**HUNTERIAN MUSEUM – Draft transcript**

***Battlefield Medicine at Waterloo*, Tuesday 16 June 2015**

DR ALBERTI: Ladies and gentlemen, welcome to the Royal College of Surgeons. My name is Sam.
I work here. It is my great delight very briefly to introduce you to this afternoon's lecture, the climax of our 2014/15 series, as I'm sure you will agree by the end of this 45‑minute talk or 50‑minute talk with some questions, by my colleague and friend Mr Michael Crumplin.

Mick was a consultant surgeon up in the wilds of North Wales. Alongside his clinical practice, he developed unparalleled expertise in the history of surgery and, in particular, the history of military surgery and, in particular, the history of military surgery during the Napoleonic and the Peninsular War. His expertise is as such that he is not only the foremost surgeon on battlefield surgery on Waterloo; he is one of the finest historians of Waterloo. We welcome him on this bicentennial week. I think, you're busy hobnobbing on Thursday, I think. Mick, due to his expertise on Waterloo, is Education Lead for the Waterloo celebrations. Not only that, ladies and gentlemen, he is honorary curator at the Hunterian, at the Royal College of Surgeons and, as such, an integral part of our team here.

He will be talking to us today about the bloody fields of Waterloo. Mick, thank you very much.

MR CRUMPLIN: Good afternoon, everybody. I hope you can all hear. Sam, thank you for that warm welcome and for your invitation with the help of Hayley Kruger to get me to talk on this important subject.

Around six months ago, the English College held a superb conference on the medicine of war between Hunter and Helmand. We anticipated so many military commemorations as in World War 1, VE Day Gallipoli and Waterloo.

In two days, we recall the actual Battle of Waterloo. We should remember that this battle ended a long and crippling war in Europe, which left more than four million Europeans dead, which is a huge proportion of a population. Such victories, of course, are brought at a price. As we gaze at this sanitised image of the Duke and his Staff by Jan Pienerman, we notice a pale figure being helped off his horse. This is the Prince of Orange, the second in command under the Duke of Wellington, wounded. And really, all too often, the less appealing aspects of warfare are forgotten by historians and they are passed over as being too gruesome or with ignorance.

There are many anecdotes, of course. I would like to tell you about the battle and the medical aspects to the campaign. I think, most importantly, we should dedicate this talk to the efforts that this college made to support this war. We only had a population of nine million at the beginning of this war. Here are two cousins, Edwin and Watkin Griffiths, who come from where I live. They both were majors in light Dragoon regiments. They were fatally injured by cannon shot to the chest. It's not only the fatalities we have to remember, because having lost 453 men in Afghanistan in operations, we had 1,900 men and women injured. The impressive results of Camp Bastion recently at 93% survival if they came in alive reflects 200 years of research, hard work and tough lessons learned.

So the war that ended at Waterloo was a long, long one: 21 years long. We lost 2.5 percent of our population which is a greater loss proportionally than in World War One and the debt of the war was £1,600,000. We were on our knees at the end of this war. Of course, gaining naval power, gaining supremacy at sea, was all important for all of these campaigns. When Nelson went to meet his nemesis in October 1805 just a short while before that he met Sir Arthur Wellesley in the colonial office and the baton of war was metaphorically handed over to the small British Army and three years later the Peninsular War began in 1808. Our adversary was a fantastic strategist, masterminding all sorts of shenanigans, and we see him as a young general in command of the Army of Italy, republican general, and his format has changed somewhat, his physique has altered. The war has worn him right down. There are rumours of him being a dwarf. He certainly had bladder stones and cystitis and yes he did have haemorrhoids the night before Waterloo, they were treated by Baron Larrey with leeches and that comes out of Prince Jerome’s diary. Medically, he was fit enough during the battle, contrary to all rumours, but he was absolutely exhausted, of course. His army ‑‑ don't forget that by Waterloo, the French nation had lost almost one million men, so the army was decimated as far as experienced soldiers were concerned but there were enough. There were many prisoners released that came back to fight. The French Army were keen to fight again, but the officers were not, because if Napoleon lost, their future was very much in the balance. Of course, there were problems with leadership at this battle.

What's interesting is if you look at the war in three chunks and the bottom one is missing, the first one you've got the Low Countries and the savage weather conditions and poor organisation of the medical forces and in the West Indies you have yellow fever and malaria. Those two campaigns were going until 1799 and cost us over half of the casualties of the whole war through unpreparedness and adverse weather conditions. The middle chunk of the war was fascinating medically, but we didn't learn as many lessons as we could have done from the first chunk of the war.

Of course, the next part of the war is the Peninsular War which goes on until 1814. This is the Iberian campaign, often thought to be unimportant in the war, because Britain never fielded a conscript army and never fielded a large army but it did grow in the Peninsular.

The medical profession under James McGrigor became impeccable. While we were in the ascendency the last part of this great war the French were running out of money. They were running out of men. They were becoming bureaucratically overwhelmed and the French Service de Sante was in decline. We had the Russian snows, the campaigns of 1812 which decimated the French Army and the Battle of Leipzig.

The last action in France was fought in the spring of 1814 and Bonaparte was sent away to Elba. Not far enough unfortunately and many wanted him back. He came back because there were dispossessed people and a chunk of the nation who would like to have a go. It was ill conceived and a hopeless dream, really. But the Hundred Days began when he landed on south of France on 1st March 1815. Sorry about the technical things. This is the border between France down here and the Low Countries, the kingdom of the Netherlands, and what would be Belgium up here. Our lines were from Britain across the Channel. The Prussians here in black, four army corps about 15,000-20,000 in each corp. We had many men coming from Maastricht in the east. They were to coalesce under the Duke of Wellington and Marshal Blucher and were going to invade France. We didn't get that far because the French had outwitted us. Napoleon had moved with lightning speed with an army du Nord of about 125,000 men and the Imperial Guard. They were going to cross the River Sombre and push back the Prussians, decimate them and then turn to the Allies and then occupy Brussels for peace. It really was the essence of the campaign.

Rumours were running rife around the place. The British Army were assembling quickly. There were units in Ireland. Bonaparte had outwitted us from the time point of view. His leaders were deficient. We didn't have all of the great French marshals who pushed the army through Europe so effectively. We did have the brave Marshal Michel Ney, a turncoat, and Marshal de Grouchy, a cavalryman, who were going to have to behave himself, obviously, being the most recently appointed man. These two men. This man was hotheaded on the battlefield and not to be relied upon especially when things were going in a difficult way. And de Grouchy was going to be rigidly obeying orders. Marshal Soult was the Quarter Master of the Army.

So what about the medics? We have Baron Pierre Francois Percy, a famous French surgeon, who did many good things in the revolutionary war, along with Baron Jean Dominique Larrey. Many of you will have heard of him. Baron Percy had cardiac failure and wasn't present at the battle, but his reputation had already been established. He got taken prisoner at Waterloo by the Prussians, was almost shot, being mistaken for the emperor. So Baron Larrey was very much in evidence operating on the frontline in telescope vision of the British Army. Perhaps the most famous surgeon of the Napoleonic wars. On our side we have Arthur Wellesley a minor aristocrat, austere, some humour about him, very much respected. Through his learning and logistics and his intelligence gathering was probably, on the day, arguably the greater general.

There's Field Marshal Blucher, age 72, with schizoid tendencies. He thought he was fathered by a pink elephant. He drank and embrocated himself with schnapps and rhubarb. He was injured at Ligny but managed to come to our aid. Marquess of Anglesey to be Lord Uxbridge commanded the cavalry and lost a leg. Rowland Lord Hill and the Prince of Orange were the two inferior leaders to Wellington. The Prince of Orange was wounded in the left shoulder. The Army Medical Department, we mentioned James McGrigor. He was giving a lecture in this area on the day of Waterloo to the London Medical Chirurgical Society. He had been appointed Director General just five days before the battle. There were 52 hospital staff; a lot of them were residents in the Low Countries at that time. Don't forget Brussels was the social centre of the army of occupation. There were many late arrivals which really speak of the inadequate provision for hospital care by the British. 57 regimental medical officers, who were basically GPs in the Army who could operate, and their assistants. A lot of the regiments were deficient in medical staff. And the gunners had their own medical staff which was extremely efficient and didn't get merged with the Army Medical Department until just after the Crimean War.

This is Grant the principal medical officer brother of Colhoun Grant the great spymaster of Wellington in the Peninsula. This is James McGrigor again his brother in law. Both of these men were good organisers. We read little of them at Waterloo because they were really too distant from the action. I’m sorry about this very bucolic figure over here but it shows you how men were dressed to go up into line. They needed sponges and they needed water, they needed minor instruments and lots of bandages because there is very little you can do on the frontline. The regiment sent off three surgeons it sent most senior of the two juniors in. So the main surgeon and the more junior assistant surgeon went to the field hospital. This is how a staff surgeon or regimental surgeon would have looked when he was operating. You used a sponge primarily to clean your instruments and your hands and the patient's wounds. Of course, there was no knowledge yet of antisepsis or of pain relief.

The 15th June was a great social occasion by chance in Brussels. It was the 4th Duke of Richmond's wife's ball. And I think there were probably two medics at the ball. One would have been Grant and the other John Hume, Wellington's personal physician. It was here at midnight that Wellington learned that Napoleon Bonaparte had crossed the Sombre in force. Troops ran from the east and the north to Quatre Bras which was a place where they would hold Napoleon. The strategy is important because after crossing the Sombre at Charleroi, Marshal de Grouchy took the right side of the army and they engaged on the 16th this day 200 years ago, they engaged the Prussians at Ligny. 19,000 Prussians became casualties and 11,000 French. The Prussians did not retire east. They retired with agreement with Wellington north to link up with Wellington later in the campaign. Marshal de Grouchy was detached with 30,000 men, a big mistake, because Marshal de Grouchy did not use his initiative and failed to prevent the Prussians joining Wellington on the 18th.

Meanwhile, at Battle of Quatre Bras, we had the British Allied forces engaging Marshal Michel Ney's halve of the force which had been divided in two. And through troop delays and Marshal Ney's inertia, nothing much happened. Our troops built up and we made a withdrawal to here. This is just south of the village of Mont-Saint-Jean which is south of the town of Waterloo and this two-and-a-half to three‑mile front stretched across the Brussels Charleroi road. The French would advance and land a kilometre opposite them here and eight miles away was potential hell from the Prussian Army. This is the Duke doffing his hat to his Rear Guard as he retreats northwards up that road to establish himself in position across a ridge he had seen previously. You can see that the thunderclouds are brewing. It was the worst night on the 17th June, the worst night of a storm in ten years. It was dreadful because no fires could be lit. Nobody could keep warm or dry, except for some lucky officers. You can imagine how difficult it was for Bonaparte's men coming up within the churned-up non‑metal road here.

The next day, however, after very little sleep, poor food, no fires, no warmth, the army stretched and dried themselves out. You have a kilometre of valley, shallow valley lying between forces of 70‑plus thousand men facing each other, which occupy a battle area of two and a half square miles. I have no doubt there were a lot of nervous and excited young men waiting for what was going to happen. Troops came up. They wouldn't have looked as clean as this! This is a modern re‑enactment. They would have been filthy and muddy and so forth. You can see that they're still wearing the canvas shako covers up into line.

The forces facing each other because of detachments and because of injuries, you can see they were similar in size. Remember that only 26,000 of this force were British. This is an Allied victory, a European effort and, therefore, it's a European commemoration. Of the Prussians only 48,000 of those 100,000 available joined the battle, they joined it late. They were fundamental to the battle. Without them, we couldn't have won. Wellington planned it that way and he won the battle and that is all there is to it. But there is controversy about it still.

This is where the great gun battery was. This is the east over here. Up here is Brussels. Behind me is the big fortress of Hougoumont. These three outposts were heavily defended. This is Wellington's Ridge. This was his position. And just 400 yards down the road behind these houses north is the big farm hospital of Mont‑Saint‑Jean and is now opened up as a museum in Belgium. I have a very rich man helping me do that!

Here's Wellington's line. This is the French. This is the kilometre. Look at the shallow valley. You can see there's no cover. It's ideal tank infantry artillery country. Manoeuvring was simple but very little cover for casualties. A lot were looked after in the farms and the big hospital farms behind the lines. The other thing that stopped you getting a clear view, because Wellington said a battle was like a dance and you could only see your own partner, was the smoke which was unpleasant to breathe and inhale during the battle and added to the general thirst that the men felt. We will come back to this diagram a bit.

This is Hougoumont. You have the British and Allied lines here. The hospital is here, 400 yards down the road. The north‑south road. 1 Infantry corps and the Imperial Guard. The important village of Plancenoit. This is where later one Prussian corps would come from the east to help. So that's the layout of the battle.

This is the attack on Hougoumont, which is a farm with seven‑foot walls, which I tried to climb and it's almost impossible! The French became sitting ducks unfortunately and it was bravely defended by the light companies of the guards and also a lot of German soldiers.

So Hougoumont is now rebuilt. It's got new doors and looking wonderful. It's there for you to see. There are even two landmark trust flats. That's George Osborne's million euros – thank him very much!

This is the killing ground between the brick wall and the chestnut forest, which is here. It was about 12 acres in size. The French came under heavy persecution in that killing ground. Maybe some of them had to look after their own wounds, because their ambulances or systems of forward surgical support were not with them. They were about a mile away. The French ambulance system, which we will refer to later, was stretched in this battle. Here we have the north gates of Hougoumont being broken into by the French. The doors were shut. Thank goodness the farm did not fall. Colonel McDonnell and Sergeant Graham closed the gates along with Lieutenant Wyndham. Wyndham’s family has just made new oak gates to go back on the farm now. The chateau, at 2.30pm., caught fire. It was fired by an incendiary carcass and they had to get all of the wounded out of the chateau and into the outlying barns. Now, you can see looking westwards, with north to our right, and south to our left, the chateau of Hougoumont, which is about to be fired from the great barn. These are Nassau troops, Dutch‑German troops here. There’s an ordetly looking after a wounded redcoat here. We are standing in the formal gardens looking west, and behind me is a great big orchard which actually changed hands several times. Hougoumont petered out by about five o'clock. They failed to take it.

The Allied casualties were about 850. But the French, nearly 5,000 men died. They kept pouring men in and they kept dying. The whole point of Hougoumont from Napoleon's point of view was to suck the allies into Hougoumont, which they failed to do. There were never more than 1,500 men holding that farm. We don't know about the medical staff at Hougoumont or at any of the arm outposts. But with this number of casualties here, I can't believe there was no casualty support. I'm trying to find out that information. This is William Britain who made lovely military models and it shows you Colonel Whymper of the Coldstream operating. We have no proof of these Coldstream Guards surgeons.

This was a young man, Bamford Hesketh, who fought in Hougoumont with the light guards company. He didn't die until 1828. He was terribly wounded at the battle. The wounds that were caused, which he never recovered from, and at that time until the day of his death, his sufferings were heart‑rending to his family. He had most of his jaw shot away, which explains a lot, really. He survived all of that time and took promotion. It is just one of the casualties at Hougoumont.

This is Brigade Major Harris. He was shot closely in the arm and at a distance in his thorax and chest. He was operated on in Hougoumont the following day. What's interesting is that we have his coat. We can see that the sleeve is split down for the above elbow amputation to have taken place. We can also see that the bullet entry of the wound goes right through with a circle of cloth missing. This wound here, this damage to the coat is by the spent ball which went into his thorax. The ball has lost energy and it has only turned a flap of cloth, it didn't move the disc of cloth right through the patient, but these bits of cloth carry bacteria. He survived without much trouble.

This is a third degree of full thickness burn. There are some nasty pictures here, I'm afraid. If you want to know about Nelson in battle, it is not always nice. These burns were treated with lead acetate and honey and non-adherent dressings. As today the big killers in burns are fluid imbalance and infection.

The sucking in of our troops in Hougoumont didn't work. It goes on all day. It is about 1.30 p.m. now. It was preceded by a three quarters of an hour artillery barrage. Fresh infantry come to attack Picton's 5th Division. It was a risky time in the battle. The casualties from the cannonading were not as many as could have happened. The ground was wet and a lot of the common shell went into the ground. It didn't bounce. We think about 500 casualties.

The wounds. This is Sergeant Voultz of the King's German Legion. If you have a limb torn off, you can survive that, but not for a head strike – you won't survive. This man survived not only this avulsion injury, but a three‑week attack of tetanus, which was amazing. He was one of two survivors of tetanus from the battle. These are of course Charles Bell’s paintings which haunt us and are the only illustrative material we have of wounds during this long war

This is Albrecht Heifer, who was a Brunswick Huzzar. A shot has passed obliquely across his chest causing soft tissue loss and broken ribs. He survived the injury.

But then the infantry attack followed the cannonading. We have 17,000 men coming up in large wide columns and skirmishing was abundant. As these lines and this infantry came over the crest of Wellington's Ridge, they were pushing Picton's already damaged division well back. They went over the ridge and things were looking rather bleak. Thomas Picton, a Welshman from Carmarthen, a brave but rather foul‑mouthed and coarse gentleman according to Wellington, ordered his men forward, no doubt with a few expletives! He was killed by a right temple shot by a Frenchman. When the undressed his body they found another big wound on his stomach, he had broken two ribs, which he failed to tell anyone about, so he could lead his Infantry Division at Waterloo. This is the memorial on the battlefield. You can see the gunnery ridge from where the French attack came. The valley and this is the hedge which was broken through by the French.

Now, to repost this, there had to be something impressive and the French were not expecting cavalry because they couldn't see them. This will happen in a second, but before that, this is the ball that killed Picton and his compass. His military clothing hadn't come up so he was wearing a top hat.

This is a nice bit of surgical instrumentation, the saw that removed Lord Uxbridge's leg later in the day!

Here is a French picture of a British soldier rifling Picton's pocket as soon as he hits the ground, which is believable. But the real story is that it was a French soldier!

Anyway, the repost to this assault was two and a half thousand heavy cavalry. The only heavy cavalry we had, the Union Brigade and the Household Brigade. Two and a half thousand attacking down the north‑south road but pushing the infantry away. You will notice there are chopping assaults by a sabre, or pointing and thrusting injury. They cause different wounds. The French used the long‑pointed sword. We tend to slash at people.

Ponsonby's Union Brigade went too far. They were good cavalry but they were totally inexperienced. They didn't come back. Unfortunately, they were attacked by fresh French lancers and they were decimated. We lost over a third of that brigade in this action. Ponsonby was killed and we never really had an effective cavalry corps here.

The wounds were interesting, because we didn't have the lance but the French did. They had a nine‑foot lance which has a great reach. It can take people off their horses before you can get near them, if it's skilfully used. So the French lancers played havoc and attacked like a swarm of bees. Like Nelson's tactics with ships, you engage one man, yourself, and destroy him and go on to another.

Here, you can see General Sir William Ponsonby being killed unfortunately at Waterloo, with his ADC beside him. His sword was recovered from a junk shop in France about 30 years later and given back to the family.

Another Ponsonby, a cousin, came to his rescue with the 12th Light Dragoons. They didn't do much good. Frederick received 17 wounds. One of them was an open sucking wound from a lance. Chest wound. There were head and arm injuries.

This is Baron Nassau, dismounted from his horse, giving Ponsonby some brandy. Ponsonby survived and he met Nassau many years later at a levee. With cavalry, protection on the head even a brass Victorian from the Crimea cask won't protect you completely.

Chopping injuries tend to fall around the shoulders, face, neck and arms and sometimes the torso. Whereas a pointing and thrusting injury ‑‑ and apologies for this gruesome slide ‑‑ which damage vital organs or cause fatal bleeding. The kinds of injuries were different.

This is Peltier a French lancer. They got his bowel back inside. They put two ends of the bowel on to the skin as a crude form of colostomy.

I was lucky enough to get some very interesting data on the Royal Scots Grays from a specialist colleague. 77 wounds in 29 troopers. 48 of the 77 wounds were caused by the lance, but interestingly only 13 of the 48 were body strikes. It means they were inaccurate. It means that in the panic and fear and adrenaline drive of assault, you can be inaccurate with your dishing out of wounds.

The other thing is out of 29 troopers, you can see there were seven severe bruising from horse falls. We tend to forget that type of injury. Field Marshal Blucher did fall under his horse at Ligny but was rescued by his ADC and made it to come and help us at Waterloo.

Another poignant story is Sir Howe de Lancey who was Assistant Quartermaster General to Wellington. He received a round shot in his left side, which broke a lot of ribs and damaged his internal organs severely. He eventually, 11 days later, died in a little hovel in Mont‑Saint‑Jean. Magdelene, who had been married to him for three weeks, eventually found him and nursed him. A little book called "A Week at Waterloo" is just wonderful, a poignant story. It is one of the finest accounts of an injured man being cared for. The medical staff don't come off terribly well! All they wanted to do was to bleed poor old Sir Howe de Lancey.

The infantry attackers failed. The Prussians are now seen in the distance. They take Bonaparte a little bit by surprise so he moves a lot of infantry across here, very wisely. So they're very depleted in infantry. This lot have failed and Plancenoit has gobbled up the rest. It is a compressed front with 12,000 of the finest cavalry in Europe and they were very fine horsemen. This panorama of Waterloo, you see the size of the assaults. Probably about 12 assaults over two hours by two cavalry corps. They were brave men. They came over and to their horror, they’re trotting up this damp ground over corpses, and they find 22 infantry squares bristling with bayonets, firing at horses with an intense fire rate, and they can't do anything. Over two hours, they bravely attack the squares until the squares are nearly out of ammunition and the French horsemen are powerless and think can only fire pistols or throw lances. On both sides there was a steadiness and élan by the British and by the French which was really unmentionably good.

The inside of a square was a hospital. The assistant surgeon would staunch haemorrhage, bind up wounds, and they were made up of two or three regiments. The dead were chucked out and the ranks closed up. This went on until six o'clock. Between squares were batteries of artillery. This is a very famous group, some of you may have heard of Mercer's battery. There is a monument on the battlefield to him. He wrote a diary, a vainglorious diary but very interesting nevertheless. They had to keep up incessant fire. This is a nice little specimen from Guys Hospital with our own breast plate which is a breastbone, with a little French ball impinged on it. It provoked a reaction of the periosteum and grandpa lived to over 90 with that little knob on his chest. I imagine his grandchildren loved to come up and caress it.

This is Gunner Butterworth's injury. He lost both arms above the elbow. What is difficult is that you can't control haemorrhage if you don't have any arms. He made it from all of the way on the frontline to half a mile back to the farm hospital of Mont‑Saint‑Jean. The reason he made it is when you have a damage injury by a missile, the muscle is stretched, and when it's stretched and disrupted, it released a chemical which narrows the artery down much more efficiently than a clean cut by a sword. But Gunner Butterworth made it to 100 yards of surgical aid, which was sad.

The Prussians really have arrived now. The French are being chased out of Plancenoit. The young guard get sent in. It is a vicious street fighting. The Prussians loathe the French for many different reasons. One French general had to stop his men destroying Prussian prisoners by cutting their throats. The cavalry assaults have failed. They have drawn troops off here. Eventually, Bonaparte, after going back to the farm of Rosin, he came back and said you have to go back. If you can soften back this centre here by bringing up artillery and cavalry, we can make minutes meet of the centre of the British line. This is what happened. La Haissant eventually fell, it ran out of ammunition. Three battalions were sent down to relieve it. The farm fell and the French unfortunately killed all of the wounded inside in the heat of battle. This is the attempt to relieve the farm from the line by the King's German Legion; they were fine soldiers but they were decimated by cuirassiers.

To my mind the greatest military hero of Waterloo is Christian von Ompteder who was a Colonel in the King’s German legion. He ordered the 5th regiment down to take the farm and they were decimated behind him. He sent his two nephews aged 15 and 16 to safety and he rode on on his own. He jumped in little hedge in the kitchen garden to the north and was executed by the French. The great sacrifice by a great man.

About this time also a shot took off the military secretary's arm, Military Secretary Lord Fitzroy Somerset. He later became Lord Raglan. Of course he made rather a mess of the Crimean. You can see he has an empty sleeve here. The spectre of Wellington is admonishing him during the Crimea for his performance. Somerset loses an arm.

Finally, things are going very badly for the emperor. The only thing he can do at about 7.30 is finally to send out the middle guard. There are elements of old guard with the middle guard. But they marched off on the compressed front once more to hit Wellington's centre right. These are 3,000 men. They go up in square with their surgeon with them. Their ambulances are half a mile behind them, so a lot of them will die unfortunately. They go up on to the Allied ridge. The third and fourth grenadiers of the middle guard, these fine and wonderful looking old soldiers called the grumblers and hit the centre. The line of two squares actually break and they come back again. But luckily, a Dutch Brigade and artillery battery are sent in by Wellington and the guards are sent back. Meanwhile, the chasseurs meet the Maitlands foot guards. You can see Le Haissant here. It is acknowledging it as a lot of British Historians haven’t done. We got a lot of help from our allies. This is Maitland’s foot guards, courtesy of Metro-Goldwyn-Mayer, hiding in the corn. They send them down the slope and there is another strong square of Chasseurs of the guard and finally Sir John Colborne commanding the light division. These great veterans attack them sideways and they push them down the hill and the battle is over. At this time, while the Belgians are coming forward to help, the Prince of Orange is struck in the left shoulder. We know the wound here is healed by October and he goes back to Waterloo to be dressed.

If you will go, and I do exhort you to go to Waterloo now, because the investment is very big indeed. It's a stunning heritage trail to look at. But this Lion's Mound is 226, not advised for you with ischemic heart disease or arthritic problems! The epicentre is where the Prince of Orange got his injury.

The guard really have been defeated now. The French Army have been betrayed by rumours of Marshal de Grouchy returning which he failed to do. The Duke rides down and then a ball passes over the neck of Copenhagen and strikes Lord Uxbridge in the right knee. It's a compound injury and he goes away to have his operation. One of the last shots of the battle. The Imperial Guard, the middle and old guard retire in some sort of order and get away, allowing the emperor to jump out of his carriage, which is captured by Prussians and British cavalry, and ride off to Paris to think up another ruse. Meanwhile, after a chance meeting between Blucher and Wellington on the battlefield, neither spoke each other's language, so Blucher said “quelle affaire” and Wellington said “mein lieber kamerad” and they shook hands. Wellington came back to start his despatch. Which comes back to Britain on the 21st of June and in fact we are going to receive a mock‑up of the despatch on 22nd in St James Square.

In the bed behind him you can see Colonel the Honourable Alexander Gordon dying after his leg has been amputated. Sadly, this man bleeds to death from surgical failure and this is a pretty fair assumption. I will tell you why in a second. The two eagles, there weren't three, one of them was recaptured, were presented to the Prince Regent in St James Square and the nation went berserk.

Back on the battlefield, things weren't very elegant and this massive injured horses. You can imagine 6,000 wounded horses and almost 2,000 dead horses. You can imagine 55,000 men on two and a half square miles.

Here is a medical officer. And the logistical challenge is impossible. It took four days to get the Allied wounded away. A lot of the French hid because they didn't want to go to British pontoons as prisoners again. Graves had to be dug men buried locally except the very famous and Bodies were burned and so forth. The problem with Waterloo is if you look at the Somme, even the Somme casualties per day and per mile a front is nothing compared to Waterloo. Of course the total number of casualties is nothing compared to the total Battle of the Somme or El Alamein but the density is huge and that posed a big logistical problem. We didn’t have stretcher bearers as the French did. We didn't have ambulances. This is a problem. The musicians of the regiments carried the wounded. The total number wounded in the whole campaign all four battles was near 63,000. It's a huge challenge for the medical staffs of all types. The Battle of Waterloo, killed, wounded and missing, 55,000. Overall the casualties were about 23% so it’s a one in four chance of being hurt, taken prisoner or dying on the battlefield. Our casualties were slightly more because a lot Wellington's experienced regiments took harsh punishment. Notice that the officers have similar casualty rates to the whole lot. French casualties, we don’t know, because of desertions, but about 25,000. Horses, it must have been unpleasant on the battlefield with these poor animals not being cared for by the battalion farrier or veterinary surgeons.

This is one of the Charles Bell's famous Corunna oil paintings, showing tetanus, from which two people survived these horrendous muscular spasms from the neurotoxins. Treatment then was to cut off the offending wound, sedate the patient, knock out a couple of teeth to pass a tube into the stomach for feeding. Every time you presented a patient with water or food, he would go into lockjaw, a titanic spasm of the face.

There is not much you can do on the battlefield. You can bind up injuries, give water. You want to get back to a regimental aid post but there weren't any. They had to get back to that farm and a lot of men died from a lack of transport back.

There were a couple of field amputations, one French and one British. But as you can see, the conditions for an amputation on the battlefield were hardly ideal. The French had this wonderful system of close support, with vehicles. They had 340 men broken into three units of 110 men each, with 16 vehicles in these units. These were flying ambulances. They went in to operate close to action. They took the wounded out and brought supplies back or brought the lightly injured dressed men back to fight again. They had dedicated stretcher bearers and properly military trained surgeons. But by this time in the war, it was an expensive luxury and it was nowhere near its former glory. Here is a French field ambulance in action. It shows you the arrangement and the temporary set‑up on the battlefield. To have properly staffed people who had dedicated to looking after them was so important. When we gaze at Baron Larrey's uniform, his instruments and dressing case used during the Russian campaign, we wonder why we didn't copy this. People email me often to say why not. The answer is quite simple. Victorious governments don't spend new money on new developments. They won, what is the point and the enthusiasm level is very low. That's probably the reason, even Surgeon called van Milligan suggested everything the French had done, we wouldn't listen. Guthrie was furious that the British Army wouldn't set up a chair and a school of a military hygiene and medicine. It was a huge failure. If you're on the battlefield in the square, you had a long way to go.

This is the British line here. It shows you the distances that the wounded men, unaided, would have to go. When I went in the late sixties, that's my first view of the hospital in Mont‑Saint‑Jean. This bit is going to be the museum, this is a brewery, a very fine Waterloo vintage beer! This is a wedding event centre. There is a shop over here. The man is spending millions on the place. It's delightful that we have managed to persuade him to do it.

This is what an operating theatre would have looked like in Mont‑Saint‑Jean at that time. There are plenty of large barns. There are about 6,000 to 7,000 casualties there. The camp followers were there and there was a water source within the farmyard. But after Waterloo the Brussels sent down about 40 wagons, not the good French ambulances, and gradually the battlefield was cleared. This is the walled city of Brussels. We were much helped by the Belgian civilian and military medical staff. Dr Seutin here was about 22 and he did 18 above-knee amputations on the day at Waterloo. Here, we can see civilian staff treating casualties in farmhouses nearby. I looked at about 800 wounded men who survived and presented to a surgeon. 62% of them were caused by small arms fire. And then a few by edge weapons and you have about 17% survivors after cannon shot.

These are some more of Bell's pictures, a compound fracture of the tibia and fibula with swelling. Obviously, the military splints had run out, because this is a bundle of straw and tape keeping it quiet. But Guthrie actually introduced a very much better long‑leg splint in Spain. Here, we have one of Bell's pictures of an 18th Huzzar called Ellard who has a compound shoulder injury treated in Brussels. He survived. Bell has illustrated the pain on the patient's face.

Well, the problems are obvious to you. Bleeding with anaemia if you survived. There's no blood transfusion, of course. Sepsis care didn't come in for 40 years. Pain was reasonably well treated except there was always too little laudanum and opium with the battalions. Morphine sulphate was actually isolated in 1801 in Germany. Dehydration and starvation was a big problem for the soldiers. They were improperly fed on a low diet after their wounding and recovery. Wound care and cleaning out of the wound and management of fractures were poorly done. I don't think they really started to get very good until after 1915, when we really had to learn how to debride filthy wounds. So 500 allied amputations on the day, roughly 2,000 over the whole campaign. This is a college capital set with scalpels, trephines, bone nibblers, operative tourniquets for major surgery, and amputation equipment up here.

This is a dedicated amputation set belonging to Surgeon Hadi James of the 1st Lifeguards. It was his first military action. I found this set in Brisbane in a car boot sale. I'm reading a bit at St. Pauls from Surgeon James's diary. It is his account of the wounded when they came in. They are in oak or mahogany chests. Of course, the amputation technique had changed from 1760 to 1780. We went from the guillotine circular amputation to the flap amputation, where the push the knife through the tissues and ease it out diagonally so you get flaps of tissue to cover the bone end which gives much better healing.

Gordon, we talked about him, he died. Well, in Mont‑Saint‑Jean, Dr Hume, Wellington's personal physician, took his leg off with a guillotine amputation. You can see such an operation here. He picked up the arteries and tied them, not the veins. He leaves him because he's got to go and do another operation on Lord Uxbridge. He gets a second opinion and he uses a flap amputation on Lord Uxbridge. Here, you can see a wonderful apocryphal painting of Wellington comforting his brother‑in‑law, who has just run off with Wellington's sister‑in‑law, so this visit never happened! But it makes a good picture. They got on professionally quite well. You can see the Malta cross bandage, the standard dressing for a stump, and the staff surgeon proudly showing the Duke the surgical work. So Lord Uxbridge survived.

There are three artificial legs. One is in Anglesey, the other in the Waterloo Headquarters Musee Wellington and one in the Household Cavalry Brigade in Whitehall. There is the flap amputation. You have seen the guillotine amputation. This gives flaps to cover the bone end better. What had happened is when they uncovered Gordon's dressing, he was very ill. He had bled out a lot on the field and I think a ligature had come off because he said I applied another ligature. Whether he had missed a vessel or it had come off we don’t know. He died, unfortunately.

This is an Imperial Guard amputation set. What is fascinating is that it was lost on the battlefield and given to a French GP eventually who presented it to a fantastic museum, I really recommend you go there, at Lacine. It's medieval medicine mainly, but it has some incredible artefacts. And the knives are big and different because it shows the surgeons operated together. I won't go through all of the procedures. Obviously, the technique of therapeutic venesection is inappropriate. It is used mainly for chest and head wounds.

The energy of these musket balls was very low compared to modern weaponry here. So if you were standing close to a musket ball you got a devastating injury but within 300 yards you were quite safe. There was a different energy dispersal. If you could feel the ball, you could probably extract it.

These are all missiles removed by Professor John Thompson or Sir Charles Bell after the battle. You can see the disc of the cloth which carries the infection into the wound.

Trephining was done for compound or depressed fractures. The most famous or notorious case of trepanning was with this young Lieutenant in the Cambridgeshire regiment called Lockwood. He had an ugly scar after his battle in Brussels. He made a silver plate with perspiration holes and on it was written "bomb proof" and he put this across the defect in his skull and kept it in position with a black silk bandana.

As we get near the end, we have got to mention Guthrie, who was three times president and five times vice‑president of this college, and went over to the battle to help and advise. This is his triumphal disarticulation of the hip of a French prisoner of war. The bone the hip joint had been destroyed in this patient. The magnitude of surgery needed, he had two very good assistants, and the man had lost a lot of blood, but made it back to France as a shiny example of good British surgery!

You know about Waterloo teeth, young healthy and fit soldiers didn't get caries so their teeth were very valuable to sell people to mount in hippopotamus ivory or walrus ivory to give expensive dentures to the class of people who could afford refined carbohydrates.

Terrible slide. 374 victims of Waterloo, but note how much more common leg injuries were than arm injuries and how much higher the mortality is of leg compared to arm. If you do the operation soon, when it's needed, you have a much lower mortality than if you leave the injury. Nearly half of the mortality rate. So three quarters of the men re-joined the Army of the wounded the next year. And Napier actually says something very true. There is a long story of treachery, secret politics, jealousy, false rumours, and will it ever be sorted out? I think Wellington's quote is even better. He says “leave the battle alone, you will never make it a satisfactory work”. As we look at him coming back exhausted after meeting Field Marshal Blucher, those wise words percolate down to today.

This is the last survivor and witness of Waterloo. Her name was Elizabeth Watkins. She helped drip water into the mouths of the wounded. Here she is with her child and husband later on in life. She has a great‑great-great granddaughter who is coming over tomorrow. I’ve met her and she was the last witness of Waterloo to die in 1904.

A long story I’m afraid. The battle takes a bit of telling. The medical people who looked after the wounded and the wounded themselves deserve our memories and thanks as we go through these next two days, which are the bicentenary of the battle of Waterloo. Thank you very much.

DR ALBERTI: That was wonderful, mesmerising. We have time for one or two brief questions if there's anybody.

FLOOR: My great‑great grandfather fought at Waterloo and he was shot through the thighs with a musket ball so what you were just saying was very interesting to me. The family story was that he was considered to be dead on the battlefield but was taken off. Who did... how were the assessments done, if that is the right term, on the battlefield?

MR CRUMPLIN: Was he a private soldier?

FLOOR: He was a captain.

MR CRUMPLIN: He would have been looked after by MacDiarmid. It took high casualty rates. He would have put his finger in, if there was no exit wound, to feel the ball. They were trapped all over the place sometimes. And he didn't have an amputation, I assume?

FLOOR: No.

MR CRUMPLIN: Of course, he didn't have a broken bone or a damaged artery with that story. It was probably a soft tissue injury but nevertheless severe, and could get infected.

FLOOR: [inaudible]

MR CRUMPLIN: That's true, isn't it? We meet so many descendants now, which is a real joy. The damaged skull with the metal plate. I met a lady two days ago but I made her stand up so we could see here.

FLOOR: How effective was the laudanum?

MR CRUMPLIN: They didn't have laudanum. You can get the figures from the Crimean War and the supply was too small. There is no immediate pain relief. They bore the pain because they expected no different.

DR ALBERTI: Final question.

FLOOR: Bearing in mind there was no antiseptic, what was the improvement in the chances of a casualty to have an amputation in a hospital as opposed to on the field?

MR CRUMPLIN: Well, not many as I said were done on the battlefield. The sooner they were done in the hospital, the better. Eight in ten people walked away and survived. It depends on the fitness of the patient, the skill of the surgeon, and that's about it, and the site. Obviously, a hip or thigh wound is the most severe and a finger wound not necessarily the most severe.

DR ALBERTI: Ladies and gentlemen, much as we would like to pepper Mick with questions for the whole afternoon, we should probably let him rest in what is a very, very busy week.

I'm very pleased to announce that our next lecture will be on 11th August, which will be about John Quekett, whose bicentenary of his birth and 150th of the Quekett Microscopal club, which is on 11th August, a lovely lunchtime lecture. I'm delighted we have climaxed this year's series with this lecture.

I want to thank our speech‑to‑text colleagues, I want to thank the whole learning team, and especially Hayley who has organised this. Thank you to you turning up on a lovely summer's day. Thank you, Mick, for a fascinating lecture. Thanks.