Evidence: New Horizons in Scientific Evidence

Edwin Conrad
COMMENTARY

NEW HORIZONS IN SCIENTIFIC EVIDENCE

Edwin Conrad*

THE QUEST OF DIogenes

The ghost of Diogenes, with lantern in hand and searching for the honest man, is still stalking across this land of ours. Times have changed but the quest for truth is still with us. The lantern of Diogenes has been replaced in many cases by modern scientific techniques of crime detection. But the answer to Pontius Pilate’s question to Jesus some 2,000 years ago, “What is truth?” is still being sought in our halls of justice. The forensic scientist has made great progress in his search for truth, but it may be that such a goal may never be really attained until we are able to probe and read the innermost recesses of man’s mind.

During my studies, I have discovered two principles of proof which may be succinctly stated as follows:

(1) Truth is like an iceberg—most of it is submerged. Priestly.
(2) Truth is a sleeping dog—let it lie! Conrad.

THE MYTH OF FRYE

In 1923 the United States Court of Appeals in the celebrated case of Frye v. United States1 set up the polestar guiding the forensic scientist:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while the courts will go a long way in admitting expert testimony deduced from a well recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.2

Lawyers and scientists have accepted this principle of scientific proof and the courts have solemnly restated this test many times. While the principle had some merit in rendering the results of lie detector or polygraph tests inadmissible, the quoted rule was antiquated on the day of its pronouncement. Under the principle of the Frye case, no scientist could testify that an atom could be split, that atomic fission was

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1 293 F. 1013 (D.C. 1923).
2 Id. at 1014.
useful or that Man could implant his footsteps on the moon. The artificial and already obsolete principle established by the Frye case, requiring general scientific acceptance of the instrumentality of proof in the particular field in which it belongs, stood unchallenged, despite the fact that it was in direct contradiction to liberal rules of admissibility of expert testimony. However, late in 1958, a California intermediate appellate court relaxed the requirements set forth in Frye. In ruling that the results of the Nalline test were admissable to prove a state of drug addiction, the court observed:

Each of the People's experts did admit on cross-examination that the medical profession generally is unfamiliar with the use of Nalline and, therefore, it cannot be truthfully said that the Nalline test has met with general acceptance by the medical profession as a whole, general acceptance being at present limited to those few who deal in the narcotic problem.

Should this fact render the testimony inadmissable? We believe not. All of the medical testimony points to the reliability of the test. It has been generally accepted by those who would be expected to be familiar with its use. In this age of specialization, more should not be required.3


THE COPPOLINO CRITERION

Frye and Williams were steps in the development of a system of admissibility of scientific evidence. The next step was supplied by a Florida District Court of Appeals in Coppolino v. State.4 The case involved the use of complex, lengthy and impressive scientific and medical testimony, both by the prosecution and the defense, as to the cause of death of Carmela Coppolino, whose body was exhumed four months after her death. Her husband was later charged with her murder.

The prosecution pathologist testified that the deceased was in good health at the time of her death, and at the conclusion of the autopsy after the exhumation of her body he was not able to determine the cause of death, although he found no natural cause. He did find a needle injection track in the left buttock. Following the autopsy, he turned over certain portions of the body tissue to the prosecution toxicologist. It was suspected that Mrs. Coppolino had died from a dose of succinylcholine chloride, a drug which decomposes rapidly and it was therefore opined by medical and scientific experts that it was impossible to detect in the human body. The prosecution toxicologist, however, discovered the means of identifying a component part of the drug. Accordingly, he testified to a reasonable scientific certainty that the decedent had received a toxic amount of succinylcholine chloride. The state's pathol-

4 Coppolino v. State, 223 So. 2d 68 (Fla. App. 1968), Appeal dismissed without opinion by the Florida Supreme Court, 234 So. 2d 120 (Fla. 1969), 399 U.S. 927 (1970).

5 Id. at 74-75.
ogist, basing his opinion on his own negative autopsy and upon the positive findings of the toxicologist, concluded to a reasonable medical certainty that the decedent died from an overdose of the drug. The court admitted the evidence, over objections that the tests on which the testimony of the toxicologist was based were still in an experimental stage and did not meet the scientific reliability standard of Frye. A new test for the admission of scientific evidence was recognized by the Florida Court of Appeals and was stated in the concurring opinion of Judge Mann:

The tests by which the medical examiner sought to determine whether death was caused by succinylcholine chloride were novel and devised specifically for this case. This does not render the evidence inadmissible. Society need not tolerate homicide until there develops a body of medical literature about some particular lethal agent.6

William and Coppolino demonstrate that courts recognize that the progress of science demands a new approach to the admissibility of scientific evidence.

IDENTIFICATION BY NEUTRON ACTIVATION ANALYSIS

It has now been established that substances and materials may be identified by neutron activation analysis, a process developed by Dr. Robert E. Jervis. The material to be analyzed is made radioactive so that it emits radiation in the form of gamma rays. This radioactive sample is then exposed to a scintillation crystal. Every time a gamma ray interacts with the crystal, it emits a flash of light, which is then converted to an electrical pulse the voltage of which is proportional to the energy of the gamma rays. An electrical device then sorts the electrical impulses into energy groups and adds up the pulses in each group, and projects them graphically on an oscilloscope screen. A comparison may then be made among two or more substances by examining the kind of quantity of electrical impulses found in each substance.

The admissibility of expert testimony using neutron activation analysis to identify human hair was considered by the New Hampshire Supreme Court in State v. Coolidge.8 The material examined was pubic hair from the defendant found on the victim. The trial court excluded real evidence of the hair identification based on neutron activation analysis because it was not made in accordance with the procedure established by Dr. Jervis, and, therefore, was not acceptable to scientists in the field.

6 Id. at 75.
However, the State's experts, using neutron activation analysis, identified particles obtained from the homicide victim and from the accused and testified that they had elements in common in such abundance as to establish a common origin or source. To arrive at their conclusion, the experts used forty sets of particles at the beginning of the neutron activation analysis study and four sets were eventually used for neutron activation based upon their similarity of appearance under a microscope. Defendant's objections to such evidence took the following form:

1. The neutron activation analysis test is not generally accepted in the scientific profession.
2. The technique used was not followed generally by the profession.

The New Hampshire Supreme Court ruled this expert testimony admissible because Dr. Jervis' own procedures were followed, even though Dr. Jervis testified that he would have subjected the particles to longer periods of radiation. The philosophy of the court is founded upon the teaching of Williams. The court apparently was unaware of Coppolino. It should be noted, however, that there was other evidence connecting the defendant with the crime.  

**CONCLUSION**

From 1923 until 1958 scientific evidence was placed in the rigid straightjacket of Frye, which required a scientific test to be generally accepted by the scientific community. Williams and Coolidge recognized the specialized nature of science and accepted scientific evidence known only by a few specialists in the field. Coppolino adopted a more liberal position: the novelty of tests in the scientific field does not necessarily render them invalid if they are authenticated by their discoverer; "society need not tolerate a homicide until science develops a body of literature about some particular lethal agent." Hopefully, this reasoning will aid in the adoption of a system of evidence that changes as research finds reason for change. Perhaps, we can then more adequately answer the question, "What is truth?"

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