Solve the Mystery of the Three Lead Coffins

"What is *that*?" said Mr. Bevan. He didn't quite believe what the machine was telling him. Mr. Bevan looked down at the area marked off as the site of the old ***chapel***. Then he looked back at the display again.

The ***archaeology*** students working with Mr. Bevan hurried over to where he stood. He turned a few of the dials on the ***Ground Penetrating Radar*** and pointed it again at the ground at his feet. On the screen, they saw a very large rectangular-shaped blip. The numbers told Bruce and the students the blip was about three feet under ground.

"Maybe it's part of the chapel wall?" asked one of the students.

Mr. Bevan pointed to where the wall had stood. "It's too far away to be the wall," he exclaimed. "And *much* too big. We need to call Dr. Riordan and Dr. Miller. I think this is worth a bit of digging!"

The next day, Dr. Riordan and Dr. Miller came to the ***chapel*** site with Mr. Bevan. Mr. Bevan pointed to the spot he had marked on the ground.

"Like I told the students, it's much too big to be part of the wall," said Mr. Bevan. "And from the readings, I'd guess it's over five feet long. It seemed like something you should know about."

"I'm glad you called," said Dr. Miller, the director of research at St. Mary's City. Dr. Miller looked at Dr. Riordan. He was walking around the marked area with a ***curious*** look on his face. "I think Dr. Riordan is already planning his ***excavation***" continued Dr. Miller.

Indeed, Dr. Riordan's mind was spinning. As the lead ***archaeologist*** at St. Mary's City, Dr. Riordan was in charge of deciding just where and how to ***excavate*** for new finds. Lately, they had been finding lots of nails, broken pottery, and other ***artifacts***. The artifacts were very useful because they gave clues about what life used to be like.

But they were nothing compared to the blips on the screen.

Dr. Riordan smiled back at Dr. Miller and Mr. Bevan. "You better believe I'm planning the dig," said Dr. Riordan eagerly. "I'll call the students. We will start first thing tomorrow morning."

By noon of the next day, a crowd of people buzzed around the ***chapel*** site. Some were stretching pieces of string across the large area they had roped off. They made squares by criss-crossing the string. Then they pegged it into the ground. The string set up a grid system for the site where they would dig. This was important so that they could keep an accurate record of what was found and where it was found.

Others were bringing up the tools to dig. The small shovels, dust pans, tiny brushes, and magnifying glasses clinked together in their bags. Others brought pads of paper and lots of pens. As some archaeologists and students carefully dug, others would write down what they were doing. If the archaeologists found even the tiniest bit of metal, brick, or pottery, the recorders would write it down. They kept very careful notes about everything they saw—from the color of the soil to how deep the crew was digging.

Archaeologists are like the detectives of history. They know that even the smallest clues can help solve the biggest mysteries.

Over the next few weeks, the students and ***archaeologists*** dug deeper. Inch by inch, they carefully removed the soil. At last, they uncovered the very top of the object. Everyone in the group held their breath. They huddled around the three-foot hole. Dr. Riordan, who was in the hole, slowly whisked his brush across the dark surface. Slowly, as the dirt was cleared, people began to see a large, rectangular box.

"It…it looks like a ***coffin,***" exclaimed Dr. Miller.

"I think so, too," said Dr. Riordan. "The metal is definitely lead." The students talked excitedly. But Dr. Riordan was brushing further around the edge of the coffin. "I think there is the corner of something else here," he said.

He carefully ***whisked*** away the soil. A second, slightly smaller rectangle appeared. The students' buzz became even louder. They smiled and pointed at the dark metal surfaces. But Dr. Riordan's brush was whisking again near the middle of the second coffin. Slowly, a third dark rectangle began to appear. But, unlike the other two boxes, this one was very, very small.

"It's so little!" said one of the students, sadly.

"Yes," said Dr. Miller. "I think it's a child's coffin."

The students standing around the pit burst into discussion. Some even wanted to know if they would be opening the ***coffins***.

"We will in good time," said Dr. Miller. But we need to think about what we are going to do. This could be one of the biggest ***excavations*** that has ever happened here."

The students standing around the pit nodded in agreement. Dr. Miller continued: "Right now, we've got to protect the coffins. We wouldn't want bad weather or ***vandals*** to hurt them. So, if you'd like to put your excitement to good use, grab a shovel. You can help Dr. Riordan and I rebury the coffins."

A few of the students picked up shovels, still buzzing about the discovery. Dr. Riordan, Dr. Miller, and the students carefully shoveled dirt back over the coffins.

Three coffins were made of lead. The ***archaeologists*** searched through their books. Only two other coffins from the first English colonists had *ever* been found. Those coffins were ***excavated*** from under Trinity Church, less than a mile from this new site. And suddenly, here were three more coffins of lead…again at St. Mary's City.

The archaeologists were excited about their find. They had hundreds of questions. Most early colonists of Maryland were buried in simple wooden ***coffins.*** What made these colonists so special, to be buried in coffins of lead? Who were these people?

They had a huge mystery on their hands. Dr. Miller and Dr. Riordan decided to ask other specialists for help in solving the mystery.

Everyone they asked had different ideas about what they could learn from the ***coffins***.

One group wanted to know who the people in the coffins were.

Another group wanted to know how the three people had lived and died.

A third group wanted to test and study the air that might be trapped inside the coffins.

All together, they were three very different goals.

Some ***archaeologists*** and ***historians*** wanted to know who the people in the ***coffins*** were. They had found other ***remains*** under this chapel. But none of the earlier finds were in coffins made of lead. Did that mean they were rich or important? Were the people in the coffins related?

To answer these questions, they would have to look through lots of books and records from the 1600s. They would need help and clues from the other archaeologists as well.

Some scientists wanted to test the bones and items inside the ***coffins***. These ***forensic scientists and archaeologists*** wanted to know how the people lived and died. There were lots of special tests they could use. For example, they could test the teeth to tell how old the people had been when they died, and how healthy they were. The scientists could look at and test the bones to see what their diet was like, and what caused their deaths. And they could test plant ***pollen*** accidentally trapped inside the coffins to learn the season each person had died.

Some of scientists and researchers studied the environment. These ***environmental scientists*** weren't only interested in the people inside the coffins. They wanted to test the air trapped in the coffins, too. They wanted to compare air from the 1600s to air from today. These ***researchers*** could learn how we've polluted the air since then. It would be a major ***breakthrough!***

Besides testing the air, environmental scientists wanted to look for insects trapped in the coffins. Insects from 17th century Maryland had never been found before. If the scientists found trapped insects, they might be able to tell what year the coffins were sealed.

The ***archaeologists*** had to take one big step to investigate their first two goals. To learn about the people, they needed to open the coffins. To test the bones and items inside, they also needed to open the coffins.

But the third goal – testing the air – caused quite a problem. If they opened the coffins, all the old air would leak out. New air leaking in would change the old air. They would never know what the old air was like.

Dr. Miller, Dr. Riordan, and the others had quite a puzzle. They were ***curious*** about the people and things in the coffins. But testing the air was very important too. Which was more important? The ***archaeologists*** and scientists decided they needed some more help. They began to call even more people for help and advice.

When word got out that three lead ***coffins*** were found at St. Mary's City, lots of people became very interested. Like the ***archaeologists***, others wanted to solve the mysteries of the three coffins. The archaeologists and ***historians*** decided that with all this help, the project would need a new name. They decided to call the ***excavation*** and research ***Project Lead Coffins***.

Help began to come in from some surprising sources.

The U.S. Army brought in a huge tent and an X-Ray machine. They also provided guards to keep the coffins safe.

The Navy agreed to help lift the heavy lead coffins with the same machines they used to lift bombs. They also created special parts for lifting and studying the coffins.

Private companies donated special machines that could see inside the thick lead coffins without opening them.

Finally, Mark Moore, an Army scientist, and scientists from ***NASA*** created an amazing ***Air Extraction System*** to safely take the air out of the coffins.

One of the groups the ***archaeologists*** had called on right away was the U.S. Army. The Army and Army Reserves agreed to help as practice for their own soldiers and scientists. The Army Reserves acted as guards, protecting the coffins. They also helped all the reporters and camera people who came to St. Mary's City from hurting the chapel site. Finally, the Army provided a special hospital tent near the site where the team could work. The tent was the same kind the soldiers might use on a battlefield. With the tent, the Army team brought an x-ray machine to study any ***remains*** inside the coffins.

Dr. Miller and the team had a problem. How do you lift very heavy, very breakable coffins from a 3-foot hole?

A team of ***researchers,*** scientists, and soldiers from the Navy came to the rescue. The Navy soldiers had lots of experience lifting large, easily breakable objects. On the base, they often moved bombs, missiles, and airplane parts! So the Navy team came up with a plan.

First, they would slide a large steel plate under the ***coffins.*** Then, they would use the lifting device they used to take jet engines out of airplanes to lift the heavy coffins. Next, they would lower the coffin ont a ***bomb cart*** – a heavy-duty wagon used to move bombs to planes on a base. Finally, the coffins could be unloaded from the bomb cart onto an exam table in the Army tent.

One of the tricky parts about opening the ***coffins*** was that nobody could see what was inside. Regular X-Rays, like the one you would get at a hospital, couldn't see through lead. If the ***researchers*** couldn't see what was inside before they drilled or opened the coffins, they might accidentally hurt the ***remains*** inside.

Several private companies came to the rescue. One company gave ***Project Lead Coffins*** a special imaging machine. Instead of using X-Rays, it used ***gamma rays***, which are much more dangerous and powerful. In fact, gamma rays are so powerful they could shoot right through the lead coffins. Another company donated special film, so that the gamma ray device could make pictures just like a regular x-ray machine.

With the machine and film, the archaeologists could see *inside* the coffins without even drilling a hole.

The ***environmental scientists*** wanted to test air inside the coffins. They could only do this if the coffin was completely ***sealed,*** so no air could get in or out. But if the coffin was sealed, how could they get the air out? And if they drilled a hole, how could they keep the air from leaking out?

The archaeologists were stumped. The second problem seemed impossible to solve. But a scientist named Mark Moore had an idea. He began to draw up plans for an ***Air Extraction System.***

The Air Extraction system would remove the air from the coffin without breaking the seal. A special needle would be drilled into the coffin. The needle had two tubes in it. One tube sucked out all the old air and put it in a collection container. The second tube blew a gas called ***argon*** into the coffin. Argon wouldn't hurt the ***remains*** inside the coffins. And if some argon gas was accidentally sucked in with the old coffin air, it was easy to divide out.

Mr. Moore was excited. So were other scientists – even environmental scientists from ***NASA*** wanted to test the air from Mr. Moore's system.

None of the help or solutions came quickly. Working out the details with the Army and Navy took several months. And it took the Mr. Moore over a year to design the ***Air Extraction System***. By the time everyone was ready to go, it was the fall of 1992. It had been almost *two years* since the excited ***archaeologists*** first ***excavated*** the ***coffins***.

But Dr. Miller, Dr. Riordan, and the rest of the team were happy. They had quite a plan. First, the archaeologists would excavate the coffins. Then scientists from the private companies would use their ***gamma ray*** machine and film to see what was inside the coffins. Next, the Navy would lift the coffins out. Then they would move them to the Army tent on the ***bomb cart***. Next, the Mr. Moore would use the Air Extraction System. The old air would be sent to ***environmental scientists*** at ***NASA*** for testing. After all of this was finished, the archaeologists could finally open the coffin lids. The archaeologists, ***forensic scientists***, and ***historians*** could start their tests on whatever was inside.

At last, the big day arrived. Tiny St. Mary's City turned into a whirlwind of people. It seemed like *everyone* wanted to see what the mysterious ***coffins*** held. ***Archaeologists*** came to dig and explore the coffins. Scientists of all types came to test and watch. Students from St. Mary's College walked across the street to the dig site. News reporters and camera crews from as far away as England came to report. The tent was filled with Army, Navy, and ***NASA*** workers.

Standing in the middle of the noisy crowd, Dr. Miller and Dr. Riordan paused to take in the scene. Photographers' flashbulbs popped. Reporters moved around the pit. Scientists and ***researchers*** shuffled papers and pens. In the middle of it all, three lead coffins sat quietly, as they had for hundreds of years.

Finally, it was time to begin.

The images taken by the ***gamma ray*** machine showed the ***researchers*** a clear picture of the ***remains*** in the coffins. The Army X-Rays and the Navy ***bomb cart*** worked perfectly. Even the ***Air Extraction System*** that had taken so long to create worked well.

At last, the archaeologists were finally ready to move the coffins. They decided to examine one at a time. They began with the smallest, since it was the easiest to move. Army and Navy soldiers and scientists lifted the small, two-foot coffin onto a table in the huge tent. Dr. Miller and Dr. Riordan took a deep breath. Then, they carefully lifted the lid.

The ***environmental scientists*** got their answers first. They hoped the air from the coffins would be pure air from the 1600s. Their ***Air Extraction System*** gathered the air inside all three with ease.

They could see tiny cracks in the small and medium ***coffins.*** Without even testing, they knew the small and medium coffins had been ***contaminated*** with modern air. New air had leaked into the coffins. But the ***seal*** on the large coffin seemed tight. Would there only be old, 1600s air in the large coffin?

It took several months to test the air. Finally, the results came back. The air from the large coffin was contaminated too. New air had leaked into the coffin through tiny holes in the lead. And strange gasses were in the air that nobody had expected. Scientists thought the chemicals used to ***embalm*** the man might have created some of the confusion. But they could never know for sure.

The environmental scientists were very disappointed. There would be no ***breakthrough*** about air pollution. But everyone still congratulated the Navy and ***NASA*** scientists. Their air extraction system had worked perfectly. And NASA thought they could use what they learned on other projects, such as the space shuttle.

Inside, they found the ***remains*** of a tiny baby girl. Her small bones were in bad shape. There were scars on her head, and her tiny ribs were much too big. This told the scientists she had not eaten well. The archaeologists knew she must have been very ill.

Everyone paused for a few minutes, looking at the little skeleton. They didn't usually find remains of someone so young. Finally, Dr. Riordan walked back to the grave site. It was time to open the medium-sized coffin.

Like before, the heavy lead ***coffin*** was lifted and moved into the tent. Dr. Riordan and some students pried off its lid.

Inside the medium-sized coffin, they found the ***remains*** of an adult woman. Her skeleton was lying inside a well-preserved wooden coffin. The wooden coffin had been inside the lead coffin. She had silk ribbons tied around her hands and feet. The scientists noticed her leg had been badly broken and reset. They also noticed her teeth were very decayed and her bones seemed weak. And a few pieces of hair were lying under her skull.

The ***forensic scientists and archaeologists*** were very interested in the ***artifacts*** in the medium-sized coffin. But there was still one coffin left to open.

At last, it was time to open the largest ***coffin***. The heavy lead coffin was nearly 6 feet long and weighed over 1500 pounds.

Dr. Miller and Dr. Riordan quickly removed the outer lead lid. Inside, they found a perfect wood coffin! Everyone was amazed at how well it stayed together for so long. All the ***archaeologists***, ***historians***, and scientists crowded around the coffin.

Carefully, they lifted the lid of the wooden coffin. The whole room gasped!

Inside were the remains of a man. From the middle of the ribs down, his skeleton was perfect. But from the middle of his chest to his head, the skeleton had turned into white ***crystals***! One of the ***forensic scientists*** recognized the type of crystals. They were called ***brushite*** (BRUSH-ite). But nobody knew how the skeleton could have turned into brushite crystals.

The scientists were ***baffled***. They were looking for answers. But the skeleton in the coffin just gave them more questions!

After all the planning and work, it seemed the mystery of the lead ***coffins*** was more confusing than ever. But the ***researchers*** were determined. They would look for more clues to get to the bottom of the puzzle.

Everyone looked back at their original goals. The ***forensic scientists, archaeologists****, and* ***historians*** had a lot of work to do. They decided to break into teams to attack one goal at a time.

The ***forensic scientists and archaeologists*** were excited about all the ***artifacts*** in the ***coffins***. They hoped to test the items inside the coffins, like bones and bits of ***pollen***. Like detectives, they would use the clues to learn about life in the 1600s.

This team had lots of information to go through. One scientist did tests on bones from each coffin. Another scientist tested the wood from the inner coffin. Still another scientist tested plant pollen trapped in each coffin. Other scientists discovered tiny pieces of cloth inside the coffins. And they sent pieces of the strange ***brushite*** crystal to even more ***laboratories***. It took months and months to gather the information. And it took just as long to make sense of what they found.

The woman in the medium ***coffin*** had died first. She had been in her mid-sixties when she died. This was very old for a woman living in St. Mary's City at the time. She had very bad back problems. She had broken her leg, and it was set so poorly that the bone healed crooked. And they could tell from her teeth that her diet included lots of sugars. That meant that she had been rich enough to afford to buy sweets – something regular colonists wouldn't have had money for. Despite her wealth, her health was very poor. This told researchers that even the richest colonists could lead very unhealthy lives.

The scientists also found ***pollen*** from a plant called ragweed in her coffin. Ragweed pollen is common in the fall. So they knew she was buried then.

The ***forensic scientists and archaeologists*** learned a great deal about the man in the large coffin. The man had died after the woman, but before the baby. The man was in his early 50s when he died. He had been about 5'6" tall. The scientists could even tell from his arm bones he was right-handed.

They also discovered he had been a little overweight. Tests on his bones showed he hadn't worked as hard as others in the colony. This told the forensic scientists and archaeologists he had probably been very rich and important. Instead of working in the fields like most colonists, this man did office work. Finally, the researchers found almost no ***pollen*** in the man's coffin. This told the researchers he died in the winter, when there is little or no pollen in the air.

What about the strange ***brushite crystals***? The tests told the scientists someone had tried to ***embalm*** the man. After people die, others can use chemicals to keep the body from decaying. But the chemicals used on this man had a strange reaction with his body. Instead of keeping his body safe, it turned the bones in his head and chest into large brushite crystals.

Finally, the ***forensic scientists and archaeologists*** tested the bones from the small coffin.

The baby had been buried *after* the man and the woman. Her tiny bones told scientists she had been only six months old. The child didn't have enough vitamins in her diet. Without enough vitamins and minerals from food, she became very sick. She also had an infection in her skull, which caused the scars on her head. Lastly, the ***pollen*** in her coffin told researchers she had been buried in the spring.

Even before the ***coffins*** were opened, some ***archaeologists*** and ***historians*** were looking through old papers and books. They looked at reports from courts in the 1600s. They looked through old letters. They read history books. They were looking for a name. A *man's* name.

The archaeologists and historians knew the man was the key to the mystery. The child was probably too young to be in any of the court records. And women weren't in many records in the 1600s either. But a man important enough to be buried in a lead coffin would certainly be in court records. Researchers also guessed that the woman buried next to the man was his wife. So if they knew who the man was, they would probably know who the woman was as well.

A ***historian*** named Dr. Lois Carr and others used clues found by the ***forensic scientists and archaeologists.*** After a long search, Dr. Carr found only a few people who fit the other archaeologists' clues.

Dr. Carr created a list of the men who might have been buried in such a way. It included several men's names, the date of their death, and the time of year they had died. It also listed if the men were married, had children, and were Catholic or not. Finally, it showed how much property the men owned.

All the ***researchers*** gathered their clues. They knew both the man and woman were rich because of the expensive ***coffins*** and the foods they ate.

They knew they had to be Catholic, since they were buried under a Catholic ***chapel***. The archaeologists also knew they had been buried between 1667 and 1704. The small chapel had only been open that long before it closed. The ***forensic scientists and archaeologists*** found that the woman had been buried first, the man next, and the child last. Finally, they guessed the man and woman had been married because they were buried next to each other. But the tests on the teeth and bones showed the woman was in her 60s. This was *much* too old to be the mother of the baby.

Dr. Miller, Dr. Riordan, and the others looked at all the clues. Then they looked at Dr. Carr's list of possible men. Their information wasn't perfect. But it was *just* enough. Slowly, they crossed off names, until at last there was only *one* name left.

The only name left on Dr. Carr's list was ***Philip Calvert***.

Philip was the youngest son of the first Lord Baltimore. He had been very rich, owning over 3900 ***acres*** of land. His house was the largest in Maryland. He was also an advisor, judge, and even governor of Maryland. With these jobs, he would not have worked in the fields like the other colonists. And Philip had a wife named Anne. Anne was buried in the fall, about two years before Philip.

The–***researchers*** decided that Philip's story checked out. The Mystery of the Lead Coffins had been solved! Well, almost…

Nobody could figure out who the child in the small ***coffin*** was. The ***forensic scientists and archaeologists*** found that the woman had been buried first, then the man, and the child last. But Anne died two years *before* Philip. And she was in her 60s – much too old to have a baby. So the six-month-old baby *couldn't* have been hers.

Historians said Philip had remarried a woman named Jane Sewall a year before his death. Was the baby Philip and Jane's child? ***Archaeologists*** and historians think so, but nobody can ever be sure. It seemed there were some mysteries the three lead coffins would not tell.

Today, scientists and archaeologists are still studying the ***coffins***. ***Philip Calvert's*** coffin is on display in the museum at St. Mary's City. And a special artist used Anne's skull to make a ***facial reconstruction***. Using a plaster cast of the skull, the artist made a sculpture of what the woman's face may have looked like. The facial reconstruction is on display at the museum, too.

The ***chapel*** where Philip, Anne, and the baby were buried is being rebuilt. When the chapel is completed, all three will be reburied under the chapel where they were found. After 300 years, their mysterious lives and deaths may finally be coming to an end.

The End.