



Questioned Documents Section - 2015

J16 Collaborative Radiography (and Other Interdisciplinary Activities) Between Document Analysts and Forensic Anthropologists at the FBI Laboratory

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After attending this presentation, attendees will understand some of the myriad uses of radiography in forensic science, including ways the same technology can be used for different forensic applications within a laboratory.

This presentation will impact the forensic science community by highlighting ways in which different forensic disciplines (specifically, questioned documents and anthropology) can work together to achieve results.

Since the discovery of X-rays in 1895, radiography has become a routine means of non-invasive examination of internal structures and composition of various objects and materials. Wilhelm Conrad Roentgen, who first discovered X-rays, further discovered that X-rays would penetrate most solid matter, but leave shadows of denser materials including bones and metal. Radiography first became widely used in medicine and dentistry, but other industrial uses followed in the early 1900s. Radiography is currently used in various industries including engineering, automobile safety, and food safety, among others. Of particular interest is the fact that radiography is also widely utilized in a variety of forensic science applications. Although often associated with medical imaging and diagnostics of human bodies by forensic radiologists and pathologists, radiography has many other forensic uses. Forensic anthropologists commonly use radiography in the examination of skeletal remains. Radiography is also used in forensic metallurgical examinations to reveal interior construction or the presence of defects, cavities, or foreign material within an object. It can be used to examine the internal components of explosive devices and to reveal the contents of envelopes, bags, and packages without having to physically open them.

In the interest of fiscal responsibility, equipment-sharing between various units at the Federal Bureau of Investigation (FBI) Laboratory is encouraged when possible. One seemingly unlikely, but ultimately highly successful, partnership recently developed between the Questioned Documents Unit and the Forensic Anthropology Program due to their shared forensic radiography needs. Radiography is used in the FBI Laboratory for document examination to view watermarks, detect concealed communications, view/confirm identity document security features, or determine whether collectors' items such as autographed baseballs have markings or construction details that support or refute their authenticity. In anthropological examinations, radiography is used to detect and locate foreign materials such as bullets and dental restorations, to assess skeletal trauma, and to estimate biological parameters such as sex and age. While many radiography units may be best suited to a specific medium of study, one system was found to serve both units very effectively. The system is a cabinet-style, self-contained unit constructed on a mobile platform. It utilizes a high-resolution X-ray source with an energy range of 10-130Kv, with available detector sizes ranging from 2"x2" to 17"x17". User-friendly touch-screen controls allow for post-processing enhancements such as contrast adjustments that allow examiners to further exploit areas of interest. Being a self-contained and self-shielded unit, no additional shielding (either in the location of use or for personnel operating the machine) is required. Digital radiographic images can be easily saved in a variety of formats.

This presentation will provide a pictographic overview of various uses of this radiography technology in the FBI laboratory. In addition, other previous and potential collaborations between document analysts and anthropologists within the FBI Laboratory will be discussed.

Forensic Radiography, Questioned Documents, Anthropology