



### **B116 Dr. Edmond Locard and Trace Evidence Analysis in Criminalistics in the Early 1900s: How Forensic Sciences Revolve Around Trace Evidence**

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After attending this presentation, attendees will understand that proper cognitive process that are applied to trace evidence analysis, that forensic sciences revolve around the trace evidence itself and not the analytical instruments used to analyzed it, and finally, some of Dr. Locard's work.

This presentation will impact the forensic community by demonstrating that forensic scientists will be able to apply the proper cognitive process to the approach to trace evidence analysis, and that forensic sciences revolve around the trace evidence itself.

This presentation will introduce the original criminalistics developed by Dr. Edmond Locard in the early 1900s. The writings of Dr. Locard were revolutionary, and they constitute the strong base from which modern forensic sciences evolved through science and technological advances. In the midst of this evolution, however, it is sometimes forgotten that trace evidence is the real subject of interest in forensic sciences.

Today, it seems that a crime laboratory cannot perform any work without the use of a gas chromatograph-mass spectrometer (GC-MS), a Fourier Transform Infrared Spectrometer (FTIR), and Capillary Electrophoresis (CE). While this holds true for some particular aspects of forensic sciences, the absence of such instruments does not prevent the criminalist from, first, properly collecting trace evidence at crime scenes and, second, analyzing a great number of traces.

Dr. Locard was the pioneer of modern criminalistics, though he did not have the modern instrumentation that is available in crime laboratories in the twenty-first century. Nevertheless, his work was not necessarily less reliable than that done today because he was cognizant of the significance of his work and its limitations. However, he describes many different traces that were observed and collected from crime scenes such as prints from fingers, nails, lips, faces, feet, and teeth. He also describes the observations of stains, such as grease, candle, mucus, feces, blood, semen, rust, food, etc. The diversity of his observations is incredible and it encompasses many potential traces that are not necessarily taken into account today.

Forensic sciences should not revolve around the instrumentation used to perform trace analysis, but around the trace evidence itself. This is a very important concept that is emphasized throughout Dr. Locard's writings that seems to be sometimes disregarded in our modern times. Dr. Locard's method of reasoning is probably the most important concept in forensic sciences, and the general process of trace evidence analysis should include the following questions in this order:

- What is the trace?
- What is its composition and characteristics?
- How can this trace be linked to its origin or to another trace (or what are the pertinent characteristics that will be used for the comparison process)?
- How can that be accomplished (or what instrumentation/ technique is needed to analyze these characteristics)?

This cognitive process emphasizes the trace evidence and not the techniques used to analyze it. It ensures that the criminalist understands the importance of what is analyzed and, therefore, it establishes a proper base for the interpretation of the results. Without having a clue about the significance of the characteristics analyzed the forensic scientist cannot properly interpret the results of the analyses, and therefore cannot reach accurate conclusions. The development of many new analytical techniques seems to have led scientists away from the significance of the trace evidence itself. It is not uncommon to see scientists trying to analyze certain trace evidence with a GC-MS or an FTIR just because there is one available in the laboratory, without really thinking of the pertinence of the characteristics analyzed. This can be avoided by asking the right questions first.

#### **Dr. Edmond Locard, Criminalistics, Trace Evidence Analysis**