

Justin Pollard follows the drama of human history's only engineered extinction of a living species – the extermination that never took place

the eccentric engineer



WE'RE VERY GOOD at making things go extinct – dodos being perhaps our most famous victim, although contrary to popular belief, we didn't eat them to oblivion, in fact they tasted horrible. But this loss was, at least in our modern minds, an 'accident', and we didn't mean it to happen. But what about deliberately engineering an extinction?

Alarming as this might sound, we have made one concerted effort to eliminate an entire species, and the story of how that went is perhaps a cautionary tale for our time.

But why would we want to make a species extinct? Because it's an even bigger killer than us. Since its emergence in Africa some 10,000 years ago, smallpox has killed more people than all wars in history put together. The smallpox virus – Variola – only lives in humans, spread by airborne droplets or concealed on the bodies and clothes of victims, particularly in the thousands of burning, sore scabs that erupt on the skin.

Within days of the scabs appearing, there is profuse internal bleeding, vomiting of blood, and the sloughing of large pieces of dead skin. Those that survived never catch the disease

again, but then roughly half of those who catch it don't survive. Within a fortnight, they're dead.

Humans are, of course, resourceful creatures, and it wasn't long before we realised that it would be useful to have a killer like this on our side. So engineering Variola as a bio-weapon began surprisingly early, in the 12th century, when the Mongols catapulted infected corpses into besieged cities.

In the New World, the disease, spread on infected blankets, was more feared than the conquistadors – a fact used by the invaders to their advantage. The problem was, no one knew exactly how smallpox was spread, how it killed and how to prevent it, making it a rather unreliable ally.

It was the British physician Edward Jenner who made the breakthrough when he noticed in 1790 that milkmaids, infected with the non-lethal but related cowpox, developed a complete immunity to smallpox and this led to his discovery of vaccination – the word coming from the Latin for cow, 'vacca'. Even before that, the Chinese

had for some time been using quills to blow dried smallpox scabs up the nose in an attempt to inoculate its citizens, with some, if not complete, success.

But Jenner's vaccination system was perhaps the first time in history that science had made a major impact on one of mankind's greatest adversaries. Sadly, his idea was slow to catch on. Despite the willingness of many nobles, including Catherine the Great of Russia, to be vaccinated, his cure could not be produced in large enough quantities to inoculate the entire population of Britain, let alone the world. So the steady, deadly spread of

smallpox continued through the 19th century and into the 12th century when it was still killing two million people worldwide a year.

What should have finally put an end to its reign of terror came in 1966, not in the form of a sudden scientific advance, but simply as a resolution. That year, the World Health Organisation (WHO) decided to eradicate smallpox from the face of the Earth. There followed a massive investigation in which teams of scientists scoured the planet for outbreaks of the disease, inoculated millions of people who were in danger of infection, and finally brought the virus to its knees.

The last known case of smallpox in the wild was located in Somalia on 26 October, 1977. The victim survived.

INDESTRUCTIBLE

But this was not quite the end of the road for smallpox. Although eradicated in the wild, the virus did still exist, frozen, in a few laboratories. In 1978, when Variola made its final bid for freedom, these numbered four.

Janet Parker was a medical photographer working above a smallpox laboratory in Birmingham in the West Midlands when she contracted the disease. How the virus escaped has still never been

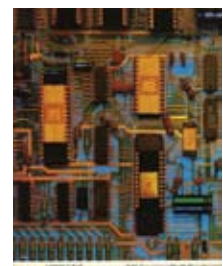
explained, but in the ensuing panic over 300 people who might have had contact with her were inoculated. Only one, her mother, contracted the disease and she survived. Janet was not so lucky. She remains the last known victim of smallpox. Several days after her death, the director of the laboratory responsible committed suicide.

This tragedy finally brought smallpox to the condemned cell. Remaining stocks of the virus were moved to two facilities in the USA and Russia. From there, the WHO decided to take the last step and destroy the disease entirely.

It was a momentous decision as it would be the first time in history that mankind had deliberately made a species extinct. By a unanimous vote, the committee decided that on 30 June, 1993 the remaining vials of smallpox would be placed simultaneously in autoclaves in the US and Russia and heated to 248° Fahrenheit for 45 minutes. The dead and denatured viruses would then be incinerated.

But at the last minute we balked. What might we lose if we destroyed a natural organism entirely? Might it be useful to the military? Or bio-engineers? Or medical researchers? Execution was postponed and the only engineered extinction put off, indefinitely. ■

■ The winner from issue 11 is **Anthony Williams** who said the most original use of engineering in modern day advertising is the 1980s Benson & Hedges ad in which a cigarette packet masqueraded as a microprocessor



Next issue: Global Engineer

win!
 What's going on in this picture? The best caption sent to jherbert@theiet.org by 15 August wins an IET goodie bag.

Justin Pollard remembers a banker turned engineer and 'gentleman scientist' who played a key role in ending the Second World War

the eccentric engineer



win!
 What is Alfred Loomis (on the right) saying to the scientists at his laboratory?
 Best suggestion sent to jherbert@theiet.org by 23 January wins an IET goodie bag.

I THINK it's fair to say that bankers aren't universally popular at the moment. In days gone by I might have said that 'their stock was rather low', but in the current economic climate their stock has all but disappeared. However, we should not assume all bankers are bad – take the case of Alfred Lee Loomis (1887-1975), who might perhaps stand as a model for the current generation.

Loomis was, in his mind at least, an inventor, although he never really fitted the image of the struggling eccentric working away in his shed, eschewing meals in favour of spending the money on more raw materials. This is because he was fabulously rich. With his brother-in-law, he ran the bank that raised much of the financing for the electrification of America's homes and factories and then, in an act that even made other bankers hate him, had the foresight to move out of stocks just before the great crash, returning during the Depression to buy up good companies at rock bottom prices. This made Loomis so rich he could buy his own Americas Cup yacht at a time when even Vanderbilts and Astors clubbed together to get theirs.

So far this has precious little to do with engineering, of course. A banker making a

fortune and buying a yacht is, if anything, a shade predictable. But at this point, Loomis and other bankers part company because he also bought something else – an engineering laboratory. Loomis had loved engineering since the First World War during which he had devised the 'Aberdeen Chronograph', a portable machine for measuring the muzzle velocity of artillery pieces. With the huge increase in his fortunes at the end of the war, he decided to indulge this love of gadgetry by buying an empty mansion and turning it into the Loomis Laboratory.

The Loomis Lab was like no other. For a start, it was in Tuxedo Park, an exclusive New York enclave whose inhabitants were so rich and so posh that they still dressed for dinner, hence the US name 'tuxedo' for a dinner jacket.

Secondly, Loomis could afford to buy equipment that most universities could only dream of. But most importantly, Loomis was not just a tinkerer, but perhaps the last true 'gentleman scientist'. He worked with passion and skill, attracting the greatest names of the era to come and visit and even work with him. His guest book included Einstein, Bohr, Fermi and Heisenberg.

To be fair, some probably turned up because his invitations included first class travel, limousine transfers and the chance to arrive at the lab on his private train, but most came for the work he was doing. And that work was wide-ranging and proved to be rather important in bringing to a close a troubling little problem known as the Second World War.

Before the war, Loomis worked on everything: from spectrometry and chronometry to electro-encephalography and ultrasound – as well as taking time out to help Ernest Lawrence raise the funding for his cyclotron particle accelerator. But with war in Europe, Loomis and his colleagues had begun to turn their efforts to radio location, building one of only two microwave radar systems in the US at that time.

This got the attention of the 1940 Tizard mission which Churchill sent to the US to share technological discoveries in return for US assistance. They had brought with them a cavity magnetron which had 1,000 times the power of any US machine, and so Loomis invited them to Tuxedo Park to spill the beans. Shortly after this, Vannevar Bush (who, as inventor of the Memex, has also been a subject of this column) appointed Loomis as chairman of the Microwave Committee with a remit to develop radar technology. Loomis founded a 'Radiation Lab' at MIT in Cambridge, Massachusetts – personally funded by him in its early stages while government financial cogs turned with their usual inefficiency.

The child of the 'Rad Lab', as it became known, was the 10cm radar which helped detect U boats, protect British and US aircraft, locate the Luftwaffe and which is often cited as the key technology for ending the war. But if you're thinking that the atom bomb was the real decider in that, then it's worth mentioning that Loomis, a

friend of many Manhattan project scientists, also eased the path of that project through government (where his cousin was, rather helpfully, War Secretary).

It must be said that Loomis did not run the Rad Lab and so cannot be called the inventor of the 10cm radar, but his passion for the subject as a gentleman amateur, his knowledge and his willingness to use his money and influence to promote engineering, should grant him a part of the credit.

And besides, he did personally invent LORAN (Long Range Navigation), a pulsed hyperbolic radio navigation system that allowed vessels to locate themselves using timed signals from low frequency radio transmitters, which just goes to show that an interest in clocks combined with the ability to buy ocean-going yachts can be used to good effect. Indeed, LORAN is still in use today although increasingly being superseded by GPS.

Let's hope our generation of bankers will be putting their bonuses to a similarly good cause. ■

■ **Justin Pollard's latest book 'Charge! The Interesting Bits of Military History' is published by John Murray.**

■ **Winner of our issue 19 caption competition is Maria Waters: 'Harold wondered whether telling his wife that he wasn't actually late for dinner as it was still only half past fog would work this time.'**



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