



Questioned Documents Section – 2010

J27 When Good Science Goes Bad - the Good, the Bad, and the Ugly

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The goal of this presentation is to communicate a clear understanding of scientific method and its central role in forensic scientific disciplines.

This presentation will impact the forensic science community by challenging the forensic scientific and legal community to pay closer attention to the methods employed by forensic scientists - not simply focus on the results obtained.

Good science has always been relatively easy to distinguish from bad science – good science is what I do and bad science is what YOU do. Easy – a non-issue! Lawyers perpetuate this *ad hominum* view in forensic contexts: good science is what the expert for MY SIDE does; bad science is what that PSEUDO-EXPERT for YOUR SIDE does. Attack the scientist, ignore the science. We have all been there.

However, such overly dramatic pugilistic approaches to the distinction between good scientific practice and bad scientific practice beg the essential question at issue: what MAKES any scientific practice a good one? And how do we tell the difference between good science and bad science?

In real science, testing eventually leads the scientific community to accept the conclusions that withstand assault and discard those that crumble under critical scrutiny. Real science, then, appears to be identified best by its methods rather than through a body of accepted theories, or the say-so of an educationally ordained priesthood of "legitimate practitioners." But just what are the methods of real science practiced by the so-called scientific community?

"Real natural science" is often methodologically cast as involving orderly and controlled procedures, pristine uncontaminated samples, and general, widely accepted covering laws and theories. From this combination of methodological and sample purity, apparently come reliable predictions, general in nature, confirmable by independent tests.

As an apparent anathema, forensic science is portrayed as using disorderly, uncontrolled procedures, contaminated samples, and specifically designed rules-of-thumb that are neither well accepted, nor general enough to apply outside the specific problem under investigation. Results from this alleged hodgepodge of nonstandard procedures are thought to be unreliable, individual conjectures, unconfirmable by reputable independent testing.

To examine this methodological charge against forensic science, let's consider the relevant individualizing practice of a natural science held by many to be the paradigm of a "real science" – physics. Relevant methods in physics will be compared with three case examples involving the difficult area of pattern evidence assessment.

To this end, cases involving footwear impressions are considered (the Ugly), cartridge case comparisons (the Bad), and pattern injury & bloodstain patterns (the Good). From these examples, we learn that the specialty areas (footwear, tool marks, and bloodstain pattern analysis) have *nothing to do with* what makes for the GOOD, THE BAD, or The UGLY. Instead, through a better understanding of scientific practices involved in the applications of natural science in each case, a distinction between good scientific practice and bad scientific practice, in turn based upon a better understanding of scientific methods, will emerge. **Scientific Method, Science vs. Pseudoscience, Method and Technique**