Pandora’s Poison

Patrick McKeon

The dead were to be buried by their own families. This was the rule set down by the rector William Mompesson who had buried his own wife. And so John Hancock and his six children were buried by his surviving wife. George Vicar and his children were buried by his wife who lost thirteen relatives. Mister Morton buried his wife and three children. Jane Hawksworth buried twenty-five relatives. When a great stench of rotting corpses came from a house, that meant the whole family had died. Then Marshall Howe, who had already buried his own family, would bury them. As he did the nine members of the Thorpe family and the seven members of the Talbot family and the nine members of the Syndall family. Many went to bed and never awoke. Many were said to have had breakfast with their family and dinner with their ancestors. Eighty per cent died. But a few never got sick.

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“Look, they crawl right up your back.” Peter Carter placed a pretzel on his head, and the rock squirrel immediately climbed up his back and picked it up.

“We travel thousands of miles to a natural wonder,” his son, Jim said, “and the animals are tamer than at home.”

As Peter sat cross legged on the ground, more squirrels arrived and crawled over his legs. They stuck their noses in his pockets, sniffed around his shoes, and one was especially interested in the snack bag he held in his hand. Whenever a crumb would fall from Peter’s head, a frantic, squeaking frenzy erupted until one of them captured it.

“They look so dignified,” Peter said, “like they’re wearing little tweed vests.”

“Yeah not furry, like the ones back home,” Jim watched as one persistently tried to get into the pretzel bag his father was holding.

“I think I can see the North Rim Lodge,” Jim’s cousin Mike was standing on the edge of the Grand Canyon, looking across to the north rim with binoculars.

“Do you think we can make it in four days?” Jim asked as they peered one mile down and twenty-three miles across the canyon.

Before Mike could answer they turned to look at Peter, who had just yelped. The pretzel bag fell to the ground as he got to his feet, holding his hand. The squirrels scattered, only to return to the bag once he started walking toward his son and nephew.

“The little demon bit me,” he said through a half smile.

“Let me see that,” Jim, an army medic examined the jagged wound, “I’ve got some antibiotic ointment in the car.”

“I knew feeding bears was dangerous,” Peter said, “but that little guy freaked out when I tried to put the bag away.”

The three of them laughed as they walked to the car past the sign:

“Warning. Prevent Plague. Squirrels have fleas. Squirrels bite. Fleas bite. Fleas have plague.”

The next morning they were awake at sunrise to start the hike.

“How’s the hand,” Jim asked his father.

“Looks okay,” Peter responded, “I’d pretty much forgotten about it.”

“You can handle the pack alright?”

Peter nodded.

“Then let’s head out,” Jim swung open the door of the cabin they’d rented in the North Rim Lodge and stepped into the dawn twilight for the mile long hike to the North Kaibab trailhead from where they would descend into the canyon to begin the rim to rim hike. Small animals skittered away from them beyond the range of their headlamps as they marched between the pines in the cool October air.

“What the hell is that?” Jim’s cousin Mike yelled as he suddenly stopped, his lamp illuminating a huge brown shape in front of them.

“It’s an elk,” Peter laughed at the bored expression on the giant deer’s face, “at least it’s not another of those damn killer squirrels.”

By the time they reached the trailhead it would have been light enough to turn off the lamps if the Ponderosa pines had not blocked out the sky. Even at that hour there were extreme runners emerging from the canyon after an all-night marathon.

“Awesome,” one of them greeted the Carters with annoying cheerfulness, “mind the mule droppings just around the bend.”

“I’m getting a bit warm,” Peter let his backpack drop an hour into the hike so he could take off his jacket.

“Yeah,” Mike said, looking at his watch thermometer, “It was forty degrees when we left the lodge, and now it’s already sixty.”

“And yesterday at the Phantom Ranch,” Jim said of the only lodging within the canyon itself, “it hit ninety-six.”

After a couple of swigs of water and biting some beef jerky off the homemade sticks Peter had brought, they continued the steady downward journey. On the first day they would descend one mile over the course of seven miles distance.

Another hour into the hike, Peter sat down on a trailside boulder, “Can we take another break?” He was rubbing the insides of his upper thighs and under his arms.

“Sure, Dad,” Jim said, “legs getting sore?”

“Yeah,” his father answered, “it must be this constant downhill pounding.”

Mike stopped when they rounded a bend and saw that the trail would be transforming into a four foot wide ledge which hugged the cliff face on one side and dropped hundreds of feet straight down on the other, with no rail or even piled up rocks as a barrier.

“Here’s where we don’t look down,” Jim said.

On one curve, a gust of wind blew dust into their faces. Peter’s wobbly legs could not stop him from being blown against the cliff wall. He bounced back, then teetered top heavy from the backpack for a second before Jim grabbed his arm to pull him away from the ledge. Just when they were ready to resume, a mule driver brought his team around the corner. The three men hugged the cliff face as the column filed past them on the very edge of the cliff.

After passing through the stone arch called the Supai tunnel, the landscape turned from cool pine forest to desert scrub.

“How’s the leg, Dad,” Jim asked, as they stopped at a water spigot.

“Still pretty sore,” Peter wiped sweat off his brow with a bandana, “I think my pack needs adjusting, it’s starting to hurt here,” he grimaced as he felt under his arm.

As the sun rose higher over the canyon, beautiful hues glowed off different sedimentary layers reflecting the sun, bathing them in a warm glow all the way to the bottom of the steep descent. From there they followed the Bright Angel Creek which would eventually lead them to the Colorado River on the other side of the Phantom Ranch. But the sensitivity around Peter’s groin made it impossible for him to appreciate the scenery or even enjoy any sense of accomplishment when he finally flopped down on a bench at the Cottonwood Campground. Seeing the distress on his father’s face, Jim and his cousin Mike insisted on setting up the tents while Peter sipped water from his camel back and munched on trail mix. He crawled into his sleeping bag as soon as the tent was ready, intending to take a short afternoon nap before dinner, but he did not come back out before the following morning.

For breakfast Jim used his Ka-Bar knife to slit open the plastic cover of an MRE – Meal Ready to Eat which he had brought from the PX for the trip. They had been stored overnight in the animal proof metal ammo boxes located at each campsite to keep the squirrels, ravens, raccoons and other critters away from their rations. Jim and Mike had slept through the night and they did not want to disturb the older man, who had not yet emerged from his tent. Mike walked back from washing his face in the icy cold water. He pulled his fingers backward through his dark, curly hair, damp from the creek, before carefully pulling the locks over the left side of his head to cover the jagged top of his left ear, “How’d you sleep?”

“Pretty good,” Jim answered, “I had to shake a couple of scorpions out of my shoes this morning, though.”

Mike winced. “At least there are none of those sand flies like in Iraq,”

Jim added water to the bag, triggering the chemical reaction which would cook the rations, “how are you doing?”

“I’m okay,” Mike answered, “Uncle Pete seemed to have it pretty rough though.”

“A good night’s sleep should have done him good,” Jim stepped over to his father’s tent and called through the mesh vent. “Ready for an army breakfast Dad?”

When Peter did not react, Jim zipped open the tent to see beads of sweat on his father’s forehead and the sleeping bag drenched from the effects of a fever. His nose and lips and the tips of his fingers were taking on a violet hue.

“I’ll look for help,” Mike peeked over Jim’s shoulder at his shivering uncle. With no phone signal, he ran searching for a ranger before finally stumbling upon an emergency phone. By the time they were able to arrange for an evacuation an hour had passed and Peter had lost consciousness.

“You see these purple spots on his skin?” the paramedic pointed to Peter’s fingers and wrist, “That means an infection has spread to his bloodstream.”

“Can I go with him in the helicopter?” Jim asked.

“We can take one of you, but the other will have to hike out. I’ll arrange for a mule to help with the equipment.”

Once the helicopter left, Mike packed up the remaining equipment and waited for the arrival of the mule. He then followed the mule and its handler back up out of the canyon to make his way home alone, bringing with him all the bags and everything they contained, things they had brought with them to the Grand Canyon as well as whatever else they had picked up while they were there.

From the report the hospital had sent Doctor Frank Skorzeny about the plague victim, he saw that when Peter Carter was evacuated from Grand Canyon he had presented with incipient buboes in his groin, but the bacteria had quickly escaped from the lymphatic system into his bloodstream. On his tablet, Frank paged through the last update he had received before boarding the plane in Atlanta. The victim was suffering from multiple organ failure from septicemic plague. It was unlikely he would still be alive when Frank disembarked in Flagstaff. The son, James, had presented asymptomatic, but as a precaution had been given the same course of antibiotics as his father. Both of them had been placed in isolation units.

For Frank this was most likely an isolated event which would in all likelihood end with just these patients, whether they lived or died. But as a CDC epidemiologist he knew there was always the potential for a more serious outbreak. If the pathogen were particularly virulent it might kill too quickly to find new hosts to infect. Then it would fade away, perhaps leaving less deadly strains, which would result in low level infections that at first killed more slowly. After the epidemics run their course, they disappear from the areas which they had invaded and remain only in those pockets where they are endemic, infecting hosts which have evolved immunity until the opportunity comes to break out once again into the wider, more vulnerable population. In the age of antibiotics, such outbreaks were almost exclusively viral, such as sporadically occur with the Ebola virus. The once deadly epidemics caused by bacteria, such as plague, could in modern times always be quelled with antibiotics.

As his plane approached Flagstaff, Frank looked out over the barren brown desert. This was one of those reservoirs where plague was endemic and which served as the source of almost all of the dozen or so cases occurring in the United States annually. Even when there were no infections occurring among the residents of the area, the bacteria was always lurking within those hosts which it did not actually sicken. Frank pushed his tablet to the side to allow the flight attendant to place a cup of water on his tray. He liked to stay hydrated on airplanes, aware that the cabin atmosphere contributed to drying the nasal passages. He had seen too many cases of respiratory disease outbreaks disseminated through airline passengers. That was one of the main paths by which new flu strains found their way around the planet.

When Frank felt the plane bank and start to descend, he looked up from his tablet to see that the flight attendant was coming down the aisle to collect the trash. She was in exactly that age range which piqued his curiosity. Frank stared at her for a few seconds trying to guess which side of that historical divide she fell on. As she approached, he glanced quickly back down at his tablet and pushed his empty water cup to the window side of his tray so she would have to lean across him to reach it. When her blouse sleeve slid up her outstretched arm, he had his answer. She had been vaccinated against small pox.

“Excuse me,” she smiled politely, probably thinking him a jerk for making her stretch, “you’ll have to stow that away now and put your tray table upright as we prepare to land.”

So they were in the same cohort, he thought, born before nineteen seventy-two when the United States stopped routinely giving small pox vaccinations, possibly later if she was born outside the country. They might be lucky in the event of a weaponized small pox event and have enough residual immunity to provide protection. She looked younger, he thought, running his hand over his own graying head. There were even some white hairs in his eyebrows now. Slipping the tablet back into his bag, he gazed out the window at the desert landscape, wondering how many creatures beneath him were harboring Yersinia pestis, the plague bacteria. He knew of at least two.

Doctor Suresh Sunder met Frank at the Flagstaff Medical Center and debriefed him on the patients as they prepared to enter the isolation areas. The first examination would be in a section of the morgue as Peter Carter had already succumbed to the infection.

“Streptomycin was administered immediately to both patients, but it was too late for the older man.”

“Did they both become symptomatic?” Frank asked.

“Not the son, but we were able to culture a small amount of Yersinia pestis from the area around what looked like a flea bite on his back.”

“Anywhere else?” Frank slipped into the protective gown and tied the back.

“No. After twenty-four hours of the streptomycin treatment we were could not find any bacteria even near the son’s bite. The father had it in his lymphatic system as well as in his blood. The antibiotic did not act in time before he died.”

Frank looked at Sunder, “How do you know it did not act in time?”

“Because the patient died,” Sunder replied.

“Was the bacteria level reduced?” Frank fiddled with the protective hood.

“No, it was still high even at the time of death.”

“But it had fallen in the son.”

“That’s right,” Doctor Sunder saw Frank’s point. If it was the same microbe, the streptomycin should have either worked for both or for neither. Even if the father had died because the treatment had been given too late, there should have been a reduction in the microbe count.

“How about in the sputum?”

“No,” Doctor Sunder was already sliding down the clear protective face shield, “It seems not to have been pneumonic.”

Frank was relieved that it had not been found in the airway. Pneumonic plague can spread through coughing as easily as a cold and would have amounted to a completely different ball game.

Peter Carter’s body showed traces of the purpura spots which generally accompany septicemia. There were also swelling blue buboes in the groin, though they were not extremely large. He knew that with septicemic plague the patient often died so quickly that the buboes did not even had time to form. The area around the squirrel bite was not very inflamed, and if that had indeed been the entry point for the plague bacillus, the septicemia would likely have proceeded quickly enough so that there would be no buboes. This all suggested to Frank that the septicemia had been secondary to the lymph infection. Careful examination of the body also revealed what appeared to be a flea bite, further supporting Frank’s initial conjecture. Internally the clotting of the blood often associated with septicemia was present. The lungs were clear, which was consistent with Doctor Sunder’s statement that no Yersinia pestis could be cultured from the sputum. Frank nevertheless took samples of lung tissue along with lymph, blood and other organ sections for further analysis. He also asked Doctor Sunder to provide him with specimens of the bacteria cultures taken from the lymph nodes and blood. When he had finished examining Peter Carter, Frank cleaned up and disinfected his hands again in preparation to interview his son, Jim.

One of the reasons Frank Skorzeny had gravitated to epidemiology after medical school was that he was not a people person. During his internship he loved the science of medicine but did not like dealing with patients, an aversion which had only grown stronger since his wife’s death. He was far more comfortable working with cadavers than interviewing a live sick patient. But he needed to leave his comfort zone now as he went from the dead father to the living son. The protective suit lent Frank some personal isolation and also insulated him from pathogens. Whenever he put it on he was reminded of the medieval sketches of plague doctors wearing long beaks. Those were also a form of protection as the beaks were stuffed full of herbs and spices meant to filter any bad air ‘miasma’ out of the doctor’s nose. The impression on the patient must have been similar to that which Frank would now be making on the son.

“How are you feeling?”

Jim Carter was perhaps thirty years old. He needed a shave and his blue eyes were puffy. Probably from crying.

“Physically okay,” he played with the intravenous line, “I have to arrange to send Dad’s body home.”

“We will need to keep him here a few more days as a precaution,” Frank gently pulled back the sheet and palpitated under Jim’s arms and then groin area. There was no sign of swelling.

“Your surname, Carter, is that English?” Frank asked.

“It is,” Jim answered, “both my parents came from Sheffield.”

“Have you felt feverish or achy?”

Jim shook his head, “just from the hike. I understand I was infected too.”

“Yes,” Frank examined the bite Doctor Sunder had told him about. It was a little red but did not appear infected.

“Was your father the only one bitten by the squirrel?” Frank turned to see Sunder enter the room.

Jim nodded.

“I hope you were able to get all your equipment out,” Frank said.

“I took some of it which we could get into the helicopter. I left the rest with Mike.”

“Mike?” Frank looked at Sunder who shook his head in ignorance.

“My cousin,” Jim said, “he was with us on the hike.”

Frank, and apparently Sunder, had not heard about Mike. It was important he be contacted and isolated until it was certain he had not also become a vector for the plague bacillus.

“Where is he now?” Sunder asked Jim.

“He went home,” Jim answered.

“Which is?” Frank asked.

“New York City. He lives in Manhattan.”

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When Mike Carter’s uncle and cousin were airlifted out of the Grand Canyon he was left with the majority of their equipment. The Park Service arranged a mule to carry out the tents, sleeping bags and provisions, but Mike needed to hike out himself. The Cottonwood Campground where they had spent the night was the first stop on the hike from the North Rim to the South Rim. In order to make his way out of the canyon as quickly as possible, he reversed the first day’s route rather than continue on the longer way south. The mule would leave the gear at the North Rim Lodge where their adventure had begun and where the rangers had booked one night’s accommodation for Mike even though the lodge was completely full. He also managed to reserve a spot on the five hour Trans-Canyon shuttle to the South Rim where the rental car had been left in anticipation of the group hiking out some three days later.

Once he was outside the canyon and had regained reception for his phone, Mike called his cousin Jim, who told him that he was in the hospital in Flagstaff and that his Uncle Peter was seriously ill.

“I should get there in a few hours.” Mike told him.

“Don’t bother,” Jim said, “we’re in isolation, so you won’t be able to see us anyway. You might as well fly back and get ready for your reserve duty.”

Mike was able to rebook his original flights under emergency circumstances, and arrived in Kennedy Airport the next morning.

When he got to his apartment building, a burly man in a t-shirt greeted Mike with a back slap at the front door and helped carry his bags up the stoop, “Welcome back, Buddy. Coming from the reserves?”

“No Wally, a vacation with my brother and uncle,” Mike skipped mentioning the tragic ending of his trip. He didn’t dislike Wally, but found him a bit intrusive, “in a couple of days I’ll be doing my two weeks.”

“Good to know we got guys like you keeping the country safe,” Wally shook Mike’s hand.

After Mike broke up with his girlfriend Beth O’Neal, the main thing which kept them in touch was Tyke, the Rat Terrier they had picked up as a puppy from the pet shelter. Since Beth travelled frequently, Mike had won custody, but Beth had visitation rights. Her apartment in Brooklyn was a half hour subway ride from Mike’s place on Orchard Street near Broome. That area where the Lower East Side blurred into Chinatown was one of the somewhat affordable neighborhoods left in Manhattan. It still retained the slightly grubby look which it never seemed to shake off from its hundred fifty year role as an immigrant ghetto. Yet gentrification was still creeping in and Mike was not sure how long it would make sense for him to keep paying what he was for a studio, in spite of the good salary he made in banking technology. Beth had agreed to stay in Mike’s apartment while he was hiking the Grand Canyon and then again shortly after that during the two weeks he would be at Fort Dix.

“Sorry about your uncle,” Beth gave Mike a quick hug as he entered the apartment while Tyke jumped up to his waist, yapping without pause, “how’s Jim doing?”

“He doesn’t have symptoms, but he also tested positive for exposure to plague,”

“My God,” Beth shook her head, “I didn’t know plague even existed anymore.”

Mike pulled Tyke away to stop him from pulling a sleeping bag out of a duffel sack, “thanks for watching him. How was he in the dog park?”

“I took him to Corlears Hook instead of Coleman Oval.”

“It’s kind of empty there. Did you feel safe?” Mike dragged the bags through the apartment door.

“With Tyke to protect me, sure. I like it there because it’s easier to handle him without those other dogs around,” Beth squatted to get Tyke’s attention, but he continued to sniff around and try to get into the bags.

“I like to let him socialize though,” Mike let his backpack drop to the floor.

“He was plenty busy chasing the rats,” she said.

“That’s what he was bred for,” Mike smiled.

As Beth tried to pull Tyke out of a bag by the tail, she stopped and sniffed just like the dog.

“You smell like a mule.” She stood up with a frown, holding her nose shut.

“It’s not me,” Mike said, “they loaded everything on them to get it out of the canyon. Oh, do you think you’ll still be able to watch him for the next couple of weeks? I’ll be leaving for Fort Dix day after tomorrow.”

“Sure,” Beth had Tyke in her arms now as he wriggled to get free, “I’ll alternate between the two parks so he sees enough dogs to remember he’s not one of us.”

After Beth left, the physical and mental exhaustion of the last few days overcame Mike. Pulling his shoes off, he flopped fully clothed on top of the bed and sunk immediately into a heavy sleep. Tyke busied himself with unpacking the bags, though not quite as methodically as Mike would have. He made sure he investigated and rolled in every corner of every bag, taking in the exotic smells with his sensitive nose and burrowing all the way inside to identify everything they contained. One by one the dog pulled each and every item out of the pack, licking what might in any way appear edible to confirm his suspicion. All the dirty socks ended up on the floor as did the shirts, both clean and dirty. He also pulled out the clothing and gear of Mike’s Uncle Peter, burrowing inside one of the used t-shirts, still damp from sweat. He also went as far down one leg of Peter’s hiking trousers as he could until his snout poked out of the bottom. Once Tyke had satisfied his curiosity about the contents of all the back packs, he sat down to scratch furiously at a sudden itch on the top of his neck. On the shelf above him stood the bottle of flea repellent which Mike had left for Beth to apply to Tyke while he was away. The bottle had not been opened.

Frank Skorzeny had tried to call Mike Carter several times on the cell phone number his cousin had given him in the Flagstaff hospital, but had only been able to reach his voice mail. When he got off the plane in Atlanta he tried one more time, then contacted the FBI to help track him down before heading to the CDC laboratory. Frank expected this outbreak would most likely end like the handful of other plague cases which Frank investigated each year. It would be a small incident affecting a couple of people and then be quickly brought under control through isolation and antibiotics. Some facts about these cases did have him concerned though. One was the failure of the streptomycin to reduce the count of the plague bacteria in Peter Carter’s body. It was true that the elder Carter was beyond saving, but still the antibiotic should have had some effect. You could put an antibiotic droplet on a culture in a simple petri dish and watch the bacteria die off in typical plaque rings around the points where the drug had been applied. The treatment had seemed to control the infection in Jim, but he was thirty years younger than his father, and his immune system might well have simply been able to fight off the infection on its own.

More worrying for Frank was the fact that Mike Carter had managed to return to New York City and was now unreachable. He needed to be located even though bubonic plague is actually not that easy to spread in the living conditions of a modern city. In the past, when such a pandemic would kill half the people in Europe, the population and animals lived in close proximity in the country, and in the towns the dwellings were crowded next to each other with rats and other potential animal vectors all around them. Fleas as well as lice and other parasites were more common, so it was very easy for diseases like plague to spread quickly. Although Frank realized there was some truth to the urban legend that in any major city no one was more than six feet from a rat, they were for the most part not scurrying about inside apartments. Aside from the most indigent vagrants, citizens of a developed city did not generally have a problem with fleas as they would be quickly dealt with if discovered. In spite of these facts, Frank knew that the rats in New York did harbor the same Oriental Rat Flea which had carried the plague around the world several times over the centuries.

Pneumonic plague was quite a different matter from bubonic plague. If an epidemic does not require flea bites to be sustained, but can simply be spread through coughing and sneezing, it will be much more difficult to contain. Frank had read the evidence that The Black Death of the fourteenth century had spread so quickly because that particular strain had a tendency to transition from bubonic to pneumonic. Plague, whether bubonic or pneumonic, can be treated with antibiotics, but they must be administered immediately since the disease kills so fast. He had seen cases of a victim going home from work not feeling well only to be found dead in bed the next morning. This high virulence is likely what caused the historical pandemics to eventually peter out as there would be too few hosts surviving for the outbreaks to be sustained. Frank was searching the internet for an article he had once read about a plague city in England when the phone rang. It was Doctor Sunder from Flagstaff.

“I have some news about the plague cultures,” Sunder said, “they are showing resistance to streptomycin.”

“In both of the patients?”

“Yes, the son’s body must have fought off the infection on its own,” Sunder replied.

Frank asked Doctor Sunder to make sure Jim remained isolated while testing on other antibiotics continued. After hanging up the phone, Frank headed to the laboratory where his colleague Catsi Nguyen was preparing the samples Frank had brought for identification and culturing. Yersinia pestis is a slow growing bacteria, so the Flagstaff laboratory would likely stay ahead of them, but it would nevertheless be valuable to confirm the results in Atlanta as well. In addition to the resistance tests, Frank wanted to know if the bacteria had infiltrated any other organs, particularly the lungs. Although there was no sign of plague in the sputum, it was important to see if the strain from the Grand Canyon might have a tendency to enter the respiratory system, presenting a greater risk of becoming pneumonic.

“You had asked me to do DNA analysis as well,” Catsi said, “are you looking for anything in particular?”

“Yes, see if the CCRC-delta32 mutation is present.” Frank said.

“The one which confers resistant to HIV infection?” Catsi asked.

“That’s right. It could also block plague infection.”

Frank had just reread an abstract in a medical journal describing how in the year sixteen hundred sixty-five a tailor in the town of Eyam in northern England received a bundle of cloth from London where the Great Plague was ravaging the population. Within four days the tailor was dead and all of his family save his wife would eventually die. As the plague spread in Eyam this pattern repeated itself. Whole families were wiped out with the occasional exception of one or two people. A miner’s entire family was killed by the plague, yet he survived and became the town gravedigger, burying many corpses, but never succumbing to the illness himself. The epidemic continued into sixteen hundred sixty-six in spite of a decree of the town rector William Mompesson that burials should take place as close to the location of death as possible in order to avoid spreading the disease. But what brought Eyam lasting fame as a plague town was the decision to not allow anyone to leave in order to avoid spreading the epidemic to neighboring communities. Nearby towns would leave food and supplies on boundary stones surrounding Eyam. These stones marked the border beyond which citizens of the village could not pass. Eventually eighty per cent of the residents of Eyam died. Of those who survived, some suffered a brief illness, and some no illness at all.

Some three hundred thirty years after the plague had devastated Eyam, another epidemic was terrifying the world. As the number of AIDS patients and victims grew, it was discovered that the human immunodeficiency virus was the cause of the disease and life styles were identified which increased the risk of contracting HIV. In an effort to slow the epidemic, cohorts of the infected patients who shared those same life styles were identified and contacted where feasible. It gradually became apparent that there were certain individuals who, no matter how risky their behavior, were completely immune to becoming infected with HIV. HIV infects T-Cells by entering through the CCRC receptor. Researchers discovered that a mutation called CCRC-delta32 blocked HIV from binding to the receptor. If someone inherited one gene for CCRC-delta32 that person would be resistant to HIV infection, meaning they could catch the disease, but it was harder for the virus to infect them than another person with no CCRC-delta32 gene. Inheriting two genes would leave that person completely immune to HIV infection.

The next question of course was where this mutation came from. Gradually through genetic mapping a pattern was established which indicated that this gene was only present in people of Northern European ancestry, with up to ten per cent of that population carrying at least one allele. The search for an event which might select for this gene suggested the many decimating plague and smallpox epidemics which had swept through Europe over the ages. Both of those diseases target the same cells and the epidemics devastated populations so quickly that a mutation which spared sections of the population would increase greatly in frequency in those populations. Since Eyam was one of the best known and most well documented of plague cities, the DNA profile of the town’s current population was the natural starting point to begin the investigation into genetic anomalies. Indeed the results showed there was a very high incidence of this gene among the descendants of the plague survivors of Eyam.

The town of Eyam lies just outside Sheffield, the city which Jim Carter had identified as the home town of his parents. If Jim Carter had inherited immunity to plague, that would explain why he did not get sick even though the strain infecting him was resistant to the antibiotics used to treat him.