

# Misconceptions About Fire Investigation

By Carter D. Roberts

Since the very name of this series of articles hints at the fact that I will be challenging some long established fire investigation concepts, I feel that in this first article I should explain my purpose and motivation behind the articles. I would, of course, like to claim insight, brilliance, even genius; however, I cannot. I have been forced into certain conclusions simply from attempting in court to defend theories which the evidence does not support. Recently, many people in fire investigation have contributed to positive changes in our profession, but the fact of the matter is that investigative techniques change with glacier-like slowness.



Once the scientific method was introduced into medicine, the conclusion that bleeding the sick was usually more harmful than helpful became obvious. It is also inescapable that valid scientific research methods must be applied to fire investigation.

If history were to be divided into two different time periods, one could easily make a separation in the 17<sup>th</sup> Century when Francis Bacon introduced the scientific method. Before the scientific method of observation, deduction, and induction was applied, doctors normally worked from barbershops and commonly bled the sick. Doctors bled the sick not because they were stupid but because it was as easy for them to argue logically for bleeding people as it was to argue against it. Neither argument was confused by any facts based upon research or the scientific method.

Once the scientific method was introduced into medicine, the conclusion that bleeding the sick was usually more harmful than helpful became obvious. The application of the scientific method made it inevitable that sooner or later hearts would be transplanted, there would be a cure for polio, and in the future people would live much longer lives. It is also inescapable that we must apply valid scientific methods to fire investigation. Before this process can be effective, we must first argue either for or against processes similar to those the doctors were using when they were using blood sucking leeches and working out of a barbershop.

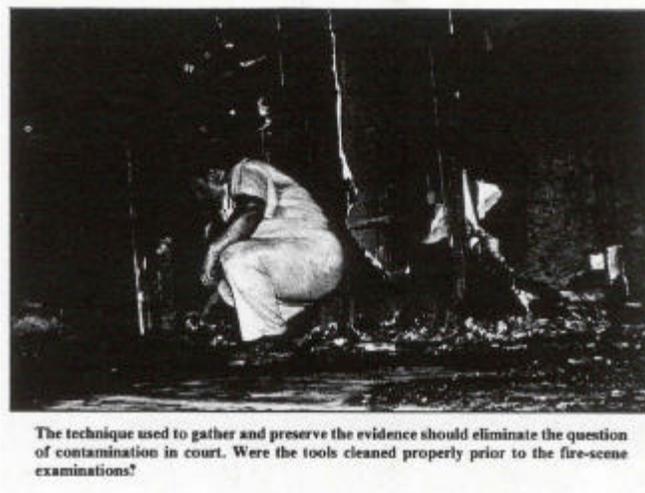
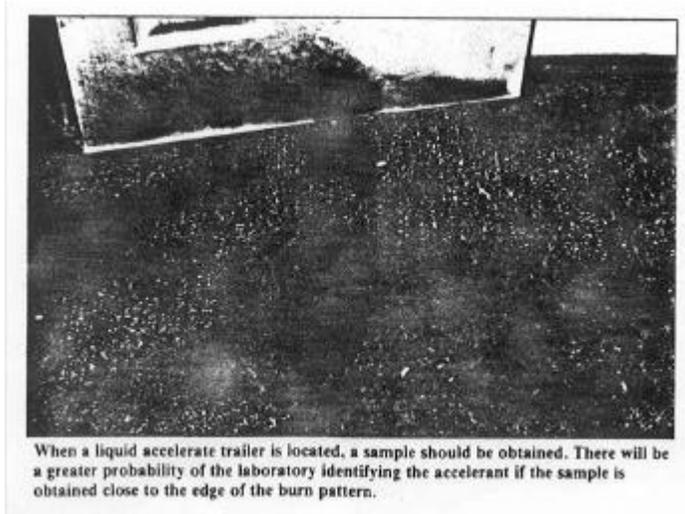
There are people in the fire investigation industry who try very hard to interpret fires accurately simply because their livelihoods depend upon their success. But like doctors prior to the scientific method their attempts are often ineffective because of the use of subjective methods. The poorly trained Investigator often does not apply any scientific principles to arrive at his conclusion as to the origin and cause of fires; and therefore, often times the judgment has all the validity of a 17<sup>th</sup> Century doctor's. The investigator is often articulate. He is systematic, his decisions can be defended in all ways expect with an abundance of evidence obtained by scientific methods.

I hope in these articles to offer better investigative methods and to rely more upon scientific research than upon subjective reasoning in fire investigation. I do not claim to be the Francis Bacon of fire investigation. I have, however, had the unique opportunity to have conducted a large number of fire investigations, to have reviewed a large number of investigation reports, and to have worked with attorneys who insist upon strong facts that can be presented with credibility in a courtroom. And I do know that accurate conclusions can be drawn from evidence only by using the scientific method of observation, deduction, and induction. It is with this object in mind that I offer the following series of articles.

### Part I / Hydrocarbons

A hydrocarbon is by definition any compound that contains only the elements of hydrogen and carbon. Coal tar, natural gas, and rubber are examples of hydrocarbons. Gasoline and lighter fluid are also hydrocarbons and in addition are highly flammable. Because flammable and combustible compounds are often used as

accelerants in deliberately – set fires, and important step in any investigation into fire origin and cause is the locating of hydrocarbons that might be present. Investigators may use many different aides to detect hydrocarbons, and these may range from the human nose to elaborate mechanical sniffing devices.



Once a suspected hydrocarbon is located, the Investigator usually takes one or more samples and submits them to a laboratory for analysis. (Usually samples are pulled when the Investigator is suspicious of arson, although I have seen occasions when a sample was

obtained simply to show that no combustible or flammable liquids were present). If the laboratory analysis confirms the presence of a flammable or combustible substance, many Investigators make the mistake of assuming that their investigation as to the fire cause has ended; and they are free to draw conclusions.

Unfortunately, the conclusion often is, "Since there was a flammable liquid present, it must have been arson." Before any such conclusion can be reached and, more importantly, supported in court, there are a number of questions that must be answered and may involve additional investigation.



Most laboratories prefer that the investigator submit the sample in a new, unlined, one-gallon paint container.

The first question is: Was there a logical explanation for the presence of the accelerant? Hydrocarbons are widely used in industry as fuels, lubricants, solvents, plastics, synthetic rubbers, etc.; and many of these are quite combustible. Since hydrocarbons are so common, it would not be unusual for them to be found in almost any structure. Cleaning solutions in a kitchen cabinet could contain flammable hydrocarbons. A recent visit from an exterminator could have innocently introduced an accelerant anywhere in a structure. Gasoline stored in a garage is so common as to be expected.

The second question is: Could the hydrocarbon accelerant have been washed in from a different location during suppression? Perhaps the gasoline mentioned above was found in a bedroom. This fact alone would not confirm arson if the bedroom was next to the garage.

The next question the Investigator must ask is: Would the technique used to gather and preserve the evidence eliminate the question of contamination in court? For example, were the tools properly cleaned prior to the fire scene examination?

The final question is: Was the laboratory analysis itself accurate? Tests are not infallible and neither are chemists.

The presence of a hydrocarbon alone is not sufficient evidence for an Investigator to make a determination of arson. It usually takes several facts to support a theory of arson and especially to prove it in court. An Investigator's job has not ended if all he has is the presence of a hydrocarbon to bring to court. It would be embarrassing indeed for the Investigator to base a conclusion of arson strictly upon the fact that an accelerant was found in the fire scene and to learn later, in the courtroom, that the occupant could easily prove a logical and acceptable reason for its location.