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From Jenner to Wakefield: The long shadow of the anti-vaccination movement Transcript

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A non-hazard of vaccination (Gillray)

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The long shadow of the anti-vaccination movement**

Professor Gareth Williams

Good evening. Frank, thank you very much indeed for your warm introduction. It is a great pleasure and a privilege to be here.

Edward Jenner is one of the great figures, one of the great godlike figures, in the history of medicine and the history of science. Looking at this image of him, I would invite you to ask yourself, "Is this the picture of a saint? Is this the face of a saint or is it the face of somebody rather more sinister?"

Firstly, a quick word to explain why I am here. My background is indeed in endocrinology, diabetes and obesity, and my research group up in Liverpool was grappling with some of the biggest issues in obesity. The first one is shown here. How did this chap get into this state? And which way was he facing when the photograph was taken?

Edward Jenner was born in the tiny village of Rockhampton out in the wilds of South Gloucestershire, about five miles south of the town of Berkeley. This is where he worked, where he lived and died, and where he is buried today. To the right of the River Severn is Jenner's catchment area. It covered about 2,000 square miles, and when Jenner did his house visits, he would set off on horseback, and he would very often stay with the patient's family overnight, and he was a great and very entertaining person, so I think a house visit from Dr Edward Jenner would have been really quite something.

Berkeley is famous in the history of medicine and the history of science because it is where the first properly recorded vaccination took place, and this was the middle of May 1796. Edward Jenner was not the first to think of vaccination or even the first to experiment with it, but, as you will hear, he was the first one to drag it into mainstream medicine and the first one to really make doctors take it seriously and start practicing it.

This image here is the first vaccination properly recorded. If you like, the *dramatis personi*, the cast of characters, begins with a cow, called Blossom, who has been omitted from the picture in the interests of clarity, and Edward Jenner is seated there. He is scratching a rather disgusting fluid, which originated from Blossom's udder, into the arm of James Phipps, who is the eight-year-old son of Jenner's gardener. The fluid he is scratching is from a cowpox pustule, which has just been lanced by Jenner on the hand of Sarah Nelmes, a rather upper class milkmaid. James Phipps is obviously there as the guinea pig, and I will come back to this image later on and explain a bit more about the context, but again, at this stage, you need to ask why exactly Jenner was doing this rather bizarre, disgusting thing with a rather filthy fluid that originated from pustules on the udder of a cow called Blossom.

A quick word about smallpox. I, myself, never saw a case of smallpox because it was already on its last legs when we did our medical training and when we qualified as doctors. One of my counterparts, who was Professor of Medicine in Halifax, Nova Scotia, back in 1914, said the fact is that, even then, they had forgotten what smallpox was like because it was already being defeated by vaccination. At that stage, there were still 63 years of smallpox's free existence on the planet to go, and in that time, it would kill 250 million people.

So, in its heyday, which spanned over two and a half centuries, smallpox was one of the great lotteries of life. It was "one of the rivers that everyone had to cross", according to de la Condamine. You had about a one in three chance of getting it during your lifetime. If you got it, you had, on aggregate, about a one in four chance of dying from it. So, across most of the planet, smallpox killed about one person in twelve, so it was one of the major killers. About 90% of its victims were under the age of five, so it was also a very brutal, a very mesmerising killer, that really had a grip of fear over a lot of the people on the planet.

If you got it and you survived, you were not necessarily that lucky, because you had about a one in three chance of being badly scarred – and we are not talking a bit of bad acne here, we are talking about scars that go deep into the skin but heal with fibrosis that open up the pits, and some people actually killed themselves because, when they recovered, they could not face what they saw in the mirror.

As well as the skin being scarred, it often got the cornea; the transparent front of the eye, and it was one of the commonest causes of blindness in young adults in Europe as a result of that. So it was a pretty mean disease.

I will just show you a couple of pictures. The little boy on the left is actually very, very famous because this picture was on the World Health Organisation's Smallpox Recognition Card, and when the volunteers were going out to vaccinate the villagers in India, Pakistan and Bangladesh to try and stamp out the outbreaks of smallpox as they arose, they would take these cards out, they would go into the village, and they would ask the schoolchildren because they were the best at identifying the early cases: "Have you seen anybody like this?" So, the little boy is in the early stage: he is covered in pustules, which are big blisters filled with milky pus, looks pretty unpleasant.

The young lady on the right of the screen there was from Zaire in the 1960s, and she was a couple of stages

further on, so those pustules have dried up, she is left with a lot of scarring, she is left with a lot of swelling, because the inflammation is still settling down, and because of the swelling, her eyes are shut tight. So, when this photograph was taken, neither she nor the people holding her up knew whether she would be able to see again, when finally she could open her eyes. So it was a really foul, horrible disease.

It would be lovely to say that medical science had risen to the occasion and came up with a cure, but I am afraid, once you got smallpox, you took your chances, and we, as doctors, were able to do very, very little, other than give, effectively, palliative care, and let nature run its course.

If you go back to the 1770s, during the time of Edward Jenner, leeches were used. Leeches were used for everything. It was one of the doctors' stock-trades. It did absolutely nothing for the disease, but it was a means of allowing the doctor to present you with a bill because at least he was doing something. The same went for salts that gave you diarrhoea or that made you throw up. The colour red was great: it was thought to protect against smallpox; it was thought to cure smallpox. When one of the Austrian Emperors was dying of smallpox, they sent to England for fourteen yards of heavy red English flannel, and they wrapped him up, and the poor bugger dropped dead on the spot! So that proved that the colour red was not actually that good for treating smallpox. The mortality figures for smallpox showed that depending on whether you had the major or the minor form, it was somewhere between twenty and fifty percent in the 1770s.

Fast forward 200 years and the first thing that struck me when I read about the current care in the Department of Health instructions was that, if the patient was female, you should remove all mirrors from her sick room, because, being female, she might not have the moral fiber necessary to cope with what she saw in the mirror - this was serious, this was what they recommended.

In the 1970s, we had Intensive Care, we had anti-viral drugs, but, put it all together, and the mortality, even then, 200 years later, was only slightly better, overall. So, once you got smallpox, you took your chances, as people always had done.

So, what about prevention of the disease? Well, there were various sorts of precursors to vaccination. People actually used smallpox pus instead of cow pus. It sounds scary but it did actually work, and it had a relatively low mortality rate, about one in 50. But what Edward Jenner did, was that he brought vaccination, so the use of cowpox rather than native smallpox, onto the scene as a therapeutic move.

Edward Jenner was one of my heroes. When I was researching the book, he was one of the people I really enjoyed reading about. I would love to have known him. He was an absolutely fascinating chap. He was a gentleman doctor, an FRS, so Fellow of the Royal Society, and a very serious scientist. As a scientist, he was a polymath - he flitted from ornithology to geology to botany. He was a dilettante - never quite finished quite a lot of experiments, and he wrote up some really dire experiments and was really gutted when the Royal Society said, "This is garbage - we can't print it." But he did do a lot of good things as well.

He played the flute and the violin and sang; he wrote poetry - I think there is just time to give you one of his poems. It was to celebrate the death of Dr Waite, who was a doctor who had perfected medicinal gingerbread for killing intestinal worms. This is known as a proto-limerick. It scans just like a limerick, and it goes as follows - it begins with the Latin names of the worms:

Ascaradis, Teres, Lumbrici and all,
Ye chyle-sucking insects that tremblingly crawl,
No more be afraid,
You're quite safe in our guts,
For Waite has done making his gingerbread nuts.

So Edward Jenner FRS, an absolutely wonderful man! He got his FRS for nothing to do with medicine. He got it for working out how the cuckoo chick gets rid of the other chicks and eggs in the nest, and, again, it is a great story, which, unfortunately, we have not got time to go into today.

Jenner learned his medicine at the feet of John Hunter, Surgeon Extraordinary to his Majesty King George, and indeed on Hunter, you know, there is enough material there for three or four other lectures. He was extraordinary: he was the man that kept Jenner's scientific interest afloat after Jenner left London and went back to the quiet backwards of Berkeley.

Hunter began his medical training as an apprentice to a man called Daniel Ludlow, in the town of Chipping Sodbury. I will come back to Chipping Sodbury in a minute, but this is where we have to think about Jenner's scientific contribution. Again, this comes into the anti-vaccination debate because, later, you will hear that people tried to demolish Jenner's approach, his systematic scientific approach, and they used the fact that he had been an imperfect experimenter in other domains to try and back up their claims.

So, Jenner was acquainted with an observation that he did not make himself, he was told by it; by somebody you are about to meet. From this, he deduced that cowpox might protect against smallpox. He formulated the hypothesis that if you give somebody cowpox artificially, then that person will be protected against smallpox. He conducted an experiment, which we have already seen the outline of, to try and see if that hypothesis were true,

and then he verified the results by challenging his guinea pig with smallpox. Then, the two bits that had defeated everybody else who had thought of this: he then decided he would tell the world about it - he would publish his results, he would disseminate his findings; and most difficult of all, given the fact that the medical profession then was even more stuck in the mud and conservative than it is today, he was going to change medical practice for the better.

So, here is where we begin actually, with the observation, and again, vaccination is giving people cowpox to prevent them from getting naturally acquired smallpox. Cowpox was a bit of a legend. It was an occupational hazard of girls in the milking parlour.

This is what it looked like. This is what Blossom's udder would have looked like. So you have got these rather nasty pustules, and if the milkmaid has got a cut in her hand, then she will pick up the virus of cowpox and she will develop very similar-looking pustules because she'll have caught the disease off the cow.

The legend was, as told to Jenner by an anonymous milkmaid who was consulting him as an apprentice, that there was an outbreak of smallpox nearby and Jenner was told to brief everybody that they might need to take care, and this milkmaid said, "I am not in the least bit worried about smallpox because I've already had cowpox." Jenner, like all the other doctors of the age, had not been told about this. He did not make the connection; he did not do anything about it for quite a long time, but parked the knowledge and returned to it later on.

Now, the reason I hesitated with Chipping Sodbury is that it is desperately easy to say Sodding Chipbury! When I went to give a talk in Chipping Sodbury, that is exactly what I did! Fortunately, they were very forgiving and, actually, the inhabitants of Chipping Sodbury are very nice, warm, caring, forgiving people, but it was deeply embarrassing at the time.

So here we have the observation being presented to Jenner by the friendly milkmaid in Chipping Sodbury, and this was the start of an experiment that actually took Jenner 30 years to complete. We know that he was interested in it because he belonged to a very interesting society called the Convivio-Medical Society, which met at this building. It still exists. It is now called the Ship Inn and can be found just off the A38 at Alveston outside the town of Thornbury. It is very similar. In those days, they presumably did not have very many Abba tribute nights as they do today, but otherwise, it is pretty much the same.

The purpose of this society was to meet regularly. They were all doctors in practice locally. They met for the united purposes of having a good time and talking about science and medicine. In the minutes, there is the entry by the then-Chair, saying that they had had a great discussion, but if Edward Jenner persisted in trying to tell people that cowpox could be used to protect against smallpox, then they would throw him out of the society. So, clearly, he was talking about it, but not doing anything, and the reception of his medical colleagues is interesting in that they simply did not believe it. This was a legend from the lower classes, the milkmaids - nothing to be taken seriously by doctors or proper scientists.

But Jenner finally got round to doing his experiment, and this takes us back to this picture. It is the 14th of May 1796, and Jenner is inoculating James Phipps with cowpox puss from Sarah Nelmes' hand and ultimately from Blossom. What happened was that the lad developed a small sore, at the inoculation site on his arm, he had a bit of a fever, and then he settled completely back to normal again. Now, Jenner then had to test him to see if he was actually immune to smallpox, protected against smallpox, and all he had to do was the then standard medical procedure, which was to give the lad therapeutic smallpox. This was a process called variolation, and again, this was the precursor to vaccination. So, you would think this is outrageous: this man gave this boy not only cowpox but then deliberately infected him with smallpox, but in fact, that second thing, although it sounds a lot scarier, was actually the bit of medicine that was accepted practice at the time. The great thing was that absolutely nothing happened. If you variolated somebody, you gave them smallpox, normally they got a nasty ulcer where you would scratched the smallpox pus in, and then after a few days, you would have satellite lesions breaking out, perhaps a couple of hundred of them, over the rest of the body, and people could be quite sick with it before they got better. Interestingly, this lad showed none of that at all. This is one of the great Eureka moments in the history of medicine and science: Jenner had proved that he had managed to make somebody immune to smallpox.

So, very excited, he sent the paper off, he wrote this case up, and lots of other cases, together with observations of people who had caught cowpox naturally and had not got smallpox, even though they had had plenty of opportunity, sent it off to the Royal Society, and they rejected the paper!

Jenner was quite easily bruised and he was very paranoid: he suspected that they were out to get him and steal his secret, and in this case, they were actually probably right because the referee was a seriously evil individual called Evelyn Hulme. So, what Jenner did was he did some more cases, he did some experiments, he wrote them up, and he self-published. It was a paper called the "Inquiry into the causes and effects of the [Varioli Vaccini], a disease known as the cowpox, in the countries of England, most particularly Gloucestershire", so a long title. It is known as "The Inquiry". This is one of the greatest pinnacles in the whole of the history of medicine. It was not peer-reviewed, and it was self-published, by a little print house in Soho.

When it came out, it was an instant sensation because it was a do-it-yourself guide to vaccination. Remember, the doctors at the time had never heard of cowpox, so they had no idea that it could be therapeutically useful,

so what Jenner was doing was he was displaying this for everybody to see, so this is a wonderful example of open access publication. The doctors, up until then, had guarded their practice very jealously. The variolators, for example, had their own private recipes but Jenner did not want any of that; he wanted this out in the open so that people could exploit what he had discovered and use it for the good of mankind. It was an instant sensation, partly because of pictures like this, and this showed the doctors exactly what the lesions of cowpox would look like, so that they could then go out and find material and vaccinate their own patients to protect them against smallpox.

Here is a wonderful example as to how quickly the vaccination took off. This is really quite a moving expedition, which was called the Royal Philanthropic Expedition of King Carlos IV of Spain. It was not entirely philanthropic because he needed to impress the Spanish colonies, from whom the tax revenue was drying up a bit, and what King Carlos (King Charles) decided to do was to send this new, apparently divine gift of vaccination to the Spanish colonies. So, they organised a little flotilla of ships, which set sail from La Corunna in Galicia, Northern Spain, across the Atlantic, and there, the expedition split: part left the ship on the Atlantic side, crossed Mexico on foot and horseback, picked up a ship on the other side, came back round the back of the world and the other bit went down through Central America, going right in to the heart of Peru, and then got boats to take them back round Tierra del Forego, back across the Atlantic to home again. The whole thing took three years, and everywhere they went, they were fantastically greeted – again, there are very, very good accounts to read of this, and it worked as a propaganda coup really. It really did work.

Now, you might ask how they managed to get vaccination all the way across the Atlantic and back round the world, and the answer was that they started in the local orphanage in La Corunna, where they acquired twenty orphaned Spanish boys, and they vaccinated them in pairs, every ten days, so, the first pair just as they left port. Ten days later, they harvested the nice juice from those two, they did the next pair, they saved the juice, and so on, so by the time they had crossed the Atlantic, they had taken it sort of arm to arm all the way across.

The Mexican party then left the twenty orphaned Spanish boys to be raised by the Church, then popped down the road to the nearest Mexican orphanage, where they acquired another twenty willing volunteers, and took them for a trip of their lives round the back of the world. So, all's well that ends well! If you then wind forward very rapidly – I mean, suffice it to say, the vaccination did work. It was highly effective, and it cleared, progressively, large swathes of the planet of smallpox. By the time Jenner had died, they had managed to clear the province of Lombardy, in Northern Italy, which again was completely unprecedented.

That process continued, and by 1967, which was the time that the WHO, the World Health Organisation, decided that they could actually wipe out smallpox for once and for all, you will see that it had been cornered in South America, Sub-Saharan Africa, Southern Asia, India, Pakistan, Bangladesh, and a bit of Indonesia. The World Health Organisation, again, set out on a concerted global campaign to stamp out smallpox from those areas, using mass vaccination, using careful targeting of early outbreaks and so on, and they succeeded. Jenner's vision of a world completely free from smallpox, which he predicted within a couple of years of actually publishing his Inquiry – it was completely an outrageous thing to predict, but he went for it, and that vision was actually realised.

The little girl here was found hiding under a sack in a village on the island of Bola, in the mouth of the Ganges, and she was the last remnant of a little outbreak of smallpox, which the local authorities wanted to cover up because it would have been an admission of defeat because smallpox was so nearly stamped out. She was the last one to get the more severe form of smallpox, so called Variola Major, and she survived and is still alive and well today on the island of Bola.

It took a couple of years to stamp out the last vestige, which was the little sort of enclave of smallpox in the Horn of Africa. The main kind of smallpox there was actually Variola Minor, and the last victim of that was a hospital porter called Ali Maow Maalin, in the town of Merca in Somalia, and what he did wrong was to jump into a jeep which arrived, with a couple of little girls in the back, both with smallpox, one of whom was obviously dying, and took the jeep, directed the driver round the back of the compound to the isolation unit, and he was in the jeep only for a few minutes and one of the little girls died, and the other one survived. He then went down, a couple of weeks later, with this mysterious pustular illness, which they took ages to diagnose, and even though he worked in a hospital where they dealt with smallpox and even though he was a volunteer vaccinator himself, you would have thought he would have been vaccinated, but he had not been. Anyway, he survived, and he was the last victim of naturally occurring smallpox on the planet.

They then had to wait a couple of years to make sure that they had not missed anything, and during that time, apparently the phone rang 9,000 times in WHO Headquarters in Geneva, but luckily, there were not any further outbreaks. So, on 8th of May 1980, just over 30 years ago, the World Health Organisation declared that Target Zero – in other words, the complete wipeout of smallpox from the whole of the planet had been achieved. To date, this is the only human infection that mankind has set out to exterminate and has succeeded in exterminating.

So, back to Jenner! We are now coming into the anti-vaccination bit. This is all really good news. I felt I had to portray the positive side here, to rev you all up a bit, but we are now coming into the slightly creepy side, which is where people look at what Jenner has achieved, and look at what it is led to, and ask quite searching questions about whether this, globally, is the right thing to have done.

Thomas Jefferson wrote to Jenner while he was still alive and said, basically, you are a great bloke, what you have discovered will get rid of smallpox, and your memory will be the fact that smallpox is no longer with us. That is great, but the centenary issue of the British Medical Journal, in 1896, described Jenner as “a prophet without honour in his own country”, and this statute, a wonderful bronze by Calder Marshall, actually epitomises that statement and underlines just how true it was, because it was unveiled in Trafalgar Square by Prince Albert, with much pomp and circumstance, and it stayed there for precisely four years, and then, under cover of darkness one night, it was carted away. You can still see it today, but you have got to go to the Italian Gardens in Kensington Gardens. The reason it was carted away is that the anti-vaccinationists decided that it was morally wrong for Edward Jenner, discoverer of vaccination, to be sharing Trafalgar Square with the nation’s real heroes, the likes of Nelson, so he was topped.

If you look at where the opposition came from, well, apparently the Almighty stepped in very early and took exception to vaccination. Many people trawled the Bible for little quotes that could be used as evidence that vaccination was blasphemy, and they managed to find, for example, the story of Job, who is the unfortunate gentleman on the ground on the left, and he is being smitten by Satan with a curse of boils, and the reasoning was that, because the curse of boils probably quite looked like a vaccination scar, this proved that Satan was actually the first vaccinator.

Developing that theme, John Birch took against vaccination because it was a terrifically good retrospective birth control method for all those poor people who kept having children and could not bring them up properly, and smallpox, as you know, killed off a lot of kids, particularly in poor families, so that was nature’s way of achieving a balance. For vaccination to come in and prevent that from happening was blasphemy, because it was clearly God’s will that these unfortunate children should die and that smallpox should be the thing that killed them.

Now, that was in 1806, and 90 years later, we had the same thing being projected again. Basically, vaccination prevents God from determining who is going to die and when they are going to do it, so it’s subverting the Divine Plan. So, you might be able to pick holes in the chain of logic in that. I am afraid to say that doctors are not that much better.

Very soon after the Inquiry was published, lots of doctors started reporting problems with vaccination. Lots of them were actually doing very comfortably with private practice, which was being undermined by Jenner’s desire to bring vaccination to as wide a public as possible.

So, for example, there were papers published in reputable medical journals, by respected doctors, which proved that, if your child was vaccinated, it would probably turn into a cow. The picture here was a lad in Peckham who, a few days after being vaccinated, was running around on the floor, on all fours, bellowing, with little bumps beginning to appear where the horns were going through his forehead, and you will see that the artist has actually made his face look quite bovine in outline.

They also said that it would give you tuberculosis; that it would make you mad; give you syphilis; give you blood poisoning; give you diabetes, etc. etc. So quite a scary list of potential side effects there.

Here is one of the responses to the lunacy of the suggestion that, if you are vaccinated, you will turn into a cow. There is a huge amount happening in this picture. It is by Gillray, who is one of the great political cartoonists of the day. If you just look at the young lady in the middle, you will see that she looks rather apprehensive. She has got every reason to look apprehensive because, if you look around, you will see the people have already been vaccinated, and she is in the process of being vaccinated, but the ones who have already been there and done that have actually got bits of cow sprouting out of their backsides, their arms, their heads, their eyes – it is a pretty gruesome spectacle. What Gillray is doing here is that he is not trying to point out the supposed hazards of vaccination; he is deliberately lampooning the people who are stupid enough to believe that, if you are vaccinated, you will turn into a cow.

Unfortunately, there was a bit of a grain of truth in some of the objections, and of that list of things that vaccination was supposed to cause, you could get blood poisoning, because, in the early days, vaccination was not a sterile procedure, so you could get blood poisoning and it could kill you, and it did, occasionally.

The other one that people really worried about was syphilis. Again, if you think back to that Spanish orphanage, if one of those orphan boys had had congenital syphilis, which was possible because it was often clinically silent, even in kids up to the age of ten, then that syphilis would have been spread by anybody who had had the arm to arm vaccination. So, in theory, if there had been one child with syphilis, you could actually have infected an awful lot of the Spanish colonies. Syphilis was something that people really were very afraid of, and if you look at this very unpleasant picture, you can see exactly why people were so terrified. In fact, they were often more terrified of syphilis than they were of smallpox.

So, this brings us to further opposition, medical type opposition, to vaccination. One of my anti-heroes – I had to admire her because she was a lady of immense erudition and energy, but she was quite a difficult character I think – is this lady called Lora C. Little, who described herself as a natural healer, an activist, and she wrote a lot. She wrote a book called “Crimes of the Cowpox Ring”, which was basically a conspiracy theory tract, pointing out that vaccination was being inflicted on the children of America through a consortium that included the people who made cowpox vaccination, the Government officials, who profited from it, the doctors, who profited from it,

and the authorities, who just wanted everybody under their control.

She collected about 300 case reports of people who had come to grief of some sort after being vaccinated. Here, for example, is her Case No. 30, a lad aged seven, who had been forcibly vaccinated at school. He did not want it, his parents did not want it, but he was vaccinated, and he died some time after that.

There were more medical disasters that were written up. For example, Immanuel Kant, the philosopher, he speculated that it cannot be a good thing to put animal stuff into humans – that is basically what he was saying. Ernest McCormack, a bit later, picked up that theme, with a bit of wonderful mathematics, and he said, “It takes a human 21 years to reach majority; it takes a cow three years to reach maturity, therefore cow cells divide seven times faster than human cells, therefore if you put cow stuff into man, man’s cells are suddenly going to start dividing seven times faster than they should do, therefore you will get cancer.” Again, you might be able to detect one or two chinks in the armour of logic in that argument, but again, people believed it.

Going back to Lora C. Little, she wrote up this case here. If you make a note of his name, Benjamin Olewine, and plug him into Google, you will see that he is still out there, being used as a case, albeit a historical one, by the anti-vaccinationists about the risks of vaccination. He, as a young man, looks apprehensive; he is close to the end of his life when this photograph was taken. He has got a very large and unpleasant soft tissue tumour, sarcoma of some sort, growing out of his upper chest. It was the same side that he was vaccinated on, but it was nowhere near the vaccination site and it was nothing to do with the vaccination, but again, it made a good story, and Lora C. Little had the sarcastic footnote to his photograph, said, “Saved from smallpox by vaccination”, the implication being “but look what vaccination did to this previously healthy young man”.

The big names were recruited in the battle against vaccination. So, for example, George Bernard Shaw, foremost writer of the day, said vaccination is “a particularly filthy piece of witchcraft”. And Alfred Russel Wallace, who was in with the Theory of Natural Selection, just after Darwin, and probably, at least in part, independently from Darwin, he, despite being a great scientist, managed to put two completely wrong things into these brief two sentences here. He said that vaccination is “probably the cause of a greater mortality than smallpox itself”, which of course is rubbish, “cannot be proved ever to have saved a single life”, also rubbish.

If you look at the impact that these statements had, they probably were responsible for some thousands of deaths in the UK, with people not having their kids vaccinated, and again, we will come back to those statistics in a moment.

The thing that really got people going in the UK was the clumsiness with which attempts were made to legislate for compulsory vaccination. The Vaccination Acts came in over a couple of decades or more, and they began rather softly-softly. They basically said that vaccination is clearly a good thing, there’s lots of evidence, and so we are encouraging all parents to have their newborn children vaccinated against smallpox.

That did not quite work, so, in 1853, they made vaccination of the newborn compulsory, with a fine of five shillings if you refused to have your child vaccinated. That was then beefed up, five years later, and it was enforced, and if you did not pay the fine, then you went to prison.

If you just think about that, they were described as “perverse outcomes”, but I don’t think they are at all perverse – I think they are entirely predictable. This was very socially divisive because, for a wealthy family, five bob was affordable, but for a family close to the breadline, five shillings was probably a month’s wages, so if that could not be paid, then the Father, the breadwinner, was put in prison, so you can just imagine how that is going to be received – that is just ridiculous really. Widespread outrage, civil disobedience – they used to burn copies of the Vaccination Act in public – and the Anti-Vaccination League, one of many organisations that sprung up to oppose vaccination, came into existence at about this time.

Here is a flyer for an event they held in Stalybridge, where they publicly burned the Vaccination Acts, and then they had an auction to raise money for prominent anti-vaccinationists who were currently languishing in prison. This actually is where the term “conscientious objectors” came from, because, before they repealed the Vaccination Acts, they actually gave you liberty to appeal to a local magistrate, and if you could convince that person that, in all conscience, you did not want your child vaccinated, then they let you off. But, again, that is fine for somebody who is articulate, who knows the game. However, it would be hopeless for somebody who is tongue-tied in the presence of authority, who does not know what the rules of engagement are, so, again, very, very unfair. Finally, they were repealed in 1909.

So, all that actually had a rather predictable outcome, in that there were parts of the country where the anti-vaccinationists actually held sway. The Members of Parliament were anti-vaccination. Gloucester, which of course was Jenner’s own county town, was one such centre. So to were Leeds, Leicester, Glasgow and Liverpool amongst others.

Here is one magnificent demonstration of the fact that vaccination works, but only if you have it. If you do not have it, it is not going to work. The lad on the left and the lad on the right were members of the same class at school, and they met the same index case who was brewing up smallpox on the same day. The lad on the right, obviously, had been vaccinated. The lad on the left, his parents, who had been whipped up by the local MP, had refused to have their son vaccinated, with obvious consequences.

Just going back to Lora C. Little, her Case No. 30 was actually her own son, and when you read it, it is actually a very moving description. She gives a very brief clinical vignette, so his case gets only a few lines in the series of 300 cases of medical disasters, but if you jump to the end of this little tract, which, like Jenner's Inquiry, was self-published, there is this conversation between the mother and her dead son, which again is quite moving reading actually and there is a lot of emotion in there. The bare facts are that he was her only child, and she had split up from her husband from this stage, so it was a big, big loss, he was vaccinated in September 1895, and he died the following April. So, it is a tragedy, a huge tragedy, and you can understand why she was motivated to do down vaccination and Jenner's invention, but if you look in a bit more detail at what happened – and again, it is not explicit, you have to dig in and put things together from the way she describes it, but he was vaccinated in September and got over it. He did not like it, but he got over it. He then got measles, which was one of the main killers of children then, and he recovered from that. He then ran up against diphtheria in April, and he was not so lucky and he died. But if you look at what was happening to American children at that time, then you will see that his run of bad luck was by no means exceptional. At that time, only six out of ten American children actually lived to count ten candles on their birthday cake. The others died. Mortality from diphtheria was 40% if you got it. So, it is a huge tragedy, personal tragedy for her, and for him, but it is not out of the ordinary, and again, it is nothing to do with vaccination.

This was also a time when other interests came into the anti-vaccination argument, and alternative therapies, "alternative", in inverted commas, medicine, was in on the act pretty early, and it was partly philosophical objection to vaccination, but it was also with the aim of making quite a lot of money out of the doubts that hovered around vaccination, whether it was safe, whether it was appropriate.

One of the people in at the very beginning was the founder of chiropractic, D. D. Palmer. He had a son called B. J. Palmer, so D. D. and B. J. are the two big names and initials. His tract on "The Science of Chiropractic" basically said that all diseases are due to misalignment, or so-called sub-luxation, of the vertebrae in the neck, and that includes things that we now would regard as infections – so, smallpox, chickenpox, which they actually thought were the same disease, and diphtheria, they were all due to misalignment of one or two vertebrae in the neck. So, if you could fix that, get the vertebrae back into line, you would cure the patient, and if you read this thing, he says it is a miracle cure: "I had a patient who was dying of smallpox, I manipulated the neck, the vertebra that was out of line, that was pressing on nerves, that was preventing the body from being nourished appropriately from the spinal cord, came back into line, and the patient recovered." He says, at the bottom, very tellingly: "Replacing luxation," so realigning these vertebrae, "will cure the patient and give the death-blow to the vaccine poison swindle." So that shows, rather clearly, where he was coming from. The interesting thing is, if you look on chiropractic websites today, you will find that the fundamentalist so-called chiropractors are still plugging this line. They still tell their patients not to vaccinate their children because infections are nothing to do with viruses or germs or whatever they may be – they are to do with troubles in the cervical vertebrae in the neck.

So, the great vaccination debate, and we are coming up to the crescendo of this now, I spotted this sign on a field not too far from Jenner the other day, and it is terrific, because this is a field in which there is a great deal of bull! It has been going on since just after the publication of the Inquiry, and I do not see any sign of it actually going away. It is a war of disinformation.

So, if you look at what the anti-vaccinationists have done, I have given them pluses here according to the gravity of what I consider their crimes to be. So, they use anecdote, or they have used anecdote. They have not just manipulated statistics, they have mutilated them, they have bent them – they have actually, for example, transposed vaccinated versus unvaccinated groups in tables in the aper to prove that vaccination gave you smallpox. That is what they did. They lied, they committed scientific fraud, they covered things up, and they recruited celebrities, like George Bernard Shaw, like Russell Wallace, to tell people that vaccination was bad, and they used the weight of their celebrity status rather than evidence to get that message across.

The big problem was that there are two sides to every debate, and the anti-vaccinationists, at various times, have been guilty of exactly the same crimes. I do not think they are quite as bad, and that is why I have given them fewer plus signs, but they still have committed these crimes. They have also used anecdote instead of evidence. They have bent statistics when it has suited them. They have lied. They have committed scientific fraud. They have recruited celebrities and so on.

I have put "plus and minus pious" because one of the greatest examples of scientific fraud was actually a rather nice, well-intentioned one. When they were vaccinating in India, there was a sizeable proportion of the Hindu population who did not want vaccination because the cow is sacred, and anything to do with cows was just complete taboo. There was an impasse, so the Hindu population not being vaccinated, until, luckily, an ancient Sanskrit manuscript came to light – it was fantastic – and when this was translated, it dated back to about 900, so it was seriously old, and it was ancient paper. It actually showed that one of the ancient Hindu physicians had not only identified cowpox – he described these blisters on the udders of cows – but, amazingly, said that if you collect this fluid and put it into the skin of normal people, they will forever be protected against smallpox. So that was great, and Hindus said it is absolutely fine, let's go with it, so they went with it. Six months later, they discovered that the paper on which this was written was artificially aged. Further investigation revealed that the British Museum's expert had written it in a hotel room in Madras on Ancient Sanskrit! So, completely fraudulent, totally dishonest but it did actually achieve an end, and it may have been morally wrong, but it worked.

So, back to poor old Jenner. Well, he has been the lens that has focused a lot of the anger over vaccination, so there are specific things that people do not like about Jenner – he was not a very good experimenter, but anytime that vaccination is in the firing line, a lot of the aggro, a lot of the antagonism, actually reflects all the way back to Jenner, as the guy who put it on the map to begin with.

This is the picture that I put up at the beginning, and I put it to you that this is actually the face of a demon – it is not the face of a saint. This is from a statue, which was commissioned, and it was designed to show Jenner as an energetic, focused man. This image was taken from the statue, but it has been hardened up, because the people that distributed that image were actually the anti-vaccinationists, and this was part of their propaganda to show that Jenner was not a saint, he was actually a hard driven man. The child he is vaccinating is of course his own son, so he is doing something obscene and bestial, and he is doing it to his own son.

And, as an example of just how much people hated Jenner, Alexander Wheeler, who is one of the anti-vaccinationists' leading lights, basically said that his science was lousy, his experiments were useless, and it is a good thing he is dead, actually, because the best thing we can do is to forget that he ever lived. So that was an example of how strongly people felt about Jenner.

If you look critically at the Inquiry and the way he went about his experiments, I am afraid you have to admit that he was not perfect. He was not a perfect scientist. He was very good for the day, but, again, when such a lot rides on the way that he conducted his science, you have to be critical about the detail of how he went about it and how he interpreted it.

The Inquiry is great, but it is flawed, and you don't even know how many subjects he vaccinated, because he talks about "a number of adults". You do not know how many were test-variolated. Do you remember, at the beginning of July, he went back and gave smallpox deliberately to James Phipps to see if he was immune. We do not know how many times he did that to the other patients, so you cannot really say that they were definitely immune.

There was a cover-up, because one of his patients did not turn up for follow-up. For today's NHS, that would be because the notes have gone missing or the appointment went to the wrong address. In this case, it was because the boy had died, and he died of a fever, what was called the workhouse fever, shortly after he had been vaccinated, and it is entirely possible that he died of septicemia actually due to Jenner's vaccination. Jenner did not admit that the lad had died in the first edition of the Inquiry. He just said that it was impossible to follow him up.

Jenner was also very dogmatic, and again, he was very defensive when he was under fire from his critics. He denied a couple of things that were quite important: firstly, he claimed that one vaccination in childhood would protect you for the rest of your life, so he denied that immunity could not be lifelong, and he stuck to that line, and so did all his disciples, even when abundant evidence started to come in, that twelve years, for example, after being vaccinated, people were getting smallpox and dying from it. So, when smallpox vaccination was around, it was done - for people at risk, it was done every ten or twelve years, and if there was an outbreak, then you were done again. So, it was not lifelong protection, but Jenner, again, believed that this was protection for life.

Jenner also refused to acknowledge that there were risks. For example, when the suspicion that syphilis could be spread by vaccination, there were 300 English doctors who wrote a letter to the Times saying that this was absolutely impossible, and Jenner was not one of them, but he supported that line, and they took a long time to retract, even when very, very strong evidence emerged that syphilis could be spread.

So, I showed you that people like George Bernard Shaw were probably responsible for thousands of deaths by stirring up anti-vaccination feeling. By the end of his life, Jenner will undoubtedly have saved millions of lives, but by sticking to dogma and refusing to acknowledge that people who had been vaccinated once as a child might have to be vaccinated again, he probably, indirectly, was responsible for the deaths of some thousands of people in the UK.

Jenner is still one of my heroes, and if you go to the Wellcome Trust collection and go up to the Rare Books, which is on the gallery at the right there, you can see, for example Jenner's diary, which shows that he worked hard but not desperately hard a lot of the time. You will find the notebook, in which the thing about Dr Waite's gingerbread biscuits is written.

And his name is above your head, flanked by Hunter and, interestingly, by Darwin, as you go up the stairs, and I think it is entirely appropriate that he should be there, even though he might not have been the first to experiment with vaccination, he was not perfect, but he was the man that put it on the map. Francis Galton, and later William Osler, said: "Credit goes to the man who convinces the world, not necessarily to the man to whom the idea first occurs," and I think that is entirely right.

So, just to round up, we started with Jenner, we have tracked right the way through, and I now need, just in the last few minutes, just to introduce an anti-hero, in my view, who is ex-doctor Andrew Wakefield.

The anti-vaccinationists, to give the context, are still going very strong today, and if you just Google "anti-

vaccination”, you will discover quite a lot of interesting things. For example, there are two societies in America, both with very respectable sounding titles, who are putting out the line that a battered baby death was actually due to a vaccine reaction, and this is an ongoing legal case at the moment, and the evidence, as I understand it, is very strongly that this is actually a battered baby, but the line has been put out that this is actually a vaccination reaction. The two organisations, or two of them, that are supporting this line are the Council of Chiropractic Paediatricians – and there is a bit of a conflict, I think, between a chiropractic and paediatrician which I do not quite understand – and the incredibly respectable looking Association of American Physicians and Surgeons. That sounds like a really credible global umbrella organisation for medical practitioners in the US, but, again, from what I have seen – please look them up and make up your own minds, but I do not think it looks terribly good to me.

There is also a thing called the Campaign against Fraud in Medical Research, which sounds really kosher, but, if you read what they are pushing at the moment, they are claiming that the Gulf War Syndrome, which as you know may or may not exist, is due only to vaccination reactions – that is the only cause for it, and also that the AIDS virus and the Ebola virus are manmade.

I have put down Dr Viera Scheibner – please make a note of her name and look her up if you have got time. I will not say anything about it, because I would like you to do that as a bit of homework and make up your own opinions about what you think about her, so Dr Viera – and it is spelt like that, that is the proper spelling – Scheibner...she’s in Australia.

And just the link to ex-doctor Wakefield is the Age of Autism, and this is now a daily web newspaper, which gives you daily updates on the new epidemic of autism. Autism has been around for a long time. It is a serious issue. It is a real curse on the sufferer, and on the family. It is getting very, very common, and again, there is lots of legal interest in this, there are lots of specialists setting themselves up, with a particular interest in autism. It does not look as though this epidemic is necessarily driven by a true increase in incidence of the disease.

This is where Andrew Wakefield comes in, because he published a paper in 1998, in the Lancet, claiming to have found a connection between vaccination with MMR, Measles, Mumps, Rubella, and the subsequent development of gut disease, Crohn’s disease, and also with autism in children. This was published, again in the Lancet, so one of the top three highest profile medical journals on the planet. It caused quite a bit of controversy immediately, and it took the Editor of the Lancet – he is not here, is he? I do not think he is... It took him an awfully long time, took him about a dozen years, to actually get the thing properly reviewed and critiqued and retracted.

It has now turned out, thanks to a fairly exhaustive investigation by the BMJ, who had a bit of a crusade against him, so they may have gone about it with a bit of extra enthusiasm, but I think the evidence is convincing that this was not just bad science, this was science driven by money, and basically, as it says there, Andrew Wakefield was hired by a solicitor to help a group of parents sue the vaccine manufacturers.

The fallout of that is familiar to all of us. It is much worse than just bad science. This is another long shadow of the anti-vaccination movement, if you like. The arrow there, at the top, is where his paper came out, and this rather busy little graph, the vertical blue bars are the percentage uptake of the MMR vaccine in newborn children, and you need to be above that dotted horizontal line in order for the population as a whole to be protected by what is called herd immunity – in other words, you have got enough protected individuals, so, if a case of infection does break out, then there are enough protected people to block it and prevent it from running away. You will see that, after that paper, the blue bars actually fall below that threshold, and they have remained below the threshold. The most recent data suggests that they are now close to that threshold again.

But there is a very predictable outcome of that, and that is the red line, which shows the rising incidence of measles. Measles is a bad disease. I had it, as a child, and I was lucky. It is still one of the major killers, in the developing world, of kids under the age of five. It is an eminently preventable disease. So, for an eminently preventable, damaging disease to be coming back, in an allegedly civilised society such as ours, in the 21st Century, tells us two things: the first thing is it is disgraceful; and the second thing is it tells us about the power of the anti-vaccination arguments, compared with the messages that conventional medicine and conventional science are putting out. So there is something fundamentally wrong about the way that we are going about trying to portray the positive benefits of vaccination. We are appealing to the wrong bits of the emotional circuitry, if you like, of an awful lot of people, otherwise this would not be happening.

So, measles is coming back in the UK, Ireland, Canada and in France. In the first quarter of 2011, there were an astonishing 6,400 cases – that is the biggest number by far for the last 30 years – in France.

We do not want things to be heading the way that they still are in countries where they are crying out for vaccination against diseases like measles. In India at the moment, there is great concern because there is not enough measles vaccine to go around – it can not be distributed properly. At the moment, in India, about 130,000 kids a year are killed by measles. So, in India, you have people crying out for measles vaccine; in the UK, we have got people saying, no, we do not want it, and it is not just their kids they are putting at risk, like the little lad on the left of the smallpox outbreak in Leicester it is the rest of society, because if the population as a whole falls below that critical threshold, then we are in trouble, all of us.

But it is not an easy thing, and we are talking about moving targets. Smallpox is no longer with us, so it would be crazy to protect us, to immunise us against smallpox.

After 9/11, the Americans were worried that smallpox might come back as a bio-terrorist weapon, and it would be quite a good one – it would not be perfect, it would be quite good- so they have vaccinated an awful lot of American servicemen, just in case. That then enabled us to know what the true incidence of the side effects of the modern smallpox vaccine is. It kills about one person in a million, but it also gives myocarditis, so inflammation of the heart muscle, to about one in 5,000, so it is not without risks.

So, when the diseases are there, you have a landscape that looks a particular way, and you can evaluate the risk of having the vaccination - it is probably better to be vaccinated. When the disease is disappearing, then the dynamics can change.

We are talking about not just the evidence of good versus harm; we are talking about the benefits of an emotional reaction, so whether do not like something because it is against religious principles or because they think the science is bad or because they have heard somebody charismatic and powerful talking about it on TV. It does come down to the benefits of this against that, and this is an argument in which the heart often wins over the brain.

So, just to give you a wind-up question: what would you do? How are you going to react to this? You need to be able to weigh up the evidence. I have presented you one view of the evidence. Again, I do encourage you to go onto the website because your interpretation of what I have put here may be different.

Just in the last two minutes, I would encourage you all to go and visit, virtually or, better still, in person, Dr Jenner's house, which used to be the Edward Jenner Museum. It is in Berkeley. It is actually his house. So, somewhere around there was where he vaccinated James Phipps, and like all small independent museums, its financial status is quite precarious at the moment, so any outrageously generous donations you can give will be very gratefully received.

The other thing I will plug, I'm afraid, is this book. It was kindly mentioned at the beginning by Frank that I did five years as Dean and then needed a year's rehabilitation to recover from that, and I took the year off to research a book on the history of vaccination in smallpox, and it was a great delight to jump on the bike and cycle twenty minutes up the road to Jenner's house, where the archives are, so it was great fun.

Why should you buy this book? Well, I will tell you why: all the royalties are actually going to Dr Jenner's house! There are only 87 shopping days left till Christmas! A perfect Christmas gift! And the book actually is not that too bad, because it was short listed for the Wellcome Trust Book Prize, or the medical Booker Award type thing, and a couple of other things, and it did not do too badly. But, more importantly, it is a book that may change your life, possibly forever.

We have talked a lot about evidence, so I am just going to close with a bit of very important evidence. Here is a friend of mine with the book, before he has got into it; and here he is shortly after! So, thank you very much indeed!