C2 Richard III: Wounds and Weapons

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The goal of this presentation is to demonstrate how modern forensic techniques used for tool mark analysis can be applied in determining how injuries were sustained to a 500-year-old skeleton; and will combine techniques from forensic engineering science, forensic pathology, and archaeology to understand the wounds and weapons used to cause the injuries found on the King's skeleton. Additionally, discussion will involve the metallurgy of medieval armor and its ability to resist the penetration of arrows. A series of tests have been conducted on steels with differing carbon contents and heat treatments to understand the relationship between steel microstructure and the penetration ability of bodkin arrows that were used in medieval longbows.

This presentation will impact the forensic science community and be especially relevant to forensic engineers, pathologists, anthropologists, and all others who have an interest in tool mark analysis and the relationship between tool marks and weapons.

Richard III was King of England between 1483 and 1485. He is perhaps best known today by the characterization presented by Shakespeare in Richard III — a stunted humpback with a scheming, vicious persona.

In 1485, King Richard III rode out from Leicester with his army to fight against Henry Tudor, latterly King Henry VI of England. The battle was fought at Bosworth Field around 20 miles from Leicester. By the standards of the time, Bosworth was a short battle lasting only around two hours. The battle reached its end when Richard III was killed.

Of all the monarchs of England since 839, Richard III was the only one whose final resting place was unknown. One legend had it that his body had been thrown into the river Soar and was lost forever. Other tales told of a church ruin with a plaque on a column claiming to mark his grave.

In 2012, the University of Leicester was given permission by Leicester City Council to excavate a site — a council car park — that, from scrutiny of ancient maps, could well be the site of the Greyfriars church where Richard may have been interred. It is not usual archaeological practice for a dig to be initiated to look for the remains of an individual.

Despite limited funding and over 500 years of lost records, the very first trench dug in the car park exposed a skeleton. Two further trenches revealed the outline of the ancient church and confirmed that the skeleton was buried in the choir of the church, a mark of high status. Moreoever, the skeleton showed pronounced scoliosis, a curvature of the spine.

Carbon dating showed that the skeleton was of the correct age to be Richard III. Mitochondrial DNA testing on his descendants proved beyond reasonable doubt that the skeleton was indeed that of Richard III. The results of the find were announced by the University of Leicester to worldwide media coverage in February 2013. In the United States, this is often referred to as "the find of the King in the car ark."

The penetration of armor by arrows was an important part of the development of plate armor. The metallurgy and microstructure of the armors that were produced in the late medieval period were highly variable with a range of microstructures and differing hardnesses. A series of experiments have been conducted using plate steel with differing carbon contents and different heat treatments to better understand how armor penetration was related to the underlying microstructure. High-speed video has been used to image the penetration mechanisms. This presentation will discuss how weapons and armor are related to conclusions about the way in which Richard III was killed.

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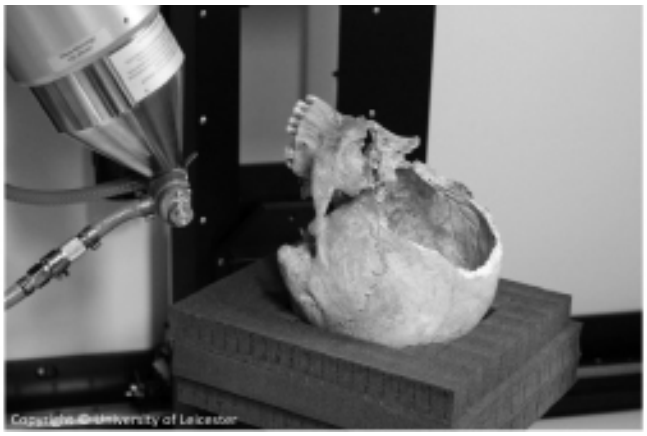

Figure 1: The skull of Richard III mounted in the micro-computed X-Ray tomography scanner.

Richard III, Micro-Computed Tomography, Arrow Penetration

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