

Precision Without Accuracy in the Cruel World of Crime Scene Work

by **D. H. Garrison, Jr.**

Forensic Services Unit
Grand Rapids Police Department
Grand Rapids, Michigan

[Originally published in the Midwestern Association of Forensic Scientists Newsletter, April 1994.]

"Insanity is often the logic of an accurate mind overtaxed." - Oliver Wendell Holmes

Recently I was examining a crime scene diagram on which the dimension "99 feet 11.42 inches" appeared for the size of a parking lot. Now, I immediately realized that this was a computer-generated sketch (probably CompuScene, CompuSketch, or one of the computer-aided design programs), but it occurred to me that the crime scene technician who had made the sketch should have a tough time selling it to a jury of mere human beings. The poor computer simply didn't know any better. The crime scene technician had fallen victim to the plague of Precision Without Accuracy, a malaise common to non-scientists, computer weenies, and used car salesmen.

The terms accuracy and precision are often used synonymously, to mean exactness or freedom from error. Accuracy is the degree of exactness actually possessed by an approximation or measurement. Precision is the degree of exactness with which a quantity is expressed. It is possible to have precision without accuracy, as computers are wont to do. It is also possible to be accurate without being precise, which is actually the lesser of the two evils.

The aforementioned 99' 11.42" parking lot was of course the garbage-output of a computer that had not been reigned in to some significant figures. The fact that such a dimension appeared in the final version of the crime scene sketch meant that the technician had not realized that expressing exactness (precision) without possessing exactness (accuracy) produces impressively useless numbers. Such numbers are usually only practicable for engineers-talking-to-other-engineers and computers-interfacing-with-other-computers. While hundredths of an inch, microns, and nanometers are often of use in science and engineering, they are seldom of value on an exterior crime scene sketch. We are trying to make a fair and accurate representation of a crime scene, not build a new parking lot. The used car salesman quotes a price of "\$16,999.95" to mean 17 grand; it may be precise, but it is neither accurate, nor particularly useful.

We should not surrender to the idea that 99' 11.42" is better than saying "approximately 100 feet," nor should we be the least bit impressed or overwhelmed by people who quote such numbers solely for the sake of exactness. Such a person, hounding the rest of us from his overly tidy office, is aptly described by the word "precisionist." Many people are awed by this type of individual and his "number crunching." Sometimes, juries are wrongly seduced by precisionistic witnesses. Instead, the jurors should be asking themselves: What kind of crime scene ruler distinguishes 42 one-hundredths of an inch from 43? And should we even care?

If the precisionist is so overly concerned with the 58/100ths of an inch missing from the 100-foot parking lot, maybe we should examine the rest of his work for an over-reliance on silly and inconsequential things. Maybe his tape measure was cold and tight, or wet and loose, or worn and stretched; maybe the parking lot was really

101 feet. Maybe it was 99' 11.429" and he carelessly overlooked those extra nine one-thousandths. Maybe he weighs grams of cocaine on a truck scale. Maybe, in his efforts to wow the jury with his fastidiousness, he overlooked something un- fastidious like a bullet hole or bloodstain. Look at it this way; if he missed a whole foot in the 100-foot parking lot, he would only have a one percent error. But this guy has somehow figured out that 58/120,000ths of the parking lot are missing. Precision without accuracy should always be suspect, a red flag to the trier-of-fact.

The other problem here, besides the hoodwinking of juries, is that the precisionist's product constitutes a waste of court reporter's tape, report papers, work hours, telephone time, computer disk space, and general wear & tear on the brains of mere human beings who have to stop and mentally translate overly precise figures like 99' 11.42" into a meaningful number like 100 feet. This is not to say that hundredths don't have their place in the world; of course, they do. Where do you think gun calibers come from? Or nickels, dimes, and pennies? Or parts- per-billion tests for toxins? Precision has its place, obviously! Even on crime scene sketches, the very accurate measurement of a bullet hole height or angle is certainly appropriate. For parking lots, however, the nearest inch will usually suffice. Workable decimals that are the product of good crime scene processing, not just the inadvertent discharge of a fraction-ejaculating computer, are certainly necessary. The key is to recognize the difference.

NOTES

1. THE INTERNATIONAL DICTIONARY OF APPLIED MATHEMATICS, W.F. Freiberger, ed., Van Nostrand: Princeton, NJ, 1960.

2. Fox, R.H. and Cunningham, C.L., CRIME SCENE SEARCH AND PHYSICAL EVIDENCE HANDBOOK, U.S. Gov. Printing Office: Washington, D.C., 1973.

3. Baker, J.S., TRAFFIC ACCIDENT INVESTIGATION MANUAL, Northwestern University: Evanston, Illinois, 1975.

Send questions or comments about this essay to:

Dean H. Garrison, Jr., Gunhand@aol.com

- [Science Ethics Home Page](#)
 - [Virginia Tech Chemistry Department Home Page](#)
-

[Brian Tissue](#) maintains this hypermedia page in the Chemistry Department at Virginia Tech.

Version: 1.1, last updated: 12/18/1996