



Dr. Laura Sherrod pushes the GPR control unit through the traditional burial plot during the first geophysical survey at St. Peter's churchyard, June 11, 2019. *Courtesy of Roger D. Thorne.*

Based upon much research on combat burial practices of the British Army in the Crimea and in World War I, and by American armies, both North and South, during our Civil War, I had long believed that, if the St. Peter's legend is factual, any immediate post-combat interments within its churchyard would have relied primarily on mass burial procedures. Despite the overwhelming British victory at Paoli just hours before, and the rout of the American Army, the British patrol ordered to leave its lines to bury their dead (and possibly additional slain Americans) would have made a quick job of it, with little ceremony, and with as little time-consuming digging in the stony soil as possible. The tactical concern of the patrol commander (quite likely a young Lieutenant) was to decently carry out his mission as quickly as possible, and safely return to join the departing British army on its way to Philadelphia. I had said nothing of this to Dr. Sherrod before her survey for fear of skewing her research in any way. But I had long believed that Captain Wolfe, as a serving officer of HM's 40<sup>th</sup> Regiment of Foot, would have assuredly been buried in his own grave, however shallow or non-descript. There is much precedent for individual graves for British **officers and gentlemen**. As for the two British enlisted men (a sergeant from the 71<sup>st</sup> Foot and a private from the 49<sup>th</sup>

Foot as recorded by Mr. McGuire), they would almost certainly have been buried together to save time. And, if indeed the British burial party had been ordered to inter American dead at St. Peter's, those corpses would have been placed together, regardless of rank, in a mass grave ... and somewhat physically removed from their erstwhile enemies. Thus, three separate burial spots are likely: a single grave for the officer; a small mass grave for the two British enlisted men; and a potentially larger mass grave for some number of Americans. Dr. Sherrod's question is therefore very important. Also, it is most unlikely that any military burials from the Revolutionary period were arranged as a series of individual graves laid side by side as in a normal civilian context.

### Results of the First Geophysical Testing

Dr. Sherrod responded immediately: *"I am encouraged to hear that the mass burial might not be just a faulty conjecture on my part ... It's nice when the science matches the suspected history. [At this time] I think the only burial that I can say with any measure of confidence that could be imaged by the data I collected is the mass burial site described."* Then she then went on to describe the higher than average amounts of rainfall our area had received in

the spring of 2019, commenting: “Water [saturation] was helpful for us [in this instance] ... though typically water causes problems with penetration . . . It is possible that the retention of water at the base and sides of the potential ‘mass burial’ allowed us to see it just enough ... to be accentuated by the increase in water content.” In other words, in this first survey we seem to have been lucky.

Dr. Sherrod continued her interpretation of two adjacent burial sites: “The two ‘British’ burial sites are not as distinct in the data, but [in] the single site ... the GPR reflection indicates something smaller than a gorget and wider than a sword ... at the bottom of the potential single burial - which, if we combine the interpretation of the history, and assume that the data is being interpreted appropriately, would be the burial location of the officer.”

Thus, the results from this preliminary survey were both surprising and extremely encouraging. Almost immediately Dr. Sherrod offered to return to St. Peter’s with the full array of geophysical tools available to conduct a comprehensive survey of the potential burial site.

The significant obstacle caused by the iron posts and chain surrounding the “traditional burial site” led Dr. Sherrod and me to consider the efficacy of having these objects temporarily removed. She stated that “if the chain and posts could be removed for the next round of geophysics,

that would be ideal. It’ll make the surveying much easier and could allow for better results with the magnetometer especially.” Whereupon, after receiving parish permission, Mr. Dave Tatum, one of St. Peter’s most trusted volunteers, mustered a team to disconnect the chains and extract the deeply-embedded posts, safely store these objects until all geophysical activities were concluded, and then replace them in their original positions.

### The Second Geophysical Testing

Dr. Sherrod’s second survey was conducted over much of July 15, 2019. As she had stated to me earlier, her return to St. Peter’s would include “trying other methods of data collection at the site and also of expanding the survey area with the GPR unit. I only collected 7 lines of data with the GPR, as that expanded beyond the suspected burial area, and I was very dubious that the geophysics would show anything useful. However, with the potential of the mass burial just outside of the suspected [traditional] burial area, I could [next] perform an expanded GPR survey and possibly a small-scale 3D resistivity survey to see if we can delineate the boundaries of the mass burial, and maybe even come across some additional geophysical clues that could help identify other burial locations. I’d also be interested in seeing whether a magnetometer survey ... might show something useful.”



In order to eliminate the magnetic “noise” created by the six cast iron posts and chains surrounding the traditional burial plot, Dave Tatum expertly removes them in preparation for the second geophysical survey. Once completed, post and chains were replaced as before. *Courtesy of Roger D. Thorne.*

Accompanying Dr. Sherrod on this second survey was one of her students, Mr. Kim Shollenberger, an energetic and extremely capable 36-year veteran of the U.S. Air Force who, upon his retirement, is seeking advanced geophysical training at Kutztown. Again using the GSSI Sir-4000 3D GPR control unit, Mr. Shollenberger began the day by conducting a far more expansive GPR scan than had been done the previous month. 39 GPR profiles were collected over the potential burial area, compared to only seven in June. Each of these profiles was again performed in a line parallel to the 1770 stone wall on the western edge of the churchyard, but this time the lines began one foot from the wall and extended east in 0.5 foot increments to a distance of 20 ft from the wall.



Mr. Kim Shollenberger propels the GPR control unit during the second geophysical survey at St. Peter's, July 15, 2019. *Courtesy of Roger D. Thorne.*

Upon completion of the GPR scans, the second tool used in this survey was a **Geometrics G-858 Cesium Vapor Magnetometer**, designed to locate subsurface ferrous metal, and specifically used at St. Peter's to identify any buttons, gorget, sword and other metal accoutrements which may have been buried with the British officer or others. Starting in a line one foot east of the 1770 west wall, data were collected as the magnetometer passed in one-foot increments in a unidirectional manner to minimize variation, with each line 80 feet in length.

Finally, in the early afternoon of that second survey, a third and final geophysical technique was used called **Resistivity Testing**. Utilizing an **MPT DAS-1 Electrical Impedance Tomography System**, and beginning in a line one meter east of the western stone wall, 32 electrodes were linearly placed into the ground. A sustained electrical charge was then passed through these electrodes, and the resulting data field was recorded. This process was repeated five more times, each in one-meter extensions eastward, up to a final width of six meters (19.69 feet) east from the wall. This profile of three-dimensional images, comprising six interconnected lines of data, would hopefully provide evidence of any changes in electrical properties beneath the ground of the survey site.

Of these three geophysical tools used at St. Peter's, resistivity has benefited the most from advances in digital technology. Dr. Sherrod recalled that, in the early 2000s, though a multi-electrode system (similar to the one she brought to St. Peter's in 2019) was marginally available, the resistivity meter at that time only allowed the measurement of one line at a time, and with only four electrodes (not the 32 used per line at St. Peter's). Furthermore, tremendous improvements in computer processing speeds since then now allow much more data to be analyzed when using resistivity technology, providing greater resolution.

### Results of the Second Geophysical Testing

We had begun this far more technically intense second survey intending to enhance and expand the exciting discoveries found the previous month. Regrettably, the July effort was less dramatic than we hoped. Rather than underscoring the June findings and establishing certitude, the second survey seemed instead to, in some ways, obscure our trail of discovery.

The subsurface in July was less conducive in highlighting potential burial features than in the previous month. The reflections were less distinct, perhaps caused by saturation differences in the soil between the two survey dates. The single burial [the British officer] indicated as a geophysical anomaly interpreted from data during the preliminary survey, was not distinctly visible in the second survey. And yet, ironically, an anomaly with a size and shape which *"could be congruent with a sword buried at shallow depth"* was recorded. The potential small mass burial [of the two British soldiers] had a visible response, but less distinct than during the initial survey.

Likewise, the subsurface anomaly associated with the large mass burial [of American soldiers] was much less distinct in the follow-up survey. A faint trench-like feature was visible across several of the survey passes, but soon became obscured.



Dr. Sherrod gives last-minute instructions to Kim Shollenberger before he commences the first magnetometer survey at St. Peter's churchyard, July 15, 2019. *Courtesy of Roger D. Thorne.*

The magnetometer testing was, quite simply, unhelpful. Even with the removal of the six heavy metal posts and chain surrounding the traditional site in place during the preliminary survey, numerous sources of strong magnetic “noise” from known burials continued to mask any Revolutionary-era targets within the survey area. That said, the temporary removal of those posts and chains was extremely important to rule out that known interference.

Finally, the resistivity testing, on which the geophysics team had such high hopes for illuminating the June GPR survey site, generally provided only shadowy results. Yet, Dr. Sherrod could still report: *“The results of [these] geophysical surveys, [though] inconclusive, ... do indicate possible locations where soldiers, both American and British, could have been buried...[and that] both the GPR and resistivity results show an anomalous feature along a portion of the survey area that could be interpreted as a mass burial.”*

But it was with some disappointment that Dr. Sherrod concluded her second survey report: *“Although two geophysical survey methods show anomalous features that correlate well with each other, and that could be interpreted*

*as a mass burial, the only way to ascertain **with certainty** the source of those anomalies is to excavate at that location.”* Dr. Sherrod well knew that this ancient churchyard is hallowed ground, and that no physical examination will be permitted. Yet as a good scientist, she stated the only option to obtain certitude, however impossible to execute.



Looking north towards the historic church, a segment of the resistivity electrodes comprising one of six lines are shown in this compressed image. *Courtesy of Roger D. Thorne.*