Crime Scene Investigation: Can maths tell what happened?

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The next Miss Marple or Sherlock Holmes could well be a mathematician, suggest researchers speaking at the British Association Festival of Science in Dublin today.
Mathematics is playing such an increasingly important role in crime scene investigations, helping forensic scientists work out a range of problems including the trajectories of bullets, fingerprint recognition and the speed of moving vehicles, that an understanding of the subject could be key for the next great detective.

Describing the mathematical techniques used in investigating everything from tracing the culprit in water pollution to what or who killed Tutankhamen, Professor Chris Budd from the University of Bath suggests that mathematics has a key role to play in modern-day crime detection.

“Mathematics is important and highly relevant to crime fighting in particular, and to many other real life problems in general,” said Professor Budd.

“It won’t solve every problem, but mathematics is a particularly useful tool in the set of techniques used in the forensic service.”

In an attempt to resolve an ancient murder mystery, X-ray analyses of Tutankhamen’s mummified body in the 1960s had proved inconclusive. It was only through a recent investigation using CAT scanning technology that scientists could work out that the Egyptian king probably

died of an infection following a broken leg.

CAT scans allow scientists to build a 3D image from x-rays using a mathematical formula discovered by Johann Radon in 1917. Without mathematics the CAT scanner would not work, nor would any other method of medical imaging. However, whilst the engineers who built the first CAT scan machine in 1972 received a Nobel Prize, Radon got nothing.

Mathematicians are now using the same approach, only in reverse, to work out the position of landmines from a photograph of an area of land. By looking for clues hidden in the photograph, the formula can help pin point the likely location of land mines and trip wires.

“People often ask the question, ‘what is the use of maths?’ The answer is that it plays such an important role in almost every aspect of our lives, we just don’t often notice it’s there,” said Professor Budd who is also President of the Mathematics Section at the British Association and Chair of Mathematics at the Royal Institution.

“Many of the mathematical techniques used by forensic scientists are similar to those used in medical imaging for brain tumours, oil prospecting and remote sensing by satellites.

“It is remarkable how often ideas which might be thought of as pure mathematics often find very real and important applications.”

Source: University of Bath