inspanned, and as I had left the camp and did not return until late I was not warned. I had just time for a hurried laparotomy. I found extensive ulceration of the Peyer's patches in the ileum; many of the sloughs were still adherent, but the direct cause of death was undoubtedly haemorrhage, for there was a mould of the shape of the intestine formed/
formed of clotted blood, extending from the caecal pouch to a point about 5 feet up the small intestine.

I had the natives paraded and their temperatures taken. One native with a temperature of 103° I placed under guard and sent to hospital. He proved to be a case of enteric fever.

I did not again meet any cases of enteric until the 8th Hussars left for home and I returned to Pretoria Hospital. The rainy season had passed and the hot weather was beginning, and unfortunately, there was again a condition of things which favoured a dirt disease.

The 2nd Battalion of the Northamptonshire Regiment occupied the barracks of the late Staat's Artillery. A large portion of the barracks was taken up by military offices and the men had to sleep in and over stables, and were overcrowded. The 2nd Battalion The Leinster Regiment was in an even worse position. They were encamped beside the Pretoria sewage farm some miles out of the town of Pretoria. I am able to state that this camp and the overcrowding in barracks were both strongly objected to by the Principal Medical Officer of the District, who warned the military staff, but to no purpose.
We often remarked in the General Hospital how very toxæmic was the character of the Leinster typhoid cases.

The 1st Welsh Regiment was also stationed at Pretoria, but it escaped very well in this last epidemic in spite of the fact that it received from home several drafts of young recruits. It was encamped beside no glaring source of infection.

Though stronger than they were, the Royal Army Medical Corps are still very weak. They are often calmly ignored by the military authorities. If they only had the power to force the purely military authorities to do their bidding in matters relating to the health of the troops, the British army would soon be one of the healthiest fighting forces in the world and the British army medical service would soon take its position as the finest army medical Corps.

This, at present ideal state, might be attained in the opinion of a distinguished officer of the R.A.M.C., if a strong representative of his corps could be placed on the new Military Board, with the powers of a dictator on matters medical.
NOTES OF ENTERIC CASES

Beaufort West Cases (1-8)
Pretoria General Hospital Cases (9-25)
Temperature Charts of latter cases still in So. Africa
1. Civil Surgeon Sowden, French extraction, Channel Islands; temperature charts - lost in South Africa.

This officer had been a month ill on my arrival and the second temperature chart had been started, but I remember that his illness was marked by a gradual increase of temperature, a sustained period and a lysis fall period.

Temperature reached normal, but at the end of the first chart there was a sharp rise and on the second chart there were a few days' temperatures recorded all about 104°. This relapse and pleurisy - left basal - occurred simultaneously. Morphia had to be resorted to, to control pain. On examination I found left lower lobe solid, as indicated by tubular breathing, and slight pleurisy dry - hot fomentations frequently to side. Morphia stopped and brandy increased. Fall by crisis came on ensuing day - 8th day - then bright, red pneumonic sputum expectorated in large quantities for nearly a week, during which time temperature kept near normal. Then a pus temperature swinging from normal to about 103° followed for a few/
few days, while fomentations were applied to an abscess in the neck, which pointed below the angle of the jaw on the left side. At the request of patient, who began to experience difficulty in swallowing, abscess was opened and a large quantity of yellow pus with blue streaks over it poured out. Syringed with Corrosive 1-3000. A probe passed to skin on opposite side of neck behind trachea. Drained. At once great relief experienced and again temperature steadied about normal.

A few days later came another rise to about 103°. Patient complained of great pain in groin. There was great dilatation of the veins of the thigh of left side. Area of saphenous vein covered with Extr. Belladonnae. Great oedema of left leg, which was wrapped in wool, raised on pillows and hot water bottle applied to foot. Morphia Hydrochlor. gr. $\frac{1}{4}$ had to be used.

From this time on, patient began to recover, but bedsores had developed and reached the bone of the sacrum in places. Boracic fomentations used and part thoroughly cleansed. Then weak boracic dressings on lint and jaconnette, and the skin gradually spread and covered over wounds.

After 13 weeks in bed, patient was carried on
to the verandah, anaemic and wasted until he resembled a skeleton, with one enormously thickened leg. I invalided him "for change to England". He was able to limp about a little before he left. He was always most hopeful and ever positive he would recover, and most unlike any other typhoid case I ever met.

A cord-like tendon replaced the last 6 inches of the left long saphenous vein.

Beaufort West:


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Enemas each 3rd day.
Complained on admission of headache, "had been seedy and eaten nothing for 5 days." This case pursued a very mild course with no unusual manifestations until 20th July, 1901. I was called at dawn to find him collapsed, pulseless, breathing stertorously, 54 per minute, purely with thorax, and abdominal wall hard. Hands held over abdomen. Perspiration marked. Vomiting attempted. Temperature 97°. I at once gave $\frac{3}{4}$ T. Opia and injected Morph. Hydrochlor. gr. $\frac{1}{4}$. A rectal tube was passed and Brandy $\frac{3}{4}$ aqua $\frac{3}{4}$ passed into colon. I believed the patient had perforated, was of opinion that he would not bear operation, sent for the priest and went to bed. He received the last rites of his Church. On 20th July 1901, at 8 a.m., grey pinched look of face gone. Pulse small and running, 140. Had complained of pain, referred to umbilicus, but was sleeping quietly. Recovery was rapid and uneventful. I percussed abdomen carefully a week later, when I found an area of dullness about the size of an orange at M'Burney's point.

I failed to elicit any history of appendicitic attacks. I should add that he was fed per rectum for 3 days after collapse. The possibility of a perforation which became localised, suggested itself to me.
Beaufort West:

3. Cape Boy Henrik - 20? years - member of sanitary gang. Admitted 18th July, 1901. Believed by conductor to have been 14 days ill. When seen, tongue foul, pulse 130, temperature 104. Was at once admitted and treated as a case of typhoid. Stools were typical. Boy left early on 22nd July. Was taken late at night by a search party in the Kaffir location. He was discharged on the 26th July, having proved incorrigible. Medical men who know the native boy, say he is often ambulatory through his attack of enteric. They say the disease is very common among them and that many small outbreaks among whites are often traceable to native sources.

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4. Sergeant Barnett, 2nd Brabants - 28 years -
admitted 12th July, 1901.

Had been unwell for 10 days. Complained of
being unable to eat and of pain in right flank.
Temperature 101. Tongue typical of enteric.
No rose spots.

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Enemas each 3rd day.

Lungs very carefully examined. Normal. No
cough. Liver normal size. Pain in right flank
disappeared in a few days. No history to point
to malaria or venereal disease.

Enemas required every 3rd day. Results,
pea soup like. Pulse and respiration were not
taken.

This man was discharged to duty on 7th Aug-
ust, 1901, having apparently had a mild attack of
enteric fever.

At this time we had no microscopes, or oppor-
tunities of doing Widal's test.
Temp. taken 9 a.m.; 7 p.m. Pulse and Respiration 9 a.m. only.
Beaufort West.

5. Private Booth, 4th South Staffordshire Regiment - 21 years. Contracted disease while employed as hospital cook. Admitted 17th July, 1901. Temperature taken 9 a.m., 7 p.m. Pulse and respiration 9 a.m. only. Booth, who was a member of his regimental team, was admitted after playing in Association Football Match. Very fine athlete.

There was a marked absence of nervous symptoms all through. No delirium or incontinence, no tremor or twitching.

He was admitted with tongue dry and covered with dirty white fur. Temperature 101.8. Complained of having been ill for 4 days, and had had diarrhoea for two. He slept from 18th July 1901, to 28th July, 1901. It was even difficult to rouse him for feeds so as to make him swallow.

I was called to see him on the night of the 28th. He was extremely grey-looking, breathing rapidly and perspiring, very restless and struggled feebly. I did not think of haemorrhage until I noticed that he yawned several times and then his temperature was taken. It was then below 98° and/
31.

and the pulse was small. I gave him T. Opil $3_j$ and injected Morph. Hydrochlor gr. $\frac{1}{4}$. I then transfused into the skin over the abdomen about $\theta_j$ of sterilized water. The foot of the bed was well raised and the pillow taken away. He rallied very quickly and I was able to return to bed.

On the 30th July and 3rd and 7th of August, he passed quantities of stale haemorrhage. This seemed to relieve the patient greatly and the temperature fell and remitted better afterwards. His further recovery was uneventful. The degree of collapse in this case was but slight compared with that in others seen since.

Beaufort West.


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Irregular & Spasmod incontinent.

Died 10 p.m.
Was admitted collapsed. Tongue dry and cracked. Said to have been a fortnight ill. Had been carried a week in ambulance. Respiration laboured. Bronchitis marked. On 27th July, face pinched and grey. Abdomen greatly distended and large area of dullness on right side. Respiration purely thoracic. Decided not to operate because pulse not to be felt at the wrist and too deeply collapsed. T. Opil $\frac{3}{4}$ was given and a rectal injection high up of brandy and water $\frac{\text{aa}}{\text{3f}}$. He was kept under morphia until time of death and fed per rectum.

Post Mortem: A light yellow fluid filled peritoneal sac, of a faecal smell. The intestines were adherent and covered with lymph. There were present in the last 3 feet of the small intestine many large ulcers. There was a hole 1' x $\frac{1}{2}$' near ileo-caecal valve. There were many small ulcers near the valve in the colon. Perforation.

7. Trooper Miller, Warren's Mounted Infantry - 22 years. Admitted 23rd July, 1901. Died 30th July, 1901. Admitted collapsed. Said to have been ill 10 days. Four days in ambulance. Delirium/
lirium marked. Temperature 103°. Great tremor and twitching. Abdomen distended. Turpentine stupes used without avail. Rectal tube passed well into colon without effect. Crepitus over both bases. Also friction sounds. The typhoid odour was well marked.

This patient after admission sank into a state of stupor and was fed with difficulty - a tube and funnel. He did not become conscious after admission.

Beaufort West.


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On admission stated had been ill a week. Very extensive rose coloured rash over chest and arms. Tongue black and dry. Teeth filthy and gums bleeding. Diarrhoea for some days. Temperature 103.3. Sponging daily three or four times. Cleansing of mouth. Condy's used. 23rd July, 1901 temperature remitting badly. Quin. Sulph. gr. x 4 do. commenced. Tendency to sickness. No ice/
ice available. Very hot water after quinine to rinse mouth. Milk one in two of water stopped, as patient very flatulent. Barley water well taken. Cleansing of mouth and moistening of tongue continually.


3rd August, 1901: Nervous symptoms becoming marked. Child delirium. Subsultus tendinum and tremor. Brandy increased to \( \frac{3}{7} \) viij.


Post mortem: Distension of intestines. No peritonitis. Ten feet from ileo-caecal valve ulcers began in small intestine and increased in number until the valve was reached. No actual perforation, although in places muscular coat was penetrated, the peritoneum covered the spaces. Very/
Very large ante-mortem clots in all the cavities of the heart. Three deaths in one week. Reported to P.M.C.L. of C.

Pretoria General Hospital.


The febrile period was very prolonged with marked nervous symptoms, tremor, nervousness, headache, neuralgia. After temperature reached normal, there was a true relapse with typical rash.

This man occupied my convalescent ward for some months. He was much wasted, had palpitation and shortness of breath on the slightest exertion and was not returned to duty, after being invalided home and in Netley for some time, until 4th December, 1903.

10. Sapper Charles Jelland, R.E., - 24 years - admitted 1st May, 1903. He had a mild attack. Diarrhoea was a peculiar feature of his case and it continued for a fortnight after admission. The temperature was normal on the 23rd day, and convalescence/
valessence was uninterrupted until 6th June, 1903, when acute dysentery set in. This continued and he was invalided in a state of great anaemia and emaciation, the stools still containing mucous and blood. His lungs were not diseased. I learn that this case at once began to improve on H.M.T. German and the dysentery ceased. He had not had dysentery before. He was invalided from South Africa and returned to duty from Netley 3rd December, 1903.

11. Private Joseph Kinnane, 8th Hussars - 21 years - admitted 16th June, 1903. This case was not exceptionally severe and would not have been invalided, had not thrombosis of each saphenous vein (long) set in during the first afebrile week. It occurred simultaneously in each leg. This case was afterwards carefully examined by several medical men, all of whom agreed that the large saphenous veins alone were thrombosed.

There was a great prolongation of the period in bed, as there was oedema and pain, and later when walking was attempted, the gait was very stiff and slow. The pulse was very slow with the patient at rest, averaging between 30 and 40 per minute./
minute. This man, though still retained in the service, is and will continue to be for some time, a very inefficient mounted unit.

A cord beneath the skin in each leg represents the long saphenous vein. On both sides the vein is obliterated for about 8 inches.

12. Sapper Cuthbert Bell, R.E., - 22 years - admitted 3th July, 1903; had a severe attack with prolonged febrile period recorded on his temperature chart. I met him first in my convalescent ward and he was of interest to me because he was suffering from thrombosis in the right leg only - right long saphenous vein - The vein was represented by a cord which could be rolled under the skin and which ended at the cribriform fascia. The femoral vein had not been affected in this case. I examined the left long saphenous vein carefully. It was not thrombosed. When invalided home this patient was still lame and had swelling of the leg after slight exertion.

13. Private Buckell, R.A.M.C., - 21 years - admitted 22nd September, 1903. This was a severe case with one relapse after the temperature had/
had reached normal, during which the temperature reached 104 and remained at this with slight remissions for six days. This relapse coincided with an attack of pericarditis. Blistering was resorted to and the to and fro rub disappeared in 72 hours. The temperature reached normal after six days.

Conjunctivitis greatly troubled this patient, and he had his fourth attack while crossing the line after being invalided. He reached home very anaemic and having great loss of muscle. He was sent to light duty from Netley on 23rd February, 1904.

14. Private Jones, R.A.M.C. I first met this patient in my convalescent ward after an acute attack of enteric fever. He was then being treated for rheumatism. I stopped the Salicylate of Sodium. In a few hours swelling of the wrists began. The medicine was at once renewed gr. X., 4 d.s., and again the condition was checked. He was listed as an invalid to go home on the transport German. The Sodi Salicyl. was unfortunately stopped a day before the train was due to start. When he was to be removed, he was in acute pain, a/
a wrist and both knee joints being swollen. Treatment was resumed and three months later he was invalided home on H.M.T. Dunera.

15. 24594 Private D. Greatorex, R.H.A., - 19 years - admitted 1st October, 1903. Had a mild attack, and had been normal for 14 days when pleurisy with pain came on in left side. The friction disappeared and as there was some dullness, patient was tapped and \( \frac{3}{4} \) iv. of sero-fibrinous fluid removed.

Later, rheumatism developed and some joints became swollen. These complications prolonged the bed period to such an extent that patient became very feeble in spite of massage, and anaemic, and had to be invalided home. He was discharged from Netley 22nd February, 1904. Gave Widal reaction on 3rd October, 1903. Dilution 1 in 200. Time, 10 minutes in hanging drop.

16. 6755, Private G. Hudson, 2nd Leinsters - 19 years - admitted 1st October, 1903. Was one of the few Leinsters who had a mild attack. His temperature seldom exceeded 103°. He had slight bronchitis, and had a slight pleuritic rub for a few days. Although the attack was mild and he could/
could at no time be considered dangerously ill, his recovery was very protracted, he having no less than three relapses. These could not be explained by food changes, or anything else. His temperature simply rose after being normal. On each occasion to about 103°. It fell after a day, or perhaps two, by lysis. On looking at his medical case sheet in the Army Medical Office, London, I was surprised to see another entry. He contracted thrombosis on the voyage homeward and was not sent to duty from Netley until 1st March, 1904. The record was "left thrombosis". Serum gave Widal reaction on 3rd October, 1903, dilution 1 in 200, under 5 minutes.

17. 6447, Private W. Brown, 2nd Leinsters, 21 years. Had a sharp attack, but made a good recovery, complicated by an ischio-rectal abscess. This was merely a recurrence of an ischio-rectal abscess following a kick some years previously. There were scars in proof of his statement. Lungs correct.

18. 7756, Private A. Millington, 1st Welsh Regiment - 19 years - admitted 10th October, 1903. He/
He was admitted from the surgical division where he had been admitted suffering from periostitis of the tibia, the result of a kick by a mule. After three weeks, Colonel Birt found that he gave the Widal reaction, and he was sent across to me. His proved to be a very toxaemic case with prolonged febrile period. His case was peculiar because of epistaxis. On two occasions the haemorrhage was slight, but on the 3rd occasion I was called at night to find his pillow soaked with blood and a steady flow going on. He was very faint and pulse was weak and irregular. The foot of the bed was immediately raised, and a catheter passed and the nares plugged behind and before. 8J of sterile water was transfused into skin of abdomen. He made a good recovery.

10. 6716, Private H. Robinson, 2nd Northamptons - 19 years - admitted 13th October, 1903. He had no rash on admission or during first part of course of the disease. He had one severe haemorrhage and marked nervous symptoms. He relapsed when temperature had just become normal and a profuse rash broke out.

He was invalided on account of anaemia and debility.
20. 6724, Private T. Hogan, 2nd Leinster Regiment - 22 years - admitted 18th October, 1903. Admitted about 7th day of illness with a high temperature. He had been in my ward for about 7 days when he had a rigor. His temperature quickly rose to over 106°, his nose became swollen and then his cheeks and forehead, until both eyes were closed. I tried to stop the advancing red ridge, marking with T. Iodi. Fort and Silver nitrate, but next morning the line had reached his clavicles. His face was painted with ichthyol, but I cannot say whether it did any good. On removing his mask four days after the onset, I detected several separate areas of fluctuation. His face was fomented at once and these areas resolved into three large abscesses, one covering the forehead and one on each cheek. Pus was found welling up next morning out of the lachrymal ducts and conjunctivitis starting. I at once opened all three abscesses, using ethyl chloride and syringing out thoroughly with 1 in 60 carbolic. The yellow ointment of mercury was used in the eyes. Next day the left membranum tympani burst, and a discharge poured out of the left meatus. All the wounds quickly healed and the temperature quickly/
quickly fell by rapid steps.

For three weeks the patient had the gravest nervous symptoms, picking at the sheet, tremor, delirium and incontinence. He was invalided and sent home on the Dunera, a mere skeleton. He recovered very quickly and was discharged from Netley on 1st March, 1904.

He gave the Widal reaction, 1 in 200, the day he was admitted.

21. Private Shirley, 2nd Northamptons - 19 years - admitted 18th October, 1903. His temperature in a few days reached 104° and nervous symptoms became very marked. He was very small and slight. Great headache was complained of, which was followed by tremor of the hands, muscular twichings, and incontinence. Delirium followed and he constantly tried to get out of bed. A night orderly was employed, and during the day convalescents sat beside him in turn. He was sponged very frequently and an ice-bag was kept to his head. This had less effect than in any other case I have had. For a fortnight he was given gr. 30 of trional every night and this dose had often to be repeated before sleep came. The sleep was natural and/
and refreshing, the patient being only partially aroused by his feeds. After 20 days, defervescence set in and the temperature had reached normal in the mornings, when a relapse occurred, with irregular consolidation of the right lower lobe. The temperature again reached normal and he was transferred, my acute ward being closed for disinfection on account of erysipelas. On examining his case sheet in London I was surprised to find that another relapse occurred with thrombosis of the left long saphenous vein and great pain and oedema of leg, and that on account of this proving permanent - the oedema - he had been invalided out of the service on the 30th March, 1904.

22. Lance-Corporal Small, A.O.C., - 20 years - admitted 19th October, 1903. Had been ill about ten days. For a week his temperature ran about 104° at night, then came a rigor, temperature 106°. The patient complained of a feeling of cold, "as if a very cold wind was blowing over him and he naked", then came a hot stage succeeded later by profuse perspiration. At first, I had no doubt that here was another erysipelas case, but as stage followed stage, I sent for some slides and took smears of his/
his blood. Staining with Leishmann's, I at once detected some corpuscles typical of malaria - rings and oblongs. He was at once given quinine, and although he had another rigor in 72 hours, it was accompanied by a much lower temperature and defervescence, which had begun, continued.

Immediately after his first rigor, he passed a large amount of blood per rectum, and a day later he passed such a quantity per urethram, that the specimen of urine had set in the vessel, when shown to me. The nurse reported that it was diffused and not in clots when first seen by her.

This patient was one of those removed on account of erysipelas. Some days later Colonel Culling asked me to see my former patient. A relapse had occurred, he having been given "boiled milk" when eight days normal. Temperature was about 103° and quickly fell to normal again.

This was his only relapse, but so emaciated and anaemic was he, that he was invalided home and was not returned to duty until 29th February, 1904.

23. Private Charles Callow, 23 years - was admitted to hospital with orchitis on 22nd October, 1903, and a history of recent gonorrhoea. Colonel Birt/
Birt became suspicious and did a Widal to find coagulation. He was transferred to my acute ward in the Medical division on 1st November, 1903. No rash, stools not typical. His temperature never exceeded 102°. I checked Colonel Birt's result, using .5 dilution and coagulation started at once. The orchitis was treated by fomentations, but swelling never went down entirely. He became anaemic and in the end was invalided on H.M.T. Dunera.

The War Office Medical Authorities allowed me to copy the Pretoria cases from my own notes on the case sheets. Unfortunately the temperature charts are still in South Africa. There are two other cases of which I have not even dates, but which are worthy of mention. The Army Medical Department could not let me have their sheets, as they are death cases.

24. Lance-Corporal Stewart (Stuart) was admitted to my acute ward one day in October. A few hours after admission he had a rigor. Temperature 105° - 106°. Swelling of the nose and cheeks. This was the first erysipelas case. I at once had him removed, bed and all, to the infectious hospital, where he died.
The floor and walls in the neighbourhood of his bed were thoroughly disinfected with Crude Carbolic (1 in 20) and Izal.

25. Private 25. One week later the case in the opposite bed, whose name I have forgotten, had a rigor, temperature about 105°, with acute glossitis. Tracheotomy instruments were immediately got out of the surgery. He was placed on his side and hot carbolic lotion 1 in 60 was sprayed into his mouth and allowed to run into a basin on the floor. The glossitis gradually became less, the difficulty in breathing became reduced and his tongue in about two days was nearly normal. Every care was taken to keep the mouth clean and the cracks in the tongue were painted with T. Benz. Co. Four days after first rigor, a second followed and tongue again became swollen. The swelling quickly subsided under treatment, but patient, who when attacked by erysipelas was too ill for removal, quickly sank and died about ten days after first rigor.

Post Mortem, was found very extensive ulceration of the last 6 feet of the small intestine - Peyer's Patches - and two large cracks were found in/
in the tongue in front and to the side of the epiglottis. It was unfortunate in this case that the patient could not gargle.
TREATMENT.
TREATMENT.

A. SPECIFIC:

1. Antipyretic
2. Antiseptic
3. Purgative.

1 and 2:

At Beaufort West and at Pretoria, I used Quinine, Antipyrine, Phenacetine and Salol. I do not think that my patients who got these medicines as a routine, benefited. At Pretoria, I had at first very serious cases of haemorrhage, sudden vomiting, sweating with collapse. My experience was such that I quickly gave up using these medicines as a routine.

A friend, who was a great advocate of chlorine water and gave it as routine treatment, stopped using it also.

3. Another medical man believed in the purgative treatment and his patients received Ol. Ricini $3_j$ t.i.d. I was able to talk freely to this officer and often pointed out to him when going round his wards/
wards, that he had more cases of serious haemorrhage than were in the rest of the division. Three of his cases died of this complication, and they were the only cases of death due to haemorrhage in enteric in Pretoria General Hospital last season.

Purgative and Antiseptic treatment seem absurd on account of the distribution of the cause of the disease.

B. GENERAL:

1. Nursing
2. Dieting
3. Treatment of symptoms and complications.

1. Nursing:

The enteric patient being put to bed, the nurse thoroughly cleans the back and applies spirit to the bony prominences, including the heels, finishing with starch, boric powder, etc., daily. There were no bedsores in my wards in Pretoria. Hogan, case 20, had to have a water bed, as his back was beginning to go.

Posture: It is a great relief to patients to be allowed to lie on the side with a well filled bolster.
bolster along the back.

The Mouth: Careful cleansing as often as necessary, 1 in 100 carbolic and a tooth-brush. Vaseline to cracked lips. T. Benz. Co. to cracks in tongue. Tongue must be moist. Sipping of water continually, ice in mouth.

2. Dieting:

Milk 1 to water 1 or 2. Soda water is a welcome change, but must be stirred after mixing. In case of flatulence, change to barley water. The addition of a spoonful of tapioca or arrowroot is always welcome. Many of my later Pretoria cases got one or other right through their illnesses. Meat juice was given regularly to all patients — \( \frac{3}{4} \) to water \( \frac{3}{8} \). Many of my patients lost little or no weight.

Stimulants: Brandy or whisky, champagne. When serious symptoms or complications appeared, or weakness, or high temperature — over 104° — I ordered Brandy \( \frac{3}{4} \) iv. per day. This was only increased in the more serious cases, but rarely was more than \( \frac{3}{3} \) viii given. Whisky was used if the patient wished a change. In some exceptionally severe/
severe cases, especially with lung complications, I was accustomed to order champagne bottles 6j., 2 per diem.

Feeds: Two hourly. Serious cases to be fed at night as well as in the day. Others not to be disturbed.

This was continued until the 8th to 12th afebrile days during which "boiled milk" was allowed. Then one week of fish, then one week of chicken, then minced meat and stews for a fortnight.

3. Symptoms and Complications:

Temperature: Hydrotherapy. Every case was sponged daily, some even four daily. I have never seen a bath used. Our staffs were too light and our baths too few. Old Indian officers, who never treated their cases in any other way in India, considered baths dangerous in a climate of such sudden extremes as the South African.

All patients cold-sponged once daily and when high temperature developed, or severe nervous symptoms, often four times daily. If the case was critical, only those portions of the patient were sponged which the nurse could reach without moving him. Also in all cases showing the more serious nervous symptoms, an ice-bag was suspended from the/
the head-rail of the Lawson-Tait bed and attached to the patient's head. Often I have noticed, in perhaps a minute after application, the delirious twitching patient go quietly to sleep. An ice-bag applied to the heart reduces the pulse-rate and I often used it, but only for 10 minutes at a time. Patients thus treated become very blue and livid if the ice-bag is kept on for a long period.

**Haemorrhage:** None of my hospital cases died of this. Quite half the cases in South Africa have haemorrhage, but treatment is comparatively rarely required and the haemorrhage is simply noted when it appears in the stools. When the haemorrhage was serious enough to cause collapse with fall of temperature, diminution of pulse, etc., my routine practice was to administer T. Opii \( \frac{3}{4} \), inject Morph. Hydrochl. gr. \( \frac{1}{2} \) or gr. 1/3, raise the foot of the bed, remove pillows, and transfuse water or with long rectal tube to pass 0j. of water into the colon. If the degree of collapse was marked, to this was usually added Brandy \( \frac{3}{4} \). Then for three days rectal feeding only. I think that the medical officers who applied ice to the abdomen did not get their haemorrhages stopped as quickly.
Last enteric season, I had more trouble with one case of epistaxis - case 18 - than I had with all the intestinal haemorrhages put together.

Perforation: Case 6 was my only personal experience.

Bronchitis: This was present in most of the cases. If pain was severe, hot compresses were used; if cough prevented rest, Brompton's sedative was given.

Pneumonia: Lobar pneumonia is uncommon, but irregular consolidation is common. Hot compresses were sufficient in all cases. Pleurisy was common, but effusion was rare. Hot compresses, Belladonna, Morphia. In all lung trouble cases were made to lie on side and back was propped up with pillows or bolster.

Abscesses were very common. Hot fomentations, opening and antiseptics.

Retention of urine occurred in a few cases; it usually lasted only a few days. All these proved very mild enterics.

Orchitis, erysipelas, malaria and rheumatism occurred in some of the recorded cases.

Two of the three erysipelas cases proved fatal.
Malaria - Lance-Corporal Small - had a quartan type, but it was quickly checked by quinine.

Rheumatism was very troublesome in the case of Jones, and less so in other cases.

**THROMBOSIS:**

Remarkably common in South Africa. I have notes of 53 cases.

1. Superficial veins in front of right elbow.
1. Left long saphenous vein and right short saphenous vein.
1. Right long saphenous vein.
8. Both long saphenous veins.
42. Left long saphenous vein.

I cannot say that the femoral vein was ever involved.

**The Treatment:** Painting with Extr. Belladonnae et Glyco. over painful part, usually groin. Injections of morphia if necessary. Wrapping of the entire limb in wool. Gentle raising on pillows and constant application of a hot water bottle to the foot.

One death occurred at Beaufort West, which was, I believe, due to pulmonary embolism.

Prevention is better than cure, and I aimed at prevention during my stay at Pretoria, with re-
markable success.

When the temperature reached normal, or when the pulse rate fell to 50 per minute, the patient's warm grey socks and drawers were at once put on. If the pulse rate was exceptionally low, the legs were wrapped in wool and slightly raised, i.e., when the pulse rate fell as low as 40, as it sometimes did.

Some prescription such as the following was given in slow pulse cases:-

Sg: T. Strophanthus, m.V.
T. Nucis Vom., m.V.
Glyc., m.X.
Inf. Calumb. ad \( \frac{3}{4} \)
Mane nocteque vel t.i.d., p.c.

Result: One case of thrombosis of the left long saphenous vein. This patient, a Private Benyon, 2nd Leinsters, admitted having sat up in bed to talk to another case and allowed his feet to rest on the floor for some time the day previous to the onset.