

To Err Is Human

It would be nice if every government official, every government scientist, and every public servant of every kind had reacted perfectly when, just weeks after the horrific terrorist attack upon the World Trade Center and the Pentagon, it was suddenly realized that someone could be in the process of killing many more innocent Americans with a biological weapons attack.

But history has shown that nothing ever goes perfectly in such situations. And critical mistakes are invariably made.

Mistakes were certainly made in the anthrax case from the very start. They were totally wrong in believing that anthrax would not escape from sealed envelopes. We all now know various authorities should have evacuated buildings faster than they did, they should have given people antibiotics before they did. They clearly guessed wrong in the Kathy Nguyen investigation. They almost certainly guessed wrong on how the AMI building became so thoroughly contaminated.

Some mistakes were eventually corrected. Most were uncorrectable. And, unfortunately, whenever mistakes are made in a politically volatile situation, there are always conspiracy theorists who will believe the mistakes were really part of some sinister plot.

The reality is that even experienced scientists sometimes made silly mistakes. As Murphy's Law says: If things can go wrong, they will. And to paraphrase the corollary to Murphy's law: People make mistakes at the worst possible time.

One well-known and obvious example of a silly mistake was the handling of the Daschle letter and the damage done to it when John Ezzell accidentally placed the bottom edge of the envelope into a groove

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filled with bleach. There was no way to correct the mistake, but fortunately it didn't really destroy any critical evidence.

Unfortunately, that wasn't the last mistake made by scientists working with the Daschle letter and the anthrax powder it contained. The next mistake was even sillier than Ezzell's mistake. And the mistake after that compounded the silly mistake with conclusion-jumping and leaks to the media, producing ammunition for all kinds of conspiracy theories which dominated scientific thinking in some circles for the next *three years*.

The Oozing Spores

Evidently, one or both USAMRIID scientists Tom Geisbert and Peter Jahrling were talking with author Richard Preston during the very early days of the anthrax investigation. Months later, Preston wrote a book called "The Demon In The Freezer" in which he provides details of conversations and events at USAMRIID during the period beginning on October 16, 2001, and running through October 25, 2001, knowledge which could only have come from one or both of those two scientists.

As history has recorded, the first word about anthrax was from Florida, where Bob Stevens died from the disease on October 5. If there was any doubt about whether it was a biological attack or not, that doubt ended on the 12th when one of Tom Brokaw's assistants was diagnosed with anthrax. She remembered a suspicious letter and they searched for it, raising the fear that terrorists were sending anthrax-laden letters through the mails. That fear is fully confirmed after the Brokaw letter found and tested. On the 14th it is confirmed that someone is sending anthrax through the mails to Florida, New York City and possibly countless other targets.

The anthrax-laden Daschle letter was opened in Senator Daschle's office *the next day*, on October 15th. A Capital Police hazardous materials team was summoned, basic tests were done, and the tests showed the powder in the letter was indeed anthrax. Meanwhile, more cases of anthrax were being diagnosed in New York City. Headlines all over the world told the unfolding story.

The lethal Daschle letter was delivered to USAMRIID later on the

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15th, and John Ezzell immediately began his examination.

The news continued to break. First Florida, then New York City, now the nation's capital. Where next? Every scientist's worst nightmare was coming true!

At that time at USAMRIID, according to Preston, "Top Institute scientists were yelling in the halls about an unknown bioterrorist weapon." Tensions were high. It was the first true anthrax attack in the history of the United States, and there was great danger that the envelope might contain *even deadlier agents than anthrax* - biological agents which could cause total and unprecedented havoc.

On the morning of October 16th, Jahrling expressed a growing concern to Ezzell that the spores might be laced with *smallpox* bacteria. That was about as scary a situation as their imaginations could conjure up. Jahrling felt a sample should be given to Tom Geisbert to examine under an electron microscope as soon as possible. Very soon, two samples in small test tubes and double-wrapped in plastic bags were provided to Geisbert. One sample was a white, milky liquid containing anthrax spores from the tests done by the HazMat unit which removed the letter from Daschle's office. The second sample was some of the actual powder that was in the envelope.

Preston says Geisbert immediately got into a biosafety suit and took the samples into a Level-4 containment room where air is filtered and kept under negative pressure so nothing can escape to the outside world. At USAMRIID they call it "The Submarine". In the "Submarine", Geisbert went through a procedure to prepare the spores in the liquid for examination. First he put a small drop of the milky liquid onto a slip of wax. Then, using tweezers, he placed a tiny copper grid atop the droplet. He waited a few minutes while the droplet dried into a crust on the grid. The next step was to make certain the spores were dead by putting the grid into a test tube of lethal chemicals.

With the preparations complete and in possession of a safe sample to work with, he left "the Submarine", got back into his normal clothes and took the sample to USAMRIID's eight foot high transmission electron microscope (TEM).

Under the TEM, "The view was wall to wall spores" - "The material seemed to be absolutely pure spores".

With ten thousand times the magnification of a standard microscope

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which uses glass lenses and a beam of light to image a sample, the TEM uses electromagnetic lenses and a thin beam of electrons. (Unlike a scanning electron microscope (SEM) which can only see the outer surface of an object, the TEM can also penetrate objects to view the internal structure - much like an X-ray machine. But that only works if the specimen is thin enough, less than 100 nanometers. The spores were 10 times that thick, so Geisbert was using a TEM to look at the outside of the spores.)

Geisbert turned a knob and zoomed in, searching for smallpox viruses which are a fifth the size of an anthrax spore. As he searched, he didn't find any smallpox, but he began to notice something else. "He noticed some kind of goop clinging to the spores", according to Preston. "It was a kind of splatty stuff."

Geisbert then turned up the power to get a closer look and crisper image. "As he did, he saw the goop begin to spread out of the spores. Those spores were sweating something."

Peter Jahrling came in to see how things were going, and Geisbert demonstrated the phenomenon for him. "Watch," he told Jahrling. He then turned the power knob, there was a hum, and "The spores began to ooze."

According to Preston:

"Whoa," Jahrling muttered, hunched over the eyepieces. Something was boiling off the spores. "This is clearly bad stuff," he said. This was not your mother's anthrax. The spores had something in them, an additive, perhaps. Could this material have come from a national bioweapons program? From Iraq? Did al-Qaeda have anthrax capability that was this good."

Jahrling then showed the phenomenon to General John S. Parker from the Army's Medical Research and Materiel Command, which had authority over USAMRIID, and Colonel Ed Eitzen the commander of USAMRIID.

General Parker began issuing orders, putting USAMRIID into emergency 24-hour operations and summoning in outside experts to help. FBI scientists were brought in.

The FBI wanted a second opinion. Samples were sent to the

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Hazardous Materials Research Center at the Battelle Memorial Institute in Columbus, Ohio.

Battelle came to a very different conclusion, determining that the spores were stuck together in lumps far too large to float easily and cause inhalation anthrax. They didn't think the spores were anywhere near as dangerous as USAMRIID believed, even though it was at least ten times more pure than anything from any known bioweapons program.

(As it turned out, Battelle had made another one of those silly mistakes. They had sterilized the spores in an autoclave which *caused* them to stick together into the lumps. When the error was discovered, one Army official yelled that they had turned the spores into hockey pucks. It took days to learn the mistake had been made. Big embarrassment for all.)

Meanwhile, Jahrling was taking a look at the dry spores which hadn't been in any milky liquid. Instead of using chemicals, he radiated them to kill them. But when he tried to look at the spores under an SEM, the spores disappeared. They were flying around like "jumping beans" due to static electricity. That scared him.

When he finally got a sample to settle down, according to Preston, "The spores were stuck together into chunks that looked like moon rocks." ... "Most chunks were very tiny, sometimes just one or two spores, but there were also boulders." ... "He could see them crumbling into tiny clumps and individual spores, smaller and smaller as he watched."

Jahrling knew something about anthrax, but he could not imagine how this anthrax had been made. According to Preston, "It looked extremely sinister. He started feeling shaky."

The next day, October 24, 2001, Jahrling was summoned to the White House to brief the Cabinet on his findings.

Analysis

I've had countless arguments about the "goop" that oozed out of the spores. It seems obvious to me that since the spores had been in a "milky liquid" and were then killed with chemicals, the "goop" was something that had soaked into the super-dry spores. Spores have pores

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into which moisture will seep and, if all other conditions are right, will trigger germination.

When put under the TEM, particularly under extremely high magnification, the electron beam heated up the interior of the spores, produced pressure, and the “goop” oozed out. Some of the goop may have been trapped within the spores’ hard coating until it burst out and created the “splatty stuff”. Photographers have taken pictures of this oozing and splattering effect on other anthrax spores, which I’ll go into in a later chapter where I interview an “anthrax photographer”.

There is no reason to believe the “additive” that Geisbert and Jahrling imagined they saw were in the mailed spores. They were almost certainly additives from the HazMat examination - or their own additives.

Later, when they used an SEM to look at the dry spores which had been sterilized with radiation (instead of chemicals) and had not been in any “milky liquid”, they reported seeing no “goop” and no “splatty stuff”.

They didn’t know what the goop was, but they were telling people about it anyway. Specifically, they told people at the White House, which probably means they didn’t have a choice.

The White House - Oct. 24, 2001

Peter Jahrling was summoned to the White House on October 24, where he briefed FBI officials, CIA spooks, John Ashcroft and other members of the Cabinet on what had been learned so far about the anthrax powder in the Daschle letter.

He told them about the mysterious “goop” they had seen oozing out of the spores. He even passed around the photographs they’d taken of the “goop”, telling everyone that it was *probably an additive*. He was *speculating!* A big *BIG* mistake in such a situation.

That speculation triggered a lot of discussion. It was asked if the additive proved it was a bioweapon produced in Iraq.

Jahrling said it “could be”, but it didn’t look like any Iraqi sample they’d ever seen before, and it didn’t contain bentonite. He told them that they’d know more the next day, after further tests were made.

According to Preston, “The atmosphere in the room started to feel

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like a war council deciding whether or not to attack Iraq.”

Jahrling tried to calm things down by explaining that a few grams of highly pure anthrax could easily be made in a little laboratory with some small pieces of equipment. “This anthrax could have come from a hospital lab or from any reasonably equipped college microbiology lab,” he told everyone at the briefing.

The FBI officials there posed a critical question: How could the investigators look for some kind of “signature” in the anthrax that might identify its source or even the specific lab which made it. It was already known that it was the Ames strain, and that brought down the number of possible labs, but was there anything in the spores which could further reduce the possible sources?

The tests they planned to do the next day might provide a partial answer that question.

Another big mistake followed. What was discussed at the White House was leaked to the media and became front page stories in the next morning’s New York Times and the following morning’s Washington Post. (White House officials blamed the FBI for the leaks, but it was never officially determined where the leaks came from.)

The front page stories in the Times were continued inside the issue where there was a separate article by William J. Broad titled, “Contradicting Some U.S. Officials, 3 Scientists Call Anthrax Powder High-Grade” with a subtitle “Two experts say the anthrax was altered to produce a more deadly weapon.”

One of the three scientists talking with William Broad was William Patrick III, who said of the Daschle powder: “It appears to have an additive that keeps the spores from clumping.” Another was former U.N. Weapons Inspector Richard Spertzel who said, “There is no question this is weapons quality.”

The Washington Post’s headline was “Additive Made Spores Deadlier”. Only three nations were known to have the technology to make such sophisticated spores, the Post said, and “A government official with direct knowledge of the investigation said yesterday that the totality of the evidence in hand suggests that it is unlikely that the spores were originally produced in the former Soviet Union or Iraq.” So, the United States was the only remaining suspect.

Clearly, none of their sources had seen the pictures of “goop” oozing

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out of the spores which were shown around by Jahrling at the White House meeting. If they had, they might have speculated differently. And Jahrling's statement that the spores could have been made in any hospital lab or reasonably equipped college microbiology lab was discounted. I just didn't fit what outside "experts" believed.

The Washington Post put it this way:

Nonetheless, the conclusion that the spores were produced with military quality differs considerably from public comments made recently by officials close to the investigation, who have said the spores were not "weaponized" and were "garden variety." Those descriptions may be technically true, depending on how one defines those terms, several experts said. But they obscure the basic and more important truth that the spores were treated with a sophisticated process, meaning the original source was almost certainly a state-sponsored laboratory.

Mistakes were piling atop mistakes. Scientists inside and outside the investigation were *speculating* without having all the facts, and, because the outside speculation came from bioweapons "experts" who saw what they expected to see, that speculation was believed by media people who saw it as "evidence" of some *illegal* American bioweapons program. The official denials were just a cover-up.

Everyone should have found out what the substance was instead of speculating. But those silly mistakes started arguments which raged for years afterward. And the entire situation was made even worse by another bad-science mistake and more conclusion-jumping the very next day.

Silica

The day after Jahrling's White House briefing, October 25, 2001, Tom Geisbert drove to the Armed Forces Institute of Pathology (AFIP) which evidently had an analytical tool not available at USAMRIID, an energy dispersive X-ray spectrometer (an instrument used to detect the presence of otherwise-unseen chemicals through characteristic wavelengths of X-ray light). He took along a sterilized sample of the dry

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Daschle anthrax already mounted on a special cassette. The mission to AFIP was to find out if the spores contained any metals or elements which didn't belong - some kind of "signature" which might help the FBI determine which lab made them. Plus, what *was* that "additive" they'd seen oozing out of the spores?

Before noon, they had learned that there were two extra elements in the spores: silicon and oxygen. The combination generally indicates silicon dioxide, a.k.a. *silica*, one of the most common substances on earth.

According to Preston, Geisbert immediately began concluding that the "goop" which had oozed out of the spores must have been some kind of powdered silica so fine that it looked like "fried-egg gunk".

And the experts at AFIP jumped to the same conclusion. They had seen no "goop" or "fried-egg gunk". All they had seen were spikes on a graph. But those spikes indicated they had detected silica, which everyone knew was an additive which caused the spores to more easily aerosolize. It was proof of weaponization!

It was all conclusion-jumping of Olympic Games caliber, because all they had really seen was *spikes on a graph*.

Although there was nothing unusual *visible to the eye* when looking at the actual spores, they could raster back and forth over spots on the surface of a spore and the X-ray machine would consistently show clear spikes on a graph which indicated silica. Silica cannot be *made* by a living organism. As far as they were concerned, it *had* to have been put there deliberately. There was no other *known* explanation. There seemed to be no other *possible* explanation. It absolutely *had* to be proof of deliberate weaponization.

Wrong. Wrong. Totally wrong. A truly *major* mistake.

And more mistakes followed, since there were more leaks, and the media soon learned that silica had been found. It was *proof* of weaponization. And if it didn't come from Iraq or al Qaeda because it was the Ames strain, it *had* to have come from some *illegal* American bioweapons program. It was *absolute proof*. There was no other possible explanation.

Wrong again.

But the news was already all over the media.

The same day AFIP detected silica, Tom Ridge, the head of Homeland Security, called a news briefing where they tried to explain

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that they hadn't fully investigated the substances yet. General Parker was there. He was questioned by reporters and tried to illustrate that anthrax spores, just like talcum particles, "if given some energy from, say, wind or clapping or motion of air in a room, they will drift in the air and fall to the ground." In other words, you did not need an additive to make spores aerosolize.

A reporter asked Tom Ridge:

"Doesn't the very fact that, as General Parker said, this is free and floaty anthrax that was sent to Senator Daschle, aerosolized, show that it is a very sophisticated operation that produced it, not a grad student in a basement, and that the knowledge of how to do that would be limited to a very narrow circle of people, some state actors and some people with access to American secrets?"

That's a *loaded* question if there ever was one. General Parker was brought back to the microphone and responded:

"Well, first of all, your question is complex, and I'd like to say that, although we may see some things on the microscopic field that may look like foreign elements, we don't know that they're additives, we don't know what they are, and we're continuing to do research to find out what they possible could be. They're unknowns to us at this present time."

But they weren't unknowns to the media. The media had very quickly located "experts" willing and able to *speculate*. That was good enough.

The flood of bad science, bad information, speculation and mistakes poured right over the dam where good science should have stopped it, and the conspiracy theories began to gush forth.

On October 31, 2001, General Parker went before The Committee on Governmental Affairs and the Subcommittee on International Security, Proliferation and Federal Service and evidently tried to squelch some of the wild speculation. In his prepared statement he said,

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On the afternoon of 15 October, USAMRIID received samples from the FBI and the Capitol Police, which included letters addressed to Senator Daschle. The initial observation of the material in one of the letters, performed under biosafety level 3 containment conditions, revealed a fine, light tan powder that was easily dispersed into the air. Preliminary laboratory results including polymerase chain reaction and fluorescent antibody stain indicated *Bacillus anthracis* spores. USAMRIID reported to the FBI on the afternoon of the 15th the preliminary results indicating that the material was anthrax spores. Further, one of our technicians/scientists made a statement that this material grossly had some attributes consistent with “weaponized” anthrax. On the evening of 15 October, USAMRIID completed the initial battery of confirmatory tests verifying positive results for anthrax. This additional information was relayed to the FBI that evening and was subsequently re-iterated to the FBI and others in an interagency conference call the morning of 16 October. At that time, USAMRIID revisited the term “weaponized” and decided the terms “professionally done” and “energetic” as more appropriate descriptions in lieu of any real familiarity with weaponized materials.

On 16 October, USAMRIID began to examine the samples further via transmission electron microscopy (TEM). Initial TEM analysis was performed on hydrated powder. This study revealed that the material was comprised solely of a high concentration of spores without debris or vegetative forms, suggesting this material was refined or processed.

General Parker explains the two causes of errors in that statement: (1) “*in lieu of any real familiarity with weaponized materials*” his scientists had provided bad terminology (and improper speculation), and (2) they had viewed “*hydrated*” spores which could (and did) give an invalid impression of the nature of the spores.

A year later, AFIP was still telling people they had found an “additive” in the Daschle anthrax. On their web site they told of how USAMRIID had come to them looking to identify an unidentified substance in the spores. They reported:

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[They confirmed] the previously unidentifiable substance as silica. “This was a key component,” Mullick said. “Silica prevents the anthrax from aggregating, making it easier to aerosolize. Significantly, we noted the absence of aluminum with the silica. This combination had previously been found in anthrax produced by Iraq.”

For the next three years, the media was filled with the results of all this bad science. It governed statements and actions by many well known scientists, including many in government agencies. It also helped prop up Barbara Hatch Rosenberg’s conspiracy theory, giving her theory some credibility even after all her rumors and innuendo about Dr. Hatfill were debunked and discredited.

Somehow, as the stories were repeated over and over, an “additive” became a “coating”, even though absolutely no one had seen anything even remotely resembling a coating on the spores. The coating theory and the conspiracy to cover up the facts about the “sophisticated coating” took on a life of its own. Unlike Barbara Hatch Rosenberg’s conspiracy theory, this the coating theory was almost universally believed by everyone *except those directly involved in the investigation*.

It didn’t matter that it was all based upon invalid speculation.